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**PERSUASIVE HOPE THEORY AND HOPE APPEALS
IN MESSAGES ABOUT CLIMATE CHANGE MITIGATION
AND SEASONAL INFLUENZA PREVENTION**

A Dissertation in

Communication Arts and Sciences

by

Amy Elaine Chadwick

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The dissertation of Amy Elaine Chadwick was reviewed and approved* by the following:

Roxanne L. Parrott
Distinguished Professor of Communication Arts and Sciences and Health Policy and
Administration
Dissertation Adviser
Chair of Committee

Michael L. Hecht
Distinguished Professor of Communication Arts and Sciences and Crime, Law, and Justice

J. Michael Hogan
Professor of Communication Arts and Sciences

Brenton M. Yarnal
Professor of Geography

Thomas W. Benson
Professor of Communication Arts and Sciences
Head of the Department of Communication Arts and Sciences

*Signatures are on file in the Graduate School.

ABSTRACT

Climate change is an important challenge that has numerous implications for our health and well-being. Communicators have many significant roles to play in addressing this challenge. One role is to use persuasive communication to change or reinforce the public's attitudes, beliefs, and behaviors to support climate protection. Messages designed to evoke hope have the potential to be an effective strategy for influencing behavior and behavioral antecedents related to climate protection. A review of extant literature indicated that no theories existed to elucidate the role of hope in persuasion or to guide the development of hope appeals. Therefore, I developed persuasive hope theory (PHT) based on appraisal theory, a discrete model of emotions, and message design theories. PHT defines hope as a discrete emotion that involves appraisals of a future or unknown event as important, goal congruent, consistent with a better future, and possible. The theory also advances a framework of hope appeals as messages that induce hope by presenting an opportunity and that identifies ways to take advantage of the opportunity. I conducted qualitative and quantitative formative research to guide the development of hope appeal messages based on PHT. The messages focused on climate protection and, for comparison, seasonal influenza prevention. I used these messages to test PHT via two quasi-experimental studies. These studies examined relationships between subjective feelings of hope and appraisals, explored relationships between subjective feelings of hope and behavioral antecedents, assessed the effects of hope appeals, and identified individual characteristics that affect the above relationships and effects. The behavioral antecedents included self-efficacy, response efficacy, attitudes toward the recommended behaviors, and behavior intentions. The individual characteristics included perceived susceptibility, perceived severity, subjective knowledge, and environmental identity. The findings from the empirical studies predominantly support the relationships predicted by persuasive hope theory. Most significantly, the findings indicate that communicators *can* design messages that create hope and that increase appraisals of importance, goal congruence, future expectation, and possibility. These appraisals and feelings of hope both have implications for antecedents to behavior. Thus, this research offers several theoretical as well as practical implications for communication and persuasion scholarship and practice.

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ACRONYMS

ANCOVA = Analysis of covariance

ANOVA = Analysis of variance

CFI = Comparative fit index

EFA = Exploratory factor analysis

IPCC = Intergovernmental Panel on Climate Change

IRB = Institutional review board

KMO = Kaiser, Meyer, Olkin measure of sampling adequacy

MANCOVA = Multivariate analysis of covariance

MANOVA = Multivariate analysis of variance

PHT = Persuasive hope theory

PSA = Public service announcement

RMSEA = Root mean square error of approximation

SRMR = Standardized root mean square residual

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Amy 

CHAPTER ONE:

REVIEW OF LITERATURE

Climate change is an important challenge facing us that has numerous implications for our health and well-being. Communicators have many significant roles to play in addressing this challenge, one of which is to use persuasive communication to change, or reinforce, the public's attitudes, beliefs, and behaviors to support climate protection. Climate change communication is nascent and, until recently, little about climate change had been communicated to the public. Much of the communication about climate change to the public relies on message strategies that evoke negative emotions. I propose that an alternative strategy for communicating about climate change is to appeal to positive emotions, such as hope, to encourage behavior change. To effectively use hope and hope appeals in climate change communication, communication scientists must first conceptualize and operationalize hope and hope appeals in persuasive contexts.

The purpose of this dissertation is twofold. First, I seek to enhance previous research on the role of emotions in persuasion and offer new insights by conceptualizing and operationalizing hope and hope appeals in a persuasive context. Second, I seek to empirically test the role of hope and hope appeals in persuasion by (a) examining relationships between subjective feelings of hope and appraisals, (b) exploring relationships between subjective feelings of hope and behavioral antecedents, (c) assessing the effects of hope appeals, and (d) identifying individual characteristics that affect the above relationships and effects.

In this chapter, I first provide a description of current and future climate change impacts that make climate change an important challenge for communicators to address. Next, I examine message strategies used in climate change communication and examples of communication using

these strategies. Third, I propose the use of message strategies that evoke hope as an alternative to the current message strategies and demonstrate the need for a theory of persuasive hope. Fourth, I distinguish hope from other related constructs. Finally, I examine existing models of hope to determine their utility in guiding climate change communication.

Climate Change Impacts

Climate change, which includes but is not limited to global warming, is rapidly becoming one of the most pressing issues of the twenty-first century. Climate change consists of differences in the atmosphere, biosphere, lithosphere, hydrosphere, and/or cryosphere¹ beyond natural variation that we can attribute directly or indirectly to human activity. There is strong evidence and scientific consensus that global warming is occurring (IPCC, 2007a) and that humans are affecting the climate on local to global scales (Cotton & Pielke, 1995; IPCC, 2007a). These climate changes include increases in global temperature, modified patterns of atmospheric and ocean circulation, rise in sea levels, changes in precipitation patterns, and changes in the human and ecological systems that depend on climate (IPCC, 2007a; M. G. Morgan, Fischhoff, Bostrom, & Atman, 2002). Climate change is affecting and will continue to affect freshwater resources, food and forest products, coastal and low-lying areas, industry and settlements, and human health.

According to the latest report by the Intergovernmental Panel on Climate Change (IPCC, 2007b), regional climate changes, particularly temperature increases, are affecting natural systems on all continents and most oceans. Effects that are already occurring include increasing instability of permafrost, upon which many communities and species depend. Arctic and

¹ Along with solar radiation, the atmosphere (gaseous components), biosphere (living components), lithosphere (solid components), hydrosphere (aqueous components), and cryosphere (frozen components) make up the climate.

Antarctic ecosystems are changing. Lakes and rivers are warming. Water quality is decreasing. Spring events such as bird migration are coming earlier. Plant and animal species are shifting poleward and upward in elevation. River fish migration is coming earlier in the year and their ranges are shifting.

These and other climate changes already affect humans and the ecosystems in which we live. We are planting spring crops earlier. Heat-related mortality has increased. Infectious disease vectors like ticks and mosquitoes have migrated into new areas. Allergenic pollen in the Northern Hemisphere has increased. We are also at increased risk of floods from melting glaciers. We face a reduced length of the growing season. Rainfall in dry regions is becoming more uncertain. We are at risk for losses of coastal wetlands and for increased coastal flood damage due to sea-level rise and human development (IPCC, 2007b). Not only are current climate changes affecting us, but future impacts will also affect humans and the climate systems upon which we depend.

In the future, climate changes will affect freshwater resources, ecosystems, food and forest products, coastal and low-lying areas, industry and settlements, and human health. In general, water availability will increase in high latitudes and some wet tropic areas. Water availability will decrease in dry mid-latitude regions and the dry tropics, increasing water stress in these regions. Drought-affected regions will become larger and more frequent heavy precipitation events in these regions will increase flood risk. As the global temperature rises, plant and animal species face major changes in ecosystem structure and function, as well as an increased risk of extinction. Due to warmer weather and greater water availability, crop productivity in mid- and high latitudes may increase, whereas productivity in low latitudes is likely to decrease. As droughts and floods increase, local crop production will decrease. Coastal areas, which house about one-quarter of the world population, face increased risks, including coastal erosion and flooding. Projected health impacts include increases in malnutrition; increased morbidity and mortality from heat waves, floods, storms, fires, and droughts; increases in diarrheal and cardio-respiratory diseases; and changes in the range of some infectious disease vectors like ticks and

mosquitoes. In particular, North America will likely experience increased competition for water resources in the western mountains; increases in forest pests, disease, and fire; increased number, intensity, and duration of heat waves and concomitant health effects; and increased stress on, and loss of, coastal regions (IPCC, 2007). These changes in the climate are the direct and indirect result of human actions.

Some of the most important human behaviors that affect the climate are the emission of greenhouse gases (IPCC, 2007a; M. G. Morgan, Fischhoff, Bostrom, & Atman, 2002), emission of aerosols, and changes in land use, including urbanization and irrigation (Cotton & Pielke, 1995). Greenhouse gases trap solar radiation in the Earth's atmosphere, which increases the global temperature (i.e., global warming). Energy production, transportation, waste disposal, and agricultural processes all produce greenhouse gases. Humans also directly affect the climate through land transformation and industrial processes. Deforestation and agricultural processes like irrigation and raising cattle change the climate. For example, by decreasing the temperature gradient between the land and sea, irrigation along Indian coastal areas has decreased winds from the sea, thereby decreasing the pre-monsoon rains upon which the region is dependent. Raising cattle for meat and dairy products releases methane, a potent greenhouse gas, into the atmosphere. Industrial processes such as energy production, transportation, and waste disposal also directly contribute to climate change. Coal- and gas-fired power plants emit carbon dioxide, a greenhouse gas, and particulates into the atmosphere. Motor-vehicle transportation also emits carbon dioxide, whereas waste in landfills emits methane. These greenhouse gases directly contribute to changes in the climate. Without dramatic shifts in the behaviors that contribute to climate change, the climate will continue to worsen.

Two major approaches to addressing the impacts of climate change are mitigation and adaptation. Broadly, mitigation involves efforts to slow, stabilize, or reverse climate change itself whereas adaptation involves efforts to anticipate and prepare for the effects of climate change. When I refer to climate protection in this dissertation, I am referring to actions taken to mitigate

climate change. Both mitigation and adaptation require behavior change on local, national, and global levels by individuals, business, scientists, governments, non-government organizations, and other social and economic players. Mitigation efforts include direct intervention in the environment, such as replacing eroding beaches, and intervention in the human causes of climate change, such as programs to decrease greenhouse gas emissions. Mitigation is necessary to slow down the numerous and widespread effects of climate change and to prevent other effects from occurring. Communication has many important roles in bringing about the behavior changes necessary to mitigate climate change. One important role for communication in mitigating climate change is to use persuasive messages to change, or reinforce, the public's attitudes, beliefs, and behaviors to support mitigation and protect the climate.

Climate Change Communication

Despite the far-reaching impacts of climate change on humans and the environment, persuasive communication about climate change is in its infancy. By far, rational appeals made by scientists and politicians to other scientists and politicians (e.g., Congressional testimony and IPCC reports) have dominated climate change communication. More recently, scientists, government, and non-government organizations have been communicating with the public about climate change. These messages frequently appeal to negative emotions, such as fear, anxiety, guilt, sadness, and anger, to influence the public's attitudes, beliefs, and behavior. One possible reason why these messages appeal to negative emotions is that the climate protection movement began as a problem-focused movement that attempted to convince others of current problems and future consequences. Although social movements, like the climate protection movement, should provide a vision of what the world will be like if the movement *succeeds* (Stewart, Smith, & Denton, 2001), the climate protection movement tends to provide a vision of what the world will be like if the movement *fails*. These scary visions are designed to evoke *fear* of the future that

inaction (or the action of opponents) will bring about; *guilt* about our own inactions and our roles in creating the problem; *anger* at those who have caused, and are continuing to cause, negative climate changes; *sadness* because of what has already been lost; and *anxiety* about what we might lose. In turn, these emotions are intended to drive us to act to prevent the fearful future, assuage our guilt, confront those who have caused the harm, and prevent future losses. There are several message strategies that pervade climate change communication and appeal to negative emotions, including fear appeals, guilt appeals, conspiracy rhetoric, apocalyptic rhetoric, locus of the irreparable, melodrama, and jeremiad rhetoric. I briefly describe these message strategies below and then provide examples of climate change communication that utilize these strategies.

Message Strategies

Fear Appeals

One common message strategy used in climate change communication is fear appeals. Fear appeals “emphasize the harmful physical or social consequences of failing to comply with message recommendations” (Hale & Dillard, 1995, p. 65). Fear appeals may also present a physically, socially, or psychologically harmful situation and then present recommended actions to prevent or solve that situation. Effective, theoretically-driven fear appeals contain two parts, a threat and a recommended response (Witte, 1992). In the threat portion of the appeal, the message presents impending physical, social, psychological, or other harm. The message attempts to make receivers feel that the threat is severe (perceived severity) and that they are vulnerable to the threat (perceived susceptibility). For example, a person who owns waterfront property in southern Florida may experience fear in response to a message containing the threat of rising sea levels and potential loss of his property. Similarly, a person living on the Gulf of Mexico coast may experience fear in response to a message containing the threat of stronger hurricanes due to global warming.

In the second part of a fear appeal, the message presents a recommended action that will alleviate the threat. The experience of fear evoked in the first part of the message is designed to make the reader want to perform the recommended action to avoid the consequences of the perceived threat. Thus, the person in Florida might build a sea wall or sell his property. The person on the coast of the Gulf of Mexico might reinforce her home against hurricanes, create an escape plan, or buy insurance. The recommended action part of a fear appeal should make receivers believe that the action will successfully avert the threat (response efficacy) and that they can successfully perform the recommended action (self-efficacy). It is important to note that the action that people take in response to a fear appeal may not actually be the recommended action. Maladaptive responses might include deciding that the threat is not real (e.g., that climate change is a hoax) or that they are not vulnerable to the threat (e.g., that a hurricane cannot strike the same place twice). Despite the potential for maladaptive responses, message designers frequently attempt to evoke fear and create changes in behavior that will diminish the fear.

Guilt Appeals

A second message strategy used in climate change communication is guilt appeals. Guilt is a negative emotion that is aroused when a person's behavior does not match his or her own standards, identity, or moral code (Baumeister, Stillwell, & Heatherton, 1994). For example, a person who considers herself to be an environmentalist and believes that recycling is an important behavior to help protect the environment will experience guilt if she throws a plastic bottle in the trash because there are no recycling bins nearby. The perceived inconsistency between her standards and actions leads the person to want to make amends for her wrongdoings (Roseman, Wiest, & Swartz, 1994). Thus, to make up for throwing the plastic bottle in the trash, the environmentalist might pick up trash alongside the road, donate to an environmental cause, or lobby for more conveniently placed recycling bins. Guilt appeals attempt to evoke guilt to encourage receivers to take behaviors that might assuage the feelings of guilt. Like fear appeals,

effective, theoretically-driven guilt appeals consist of two parts (O’Keefe, 2002). The first part of the appeal induces guilt by identifying an inconsistency between the receiver’s standards, identity, or moral code and his or her behavior (e.g., a transgression or failure to meet an obligation). The second part of the appeal identifies a recommended action that the receiver can perform that will resolve the inconsistency and assuage the receiver’s guilt (Coulter & Pinto, 1995; O’Keefe, 2002).

Conspiracy Rhetoric

A third message strategy used in climate change communication that creates negative emotions is conspiracy rhetoric. Conspiracy rhetoric is a type of polarizing rhetoric that attempts to create wide divisions between two entities (e.g., us versus them) to unite supporters of a movement against the enemy and to force commitments from those attempting to remain neutral. Thus, messages that use conspiracy rhetoric cast the opponent as a devil, a foe that must be defeated. A conspiracy is an even stronger foe than individual enemies are because it is the combination of several enemies into a single, more powerful opponent (Stewart, Smith, & Denton, 2001). Conspiracy rhetoric identifies the enemy, shows that the enemy is secretive and cunning, explains the conspirators’ motives, and tells how the conspiracy threatens sacred values (e.g., freedom). This message strategy creates fear and anxiety and is intended to motivate people to band together to expose the conspiracy and fight the enemies. However, conspiracy rhetoric can backfire and make people think that they cannot possibly tackle a secretive and powerful enemy.

Apocalyptic Rhetoric

A fourth message strategy that creates negative emotions is apocalyptic rhetoric. Apocalyptic rhetoric claims that the end of the world is near. The “end of the world” might be the world as we know it, our current comfortable life, or the end of humanity. Often the message

describes signs of our impending doom and cautions the audience that if they do not heed these warnings and take action, the world will end. In the Cold War, this style of rhetoric backfired and instead of scaring people into wanting to avoid nuclear weapons, people began nuclear proliferation for protection against the threat (Hogan, 2006). Whereas apocalyptic rhetoric may effectively create fear, this message strategy has several disadvantages. As with the nuclear weapons example, the action that the fear motivates is uncertain. The high level of fear evoked may make people feel overwhelmed and believe they cannot possibly solve the problem. Alternatively, people may believe the rhetoric is so exaggerated that they dismiss the threat altogether.

Locus of the Irreparable

A fifth message strategy used in climate change communication that creates negative emotions is *locus of the irreparable*. This strategy states that something unique is in a precarious position and that if we do not act, it will be lost forever (Cox, 1982). Often the loss of the unique (e.g., a species, such as polar bears, or pristine wilderness) is juxtaposed against the vulgar or commonplace object or state for which the unique is sacrificed (e.g., petroleum or a shopping center). Because the unique object may be lost, its existence is precarious. However, the message suggests that we do not need to lose this unique object if we take action. By forewarning us of the possible irreparable loss, the message creates anxiety but also gives us an opportunity to act before it is too late. Regardless of the potential outcome of an action, humans fear irreparable choices specifically because they are irreparable (Cox, 1982). This fear often leads to longer contemplation of action, more information seeking, incremental action that leaves open the option of deciding later (e.g., by conserving the forest now, we leave open the option of turning it into a shopping mall later), and/or extraordinary measures to protect the unique from being lost.

Melodrama

A sixth message strategy that creates negative emotions is *melodrama*. In melodrama, the message dramatizes the situation as a fight between good and evil. According to Schwarze (2006), melodrama focuses on socio-political conflicts, polarizes actors into villains and heroes, puts a moral frame on the issue, and tries to develop a unity of feeling among those on the “good” side. The message polarizes the social actors into villains and heroes that are in a fundamental moral battle for supremacy. Melodrama creates fear of the opponents and anger toward them. Critics of melodrama believe that it makes conflict resolution difficult, invites simplified solutions, and blinds us to the capacity for change in others and flaws in ourselves (Schwarze, 2006). However, Schwarze believes that melodrama can be an effective frame when a problem has not been well-recognized and when identification and consensus keep us from recognizing that problem. Melodrama is least effective for conflicts in which divisions already exist and divided parties are trying to reach compromises.

Jeremiad

A seventh message strategy used in climate change communication that creates negative emotions is an appeal to the Jeremiad. According to Opie and Elliot (1996), Jeremiad appeals draw their name from the Old Testament book by Jeremiah in which he castigates followers for betraying their contract with God. A Jeremiad appeal consists of four parts: (a) castigation of the audience for their failure to uphold a social contract, (b) use of the emotion evoked (usually guilt) to encourage action, (c) an offer of redemption through the actions provided by the message, and (d) an obviating of opposing viewpoints. Jeremiad, along with the other message strategies described above, is frequently employed in environmental communication and climate change communication.

Examples

Climate change communication comes in many forms including interpersonal, small group, organizational, and mass media communication. The results of my dissertation are most directly applicable and relevant to mass media formats; therefore, I drew examples of climate change communication only from media forms of communication, including popular literature, film, and television ads. Below, I describe each example and how it uses the strategies of fear appeal, guilt appeal, conspiracy rhetoric, apocalyptic rhetoric, locus of the irreparable, melodrama, and/or Jeremiad rhetoric. These examples predominantly use negative emotional appeals in an attempt to change their audiences' attitudes, beliefs, and behaviors.

Earth in the Balance

The first example of climate change communication comes from popular literature. In his book, *Earth in the Balance*, Gore (1992) predominantly uses apocalyptic and Jeremiad rhetoric. He provides apocalyptic warnings in his chapter "Ships in the Sand," in which he describes a fishing fleet stranded in the (former) Aral Sea because the water was drained for irrigation, creating a desert in place of the sea. Through other apocalyptic warnings, Gore attempts to shock his readers with what humans have done to the planet (Opie & Elliot, 1996). He appeals to fear and guilt to encourage his readers to rectify their dysfunctional relationship with the Earth. Using Jeremiad rhetoric, Gore castigates humans for defaulting on our relationship with the Earth and he describes how we treat the Earth much like a supermarket. He states that we take items from Earth's shelves with little thought to how those items got there or where they came from (Opie & Elliot, 1996). To rebalance our relationship with the Earth, Gore proposes that we need to find new ways of thinking and talking about our relationship with the Earth. Gore's rhetoric parallels much of the deep ecology rhetoric, which advocates a fundamental shift in our systems and mindset to protect the environment.

The Day After Tomorrow

The second example of climate change communication is a popular film. The movie *The Day After Tomorrow* (Emmerich, 2004) provides an apocalyptic view of climate change. This movie often comes to mind when people think of climate change (Chadwick, 2008; Leiserowitz, 2007). The film begins on the Larsen B ice shelf in Antarctica, which suddenly splits and completely breaks off (which did happen). Then, the movie shifts to a global warming conference at which the main character Jack Hall (played by Dennis Quaid) describes a cataclysmic climate shift that occurred 10,000 years ago. He warns his audience that if we do not take action, our children and grandchildren will face the consequences. After evoking fear of the apocalyptic future and guilt about our inaction to save the planet for future generations, the film introduces conspiracy rhetoric. The U.S. vice president who is at the conference (and happens to look like then Vice President Dick Cheney) states that we cannot address global warming because of the economic costs. He accuses Hall of being extreme and hysterical. Hall responds that the loss of a chunk of ice the size of Rhode Island is cause for extreme action. After this conference, extreme events begin happening all over the world. It snows in India. People die in Japan from football-sized hail. A massive tsunami and a super hurricane attack various countries. When Hall connects all these events together as warnings of a much larger climatic shift to come, he attempts to warn the government. The vice president is cast as the melodramatic opponent because he will not listen to Hall. The vice president believes that the extreme events are isolated events that require reactive, not proactive, responses. Next, three “super” storm cells develop over the northern hemisphere and New York City begins to flood. Finally, the government is willing to listen. Hall draws a line on a map of the U.S. approximately at the Mason-Dixon line and says that all of the people south of that line should be evacuated to Mexico and that it is “too late” to evacuate those north of the line. At the end of the film, the remaining population of the U.S. has evacuated to Mexico, the president has died, and ice covers the northern hemisphere. The vice president gives

an apologia speech in which he states that the government should have heeded the warnings and that they were wrong to keep behaving as if nothing could affect the planet.

Although the primary goal of this film is to entertain and the events are highly melodramatic, the film is an important part of climate change rhetoric. In focus groups that I conducted, students' images of climate change predominantly included extreme images like those in this movie. One student said that these extreme images make her think that climate change is not real and cannot happen. Thus, whereas the film might have gained some attention for climate change through its apocalyptic portrayal, it may have done more harm than good by making the effects of climate change seem so extreme that they are unbelievable.

An Inconvenient Truth

A third example of climate change communication is the documentary film, *An Inconvenient Truth* (Guggenheim, 2006). In this film, former Vice President Gore uses apocalyptic rhetoric, locus of the irreparable, and conspiracy rhetoric along with general fear appeals to present his message. Using apocalyptic rhetoric, Gore shows us the warning signs of the coming climate apocalypse in the retreating of glaciers worldwide, stronger storms and hurricanes, the first ever hurricane in the South Atlantic, and deadly heat waves in Europe and India. Gore reminds us that we had warnings about WWII and warnings that the levees in New Orleans would break, but we ignored those warnings to our peril. Then, he shows us what the future holds, which includes the melting of the Greenland and Antarctic Peninsula ice sheets and a rise in sea level of about 20 feet. Gore shows how this sea level rise will affect Florida, the San Francisco Bay, the Netherlands, Beijing, Shanghai, and Calcutta. After that, he reminds us that the thousands of refugees from Katrina placed a strain on the country, but he points out that we could have 10 million environmental refugees worldwide if climate change continues unchecked. Gore also says that the melt water from the ice sheets will shut down ocean circulation and could send us into an ice age for as long as 1,000 years.

Gore also appeals to the locus of the irreparable by showing us the beauty of (a) the Earth from space and (b) a particular river on his land. He describes how he thought he was going to lose his six-year old son after his son was hit by a car. Gore then creates a parallel between losing what was most precious to him (his son) and us potentially losing the precious world we live in. Toward the end of the film, Gore shows a picture of the Earth as a tiny blue dot in space. He says that everything that has ever happened to humans has happened on that tiny dot and that it is our only home. By demonstrating the peril our unique and precious world is in, Gore attempts to create anxiety that will encourage people to act before we lose our climate and home.

Gore also describes the conspiracy of Presidents Reagan, G. H. W. Bush, and G. W. Bush to oppose environmental action. Gore describes his efforts through Congressional hearings to call attention to climate change. He describes how presidential administrations have edited the testimony of scientists like James Hansen of the National Aeronautics and Space Administration (NASA) to weaken their conclusions. Gore states that people who worked for oil companies have positions as part of the G. W. Bush administration in charge of environmental organizations, like the Environmental Protection Agency. Although conspiracy is not a major component of the film, Gore certainly identifies a foe and a conspiracy against which we must fight.

Gore grounds his apocalyptic visions in science and presents the information in a calm and logical manner. The overall tone of the movie is serious with some moments of humor. One major contribution of the film to climate change communication is the thorough way in which Gore addresses barriers to action on climate change. However, Gore fails to provide us with a vision to which we can aspire. Near the end of the film, Gore devotes less than three minutes to cataloguing U.S. achievements, such as fighting WWII on two fronts, ending the Cold War, bringing down Communism, and landing on the moon. He draws a parallel between these achievements and our ability to fight and conquer global warming. Although he provides this statement of efficacy and our ability to overcome major challenges, Gore primarily appeals to negative emotions to encourage changes in attitudes and behavior.

Environmental Defense Ad

A fourth example of climate change communication is the “Train” public service announcement (PSA) from Environmental Defense (2007). Typical of many PSAs by environmental organizations, “Train” evokes fear and guilt, but does not provide the audience with any solutions other than visiting a Web site. The PSA begins with an image of green grass and sounds of nature. In the background is the faint sound of a train. The image cuts to the face of middle-aged white male who says, “Global warming.” The PSA then shows a loud train with pictures of the train and the tracks. Then, the speaker says, “Some say irreversible consequences are 30 years away.” Over his shoulder you can see the train approaching. He says, “30 years.” The ad shows the train moving faster, getting louder, and getting closer behind him. “That won’t affect me,” he says. The speaker steps off the track and a young, blonde girl dressed in white is standing behind him on the track with the train mere feet away from her. Just when the train would hit the girl, the image cuts to a close-up of her face. Then, gray text on a black background reads, “There’s still time.” This text is followed sequentially by text in red that reads, “fight” “global” “warming” and finally “fightglobalwarming.com.” This ad, like many of its ilk, creates fear of what the future might bring and guilt about leaving climate problems to the next generation. The ad positions global warming as a big, scary entity against which the little girl is helpless. The rushing train metaphor does not indicate what the solutions are, nor does the ad provide information about steps that viewers can take to slow down the train.

WWF Ad

A fifth example of climate change communication is a recent World Wildlife Federation advertisement (WWF, 2007) about climate change and polar bears. Like many ads focused on endangered species, this ad uses the locus of the irreparable to evoke emotions in its audience. The ad shows images of a polar bear mother and cub on a tiny ice flow in the middle of a vast ocean. The mom and cub look tired and lethargic. Finally, the mom jumps off the ice flow into

the water. The baby remains on the flow for a short time looking distressed and finally slips into the water after the mother. During these images, actor Sharon Lawrence talks about climate change. She says that climate change is threatening polar bears, leaving them without ice on which to hunt, making them starve to death and drown. She states that polar bears are on their way to extinction and that if we do not act now they will all die in our children's lifetime. Finally, the audience is encouraged to provide a monthly contribution to WWF. By appealing to the locus of the irreparable, this ad encourages people to feel sadness about the state of the climate, guilt about their actions that have contributed to the state of the climate, and fear for the consequences of those actions.

Hope as an Alternative Message Strategy

As can be seen from the examples above, much of climate change communication appeals to negative emotions. These messages are designed to evoke *fear* of the future, *guilt* about our own actions and inactions, *anger* at those who have caused and are continuing to cause problems, *sadness* because of what has already been lost, and *anxiety* about what we might lose. An alternative strategy for communicating about climate change would be to appeal to positive emotions, such as hope, to encourage behavior change. Based on a review of extant literature, I define hope as a discrete emotion that involves appraisals of a stimulus as novel and relevant to a future or unknown outcome that is consistent with goals, possible but not certain, important, and consistent with a better future. I further explicate hope below and in chapter two. Appeals to hope could create a vision for a desirable future and then make this vision seem important and related to important goals and values of the audience. Finally, an appeal to hope could make the audience believe that achieving this vision is possible. Instead of creating a problem-focused vision of the future like current climate change communication does, appeals to hope could create an opportunity-focused vision that builds excitement and enthusiasm. This brings me to the first goal

of this dissertation: to conceptualize and operationalize hope and hope appeals in a persuasive context.

Justification of Hope as a Persuasive Message Strategy

There are at least four major reasons why a formal conceptualization and operationalization (i.e., a theory) of persuasive hope is needed. First, human behavior is often motivated by future cognitions. Second, hope is a future-oriented emotion that can tap into these motivations. Third, appeals to hope are frequently used in applied contexts without theoretical guidance. Fourth, despite its utility as a future-oriented emotion and its frequent application, hope has rarely been theorized or tested in a persuasive context.

The first reason why a theory of persuasive hope is needed is that human behavior is often motivated by thoughts about the future.² As Markus and Nuris (1986) state, “Ideas about what is possible for us to be, to think, to feel, or to experience provide a direction and impetus for action, change, and development” (p. 960). The role of cognitions about the future in motivating behavior has been well-researched and theorized, including research on possible selves (e.g., Markus & Nuris, 1986) and goal-directed behavior (e.g., Miller & Brickman, 2004). *Possible selves* are representations of what individuals believe they might become, what they want to become, and what they fear becoming (Markus & Nuris, 1986). Possible selves motivate

² In a survey of more than 17,000 middle managers in 61 societies, Javidan (2007) examined *future orientation*, which he defined as “the extent to which a culture encourages and rewards such behavior as delaying gratification, planning, and investing in the future” (p. 20). Participants were asked to indicate their own values and the values of their society. Javidan found substantial variety in the degree of future orientation of societies. However, in most societies, individual’s personal values were “similar and quite future oriented” (p. 20). Thus, although societies may vary in the degree to which the future motivates the society, individuals are still motivated by thoughts about the future.

behaviors designed to bring us closer to positive possible selves and to help us avoid negative possible selves. Future-oriented thoughts are also the driving force behind all goals and goal-directed behavior (Miller & Brickman, 2004; Nuttin, 1985). Goals affect current behavior and self-regulation through the development of pathways to achieve in the future what individuals desire now. Goals also play a role as incentives in providing meaning to current behavior and as yardsticks against which we measure our current and past behavior (Miller & Brickman, 2004). Thus, future-oriented cognitions motivate current behavior through mechanisms such as possible selves and goals.

The second reason why a theory of persuasive hope is needed is that hope is a future-oriented emotion that can capitalize on our future-oriented motivations. All emotions are aroused in response to changes or stimuli in the current environment (Lazarus, 1991; Scherer, 2001a). For most emotions (e.g., anger, guilt, joy, or pride), the emotion is directed toward the current environment or stimulus. For example, one becomes angry with a slow driver that is impeding progress toward a meeting. One feels joy when a child is born or pride when a child succeeds in school or at a sport. However, for hope, although the stimulus causes the emotion, the emotion is focused on a *future or unknown outcome* rather than the current situation. For example, information about a new discovery in cancer treatment (stimulus) might lead to hope that a cure for cancer (future outcome) is imminent. Thus, the stimulus causes hope about a future or unknown outcome. Similarly, seeing someone driving erratically (stimulus) might cause a person to fear that this driver will hit him (future outcome). Although we may be motivated by anticipating feeling an emotion *in the future* (e.g., anticipated guilt: Lindsey, 2005; O’Keefe, 2002; O’Keefe & Figeé, 1999), feeling hope *in the present* motivates behavior. As a future-oriented emotion, hope should play a large role in persuasive emotional appeals.

The third reason why a theory of persuasive hope is needed is that communicators frequently use appeals to hope in political, consumer, and social movement rhetoric; yet, we have no theory that adequately guides the application of hope appeals in these contexts. Political

rhetoric, social movements, and commercial advertisements often attempt to evoke hope in their persuasive messages. For example, in the 2008 presidential election, then Senator Barak Obama's campaign message was predominantly based on hope appeals (see Ivie & Giner, 2009 for a discussion of the campaign's rhetoric). In appealing to voters' hopes about the future, Obama (2007) stated, "We can make this election not about fear, but about the future," "let us reach for what we know is possible," and "[this is a] moment of great challenge, but also a moment of great opportunity." Like political rhetoric, the rhetoric of social movements also frequently employs appeals to hope. One key role of a social movement is to provide a vision of what the world would look like if the movement's goals succeed (Stewart, Smith, & Denton, 2001). For example, Dr. Martin Luther King, Jr. provided a hopeful vision of what could be achieved in the future in his famous speech, "I Have a Dream" (King, 2001). Finally, appeals to hope are ubiquitous in consumer marketing that attempts to sell products by causing the receiver to hope that the product will make them thinner, more popular, more fashionable, happier, *et cetera* (de Mello & MacInnis, 2005).

The fourth reason why communication science needs a theory of persuasive hope is that despite hope's utility as a future-oriented emotion and the frequent use of hope appeals in applied settings, hope and hope appeals have rarely been theorized or empirically studied. In contrast, fear and fear appeals have been extensively theorized and tested in persuasive contexts (see Floyd, Prentice-Dunn, & Rogers, 2000; Mongeau, 2000; Witte & Allen, 2000 for reviews). However, with a few exceptions from political (Marmor-Lavie & Weimann, 2006; Roseman, Abelson, & Ewing, 1986), consumer (MacInnis & de Mello, 2005), and mass media research (Nabi & Prestin, 2007), hope appeals have been ignored (Nabi, 2002). Without a clear articulation of what hope is and its potential role in persuasive contexts, researchers and practitioners will not know how to create effective messages that evoke hope, nor will they know what effects an appeal to hope might create.

Given the lack of theory and research on hope appeals, the broad use of hope appeals, and the potential for hope to motivate future-oriented behavior, it is imperative that social influence scholars formally conceptualize and operationalize hope and hope appeals in a persuasive context. This conceptualization and operationalization is the first goal of this dissertation. To begin conceptualizing hope in a persuasive context, I first distinguish hope from other related concepts. Then, I assess whether existing conceptualizations of hope can adequately inform climate change communication.

Differentiation of Hope and Related Concepts

Hope is often confounded with other concepts including enthusiasm, optimism, desire, and want. Although these concepts may share some conceptual space with hope, they are distinct. I briefly discuss each of these concepts below and distinguish them from hope.

Optimism

Extant literature often links hope with optimism, treating them as synonyms. However, the role of probability, uncertainty, and importance distinguish optimism from hope. Probability plays a different role in optimism than it does in hope. Optimism increases linearly with the probability of the desired event (Ben-Ze'ev, 2000; Lazarus, 1991), whereas hope does not. Hope may be completely unrelated to probability. Indeed, people often feel hope even when an event is unlikely (Ben-Ze'ev, 2000). Uncertainty also plays a different role in optimism than it does in hope. Uncertainty is critical to feeling hope because we cannot hope for things that are certain. Although optimism also requires some uncertainty, the degree of uncertainty is much smaller in optimism than it is in hope. In hope, the possibility that the situation could improve is accompanied by uncertainty about whether the desired outcome can be achieved. However, optimism leaves little or no room for uncertainty (Lazarus, 1999). Importance also plays a different role in hope than in optimism. Hoped-for outcomes must be important and personally

relevant, whereas people can be optimistic about nearly any outcome that is almost certain (Averill, Catlin, & Chon, 1990; Bruininks & Malle, 2005). In addition to the distinctions between hope and optimism based on probability, uncertainty, and importance, optimism has more often been characterized as a personality disposition of an enduring nature (e.g., Scheier & Carver, 1985), whereas hope is an emotion felt in response to a particular stimulus or event.

Desire or Want

Desire or want can also be distinguished from hope based on the role of importance. Hoped-for events are more important and relevant than events that individuals simply desire or want. In addition, hoped-for outcomes are often less materialistic, more socially acceptable, more enduring, and more abstract than the objects of want or desire (Averill, Catlin, & Chon, 1990; Bruininks & Malle, 2005). Although desire or want are components of hope in that we do not hope for things we neither desire nor want, hope also requires belief in the possibility of a favorable outcome, whereas we can desire or want impossible outcomes, such as the ability to go back in time and reverse decisions that hurt the climate (Lazarus, 1999).

Enthusiasm

In political communication, researchers have confounded enthusiasm with hope. Marcus and MacKuen (1993) describe political mood using orthogonal dimensions of enthusiasm and anxiety. In their research and related research, enthusiasm is defined as a response to stimuli that have positive implications for a person's goals, whereas anxiety is defined as a response to threatening stimuli (Brader, 2005). Although hope fits under this broad definition of enthusiasm, hope is a much narrower concept and is not felt in response to any stimuli with positive implications for a person's goals. Interestingly, Marcus and MacKuen (1993) initially formed the enthusiasm dimension using responses to items of "hope," "sympathy," and "proud." In a follow-up study, they measured enthusiasm via responses to two semantic differentials of enthusiastic-

unenthusiastic and interested-indifferent. In a related study, Brader (2005) measured enthusiasm via responses to four-point scales of excitement and hope. The conflation of the measurement of enthusiasm with hope indicates that some of the findings for enthusiasm (discussed in chapter two) may hold true for hope. Despite potential similarities, enthusiasm is conceptualized very broadly as an enduring, generalized mood, whereas hope is a more specific short-term, discrete emotion.

After distinguishing hope from other similar constructs, the next step in conceptualizing and operationalizing hope and hope appeals in a persuasive context is to examine existing definitions of hope to determine their utility for climate change communication.

Assessment of Existing Models of Hope

Snyder and Colleagues

In psychological, particularly psychotherapeutic, literature, researchers have defined and measured hope as a trait, or disposition, which assists in recovery from psychological disorders, such as depression. One often-cited operationalization of hope is the work of Snyder and colleagues in the development of the Hope Scale (Snyder et al., 1991) and the Children's Hope Scale (Snyder et al., 1997). Snyder and colleagues define hope as a personality trait that manifests in beliefs about one's capacity to initiate and sustain action toward goals (*agency*) and one's ability to generate multiple ways to reach those goals (*pathways*) (Snyder, 2000a, 2000b, 2002). This trait is a generalized ability that is not specific to any particular situation. Snyder and colleagues (1996) also developed a State Hope Scale to measure more short-term goal-directed thinking in response to events in respondents' lives. These conceptualizations of trait and state hope equate hope with self-efficacy (i.e., belief in one's ability to perform the recommended action) and flexible thinking or problem solving. The way Snyder and colleagues define both trait and state hope is purely cognitive and fails to account for the emotion of hope. The definitions

also fail to account for feelings of hope that individuals experience even when they perceive themselves to lack efficacy and control. Whereas self-efficacy and control may facilitate feeling hope, this cognitive, belief-based operationalization of hope fails to capture hope as an emotion and thus, is not useful in guiding attempts to evoke hope in climate change communication.

De Mello and MacInnis

In a consumer marketing context, MacInnis and de Mello (2005) define hope as “a positively valenced emotion evoked in response to an uncertain but possible goal-congruent outcome” (p. 2). Although de Mello and MacInnis (2005) ground their theory of hope in appraisal theory, they ignore many relevant aspects of an emotion (e.g., subjective feeling, psychophysiology, motor expression, and action tendency). In addition, they posit that hope is evoked whenever a future outcome is appraised as goal-congruent and possible. This implies that *any* goal-congruent, possible outcome evokes hope. Thus, individuals would feel hope for trivial outcomes, not just important ones, which contradicts previous research (Averill, Catlin, & Chon, 1990). In defining hope, de Mello and MacInnis (2005) attempt to distinguish three types of hope: “to hope,” “to have hope,” and “to be hopeful.” The three forms of hope have never been distinguished or compared in empirical research. Although de Mello and MacInnis’s conceptualization of hope has merit, it is an incomplete definition of hope as an emotion and does not provide clear guidance for the development of persuasive messages.

Conclusion

As I have demonstrated in this chapter, climate change is an important issue for communicators to address. Specifically, we have an opportunity to use persuasion and social influence techniques to encourage behaviors that mitigate climate change. Much of current climate change communication attempts to evoke negative emotions to encourage behavior

change. However, I propose that appeals to positive emotions, like hope, can be an effective alternative to current climate change communication. To most effectively use hope and hope appeals in climate change communication, communication scientists must first conceptualize and operationalize hope and hope appeals in persuasive contexts. As such, there are four main reasons why a theory of persuasive hope is needed. First, human behavior is often motivated by future cognitions. Second, hope is a future-oriented emotion that can tap into these motivations. Third, appeals to hope are frequently used in applied contexts without theoretical guidance. Fourth, despite its utility as a future-oriented emotion and its frequent application, hope has rarely been theorized or tested in a persuasive context. An examination of existing theories of hope revealed that these theories do not conceptualize hope as an emotion nor do they provide guidance for the development of persuasive messages. To address this gap, I developed persuasive hope theory (PHT). I describe the theory and its foundations in the next chapter.

CHAPTER TWO:

PERSUASIVE HOPE THEORY

Existing models of hope are not sufficient to guide the development of persuasive messages. Therefore, to achieve the first purpose of this dissertation (i.e., conceptualizing and operationalizing hope and hope appeals in a persuasive context), I developed *persuasive hope theory* (PHT). PHT addresses the lack of theoretical development and empirical inquiry into persuasive hope appeals and advances persuasive communication by: (a) explicating hope within a model of discrete emotions and appraisal theory, (b) explaining how to create messages that evoke hope, (c) identifying persuasive effects of hope appeals, (d) describing individual characteristics that affect responses to hope appeals, and (e) specifying relationships between hope, hope appeals, persuasive effects, and individual characteristics in propositional form. Because the development of this theory is a substantial portion of this dissertation, I present the theory in its entirety. However, I do not test all parts of the theory in this dissertation. After a full discussion of the theory, I identify the hypotheses and research questions derived from PHT that I address in this dissertation. Before detailing the components of PHT, I first describe the foundations upon which I built the theory.

Foundations and Assumptions

Discrete Model of Emotions

I based persuasive hope theory on a discrete model of emotions. According to a discrete emotion models, emotions are brief, intense, psychological, and evaluative reactions directed at external stimuli (e.g., people, events, or objects) (Nabi, 2002; Ortony, Clore, & Collins, 1988). In response to these external stimuli, emotions help individuals adapt to their environment by

activating a unique pattern of thoughts (cognitions), physiological changes, subjective feelings, motor expressions, and action (or behavioral) tendencies (see Arnold, 1960; Lazarus, 1991; Nabi, 2002; Ortony, Clore, & Collins, 1988; Scherer, 2001b). Through a global and rapid response, the action tendencies of emotions organize and motivate behavior that enhances the survival of individuals and species. Thus, hope as a discrete emotion is a brief, intense, psychological, and evaluative reaction in response to an environmental stimulus. Hope serves the adaptive function of creating and sustaining action toward rewarding outcomes that fulfill goals, needs, and wants. Like all discrete emotions, hope consists of (a) *appraisals* (i.e., assessments about the stimulus and possible future outcomes), (b) *action tendencies* (i.e., what the emotion makes the person want to do), (c) *physiology* (i.e., neural, chemical, and other physical responses in the brain and body); (d) *motor expressions* (i.e., facial, vocal, and postural signals of the emotion), and (e) *subjective feeling state* (i.e., how the emotion feels) (Roseman, 2001; Scherer, 1984). Hope's unique pattern of appraisals, action tendencies, physiology, motor expressions, and subjective feelings are what distinguish it from other emotions.

Appraisal Theory

Appraisal theory, like a discrete model of emotions, is a foundation of persuasive hope theory. According to appraisal theories, emotions arise from assessments, or *appraisals*, of environmental stimuli in relation to goals, motives, wants, and needs (e.g., Lazarus, 1991; Roseman, 2001; Scherer, 2001a). The different patterns of appraisals elicited produce different emotions (Roseman & Smith, 2001). PHT borrows three assumptions from appraisal theories. First, like other appraisal theories, PHT assumes that appraisal-emotion relationships are universal because they are based on biological adaptation systems (Roseman & Smith, 2001). As I mentioned previously, hope is biologically adaptive because it prepares and motivates us to take advantage of opportunities that may lead to positive outcomes (Ben-Ze'ev, 2000; Lazarus, 1991; Richman et al., 2005). Hence, cultural differences in emotions elicited by a certain stimulus are

due to different appraisals of the stimulus rather than cultural differences in appraisal-emotion relationships (Roseman, Dhawan, Rettek, Naidu, & Thapa, 1995). Thus, I assume the appraisals involved in hope to be universal (i.e., not culturally dependent); however, the specific appraisals that a stimulus (e.g., a message) might evoke are not universal. Second, also like other appraisal theories, PHT assumes that the appraisals that make up hope may involve nonconscious sensory processing, such as an orienting response,³ or more complex, conscious cognitive processing (Arnold, 1960; Roseman & Smith, 2001; Way & Masters, 1996). PHT assumes that these two types of cognitive processing occur and mutually influence each other in any appraisal. The third assumption of PHT is that cognitive and emotional processing occur in parallel, mutually influencing systems.⁴ Thus, a person's appraisals will create emotions that may influence subsequent appraisals and subsequent emotions.

Although numerous appraisal theories exist, Lazarus's cognitive-mediation theory (Lazarus, 2001), Scherer's sequential check theory of emotional differentiation (Scherer, 1984, 2001a) and Roseman's model of emotional appraisals (2001) were most influential in my development of persuasive hope theory. Both Lazarus and Roseman briefly address hope in their theories. According to Lazarus (1991), the core relational theme of hope is "fearing the worst but yearning for better" (p. 284). Lazarus deems hope a "problematic emotion" because he is uncertain about its action tendency and the physiological changes inherent in the emotion. Additionally, although he conceives of hope as a positive emotion, Lazarus (1999; 2001) believes

³ The orienting response is a reflexive focusing of attention on any change in the environment (Pavlov, 1927).

⁴ Based on studies with patients who have cognitive dysfunctions and those with emotional dysfunctions, researchers have shown that a deficit in cognition does not impair emotional processing and vice versa (Way & Masters, 1996). Thus, cognitive and emotional processing likely occur in parallel, mutually influencing systems.

that hope can only arise when the current situation is negative. According to Roseman (2001), hope is caused by appraisals of a “not unexpected”⁵ stimulus that is consistent with either appetitive or aversive motives, uncertain, caused by circumstances, and has either high or low control potential. Although both Roseman and Lazarus address hope to some extent in their theories, Lazarus does not clearly delineate the circumstances that evoke hope, whereas Roseman is more specific on these issues. However, Roseman does not distinguish between emotions like hope that are future-focused and those that are present- or past-focused. Neither theory provides any guidance for the development of hope appeals nor do they indicate what outcomes we might expect from feelings of hope or responses to hope appeals.

Theoretical Constructs and Propositions

I drew the core appraisals for PHT predominantly from existing appraisal theories and combined them in a unique way to define hope. I define hope as a discrete emotion that involves appraisals of a stimulus as novel and relevant to a future or unknown outcome, that is consistent with goals, possible but not certain, important, and consistent with a better future. Building on the work of Roseman (2001), I postulate that hope also involves (a) an approach action tendency that motivates individuals to take, or continue, action to achieve the desired outcome, (b) increased heart rate and skin conductance, (c) an open facial expression, heightened focus, and alert body posture, and (d) a feeling of eager attention. I describe these components of hope below.

Appraisals

A unique contribution of persuasive hope theory to appraisal theories is the separation of appraisals about an environmental stimulus from appraisals about future outcomes for which that

⁵ In Roseman’s theory, “not unexpected” is not synonymous with “expected.”

stimulus has implications. This separation is critical to understanding how appraisals function in future-oriented emotions like hope and fear. According to PHT, the appraisals that create hope focus first on the stimulus or change in the environment and second on the future outcome for which the stimulus has implications. For example, a news story about a promising new cancer treatment (stimulus) may cause a person with cancer to feel hope about successfully treating her cancer (future outcome). Similarly, a discovery of a technology for powering vehicle engines without greenhouse gas emissions (stimulus) might lead a person to feel hope about slowing climate change (future outcome). In PHT, appraisals of the stimulus occur first followed by appraisals of the outcome. Otherwise, there is no fixed order to the appraisals, and I assume them to be concurrent and mutually influencing. Although the order of the appraisals is not fixed, all of the appraisals must be present for hope to occur.

Appraisals of the Stimulus

The first set of appraisals focuses on the stimulus (i.e., the change in the environment) that initiates hope. According to PHT, the stimulus signals an *opportunity*⁶ and may encourage an individual to take advantage of that opportunity. The stimulus may signal changes in the real or appraised possibility of a desired outcome, the possibility of a new outcome, an increase in the importance or goal congruence of the outcome, a vision for a better future, or that the outcome is more imminent. For example, a new cancer treatment and the discovery of an emissions-free engine both increase the possibility of a desired outcome (i.e., curing cancer and decreasing fossil fuel emissions). I discuss the opportunities that a stimulus might signal further in the section on inducing hope. To experience hope, an individual must first appraise a stimulus as novel and

⁶ Opportunity is a core construct for hope in the same way that threat is a core construct for fear. As with threats, perceptions of opportunities may be highly rational or irrational.

relevant. These appraisals are not unique to PHT and similar appraisals exist in many other appraisal theories. However, the idea of separating the appraisals of the stimulus from the future outcome for which the stimulus has relevance *is* unique to PHT.

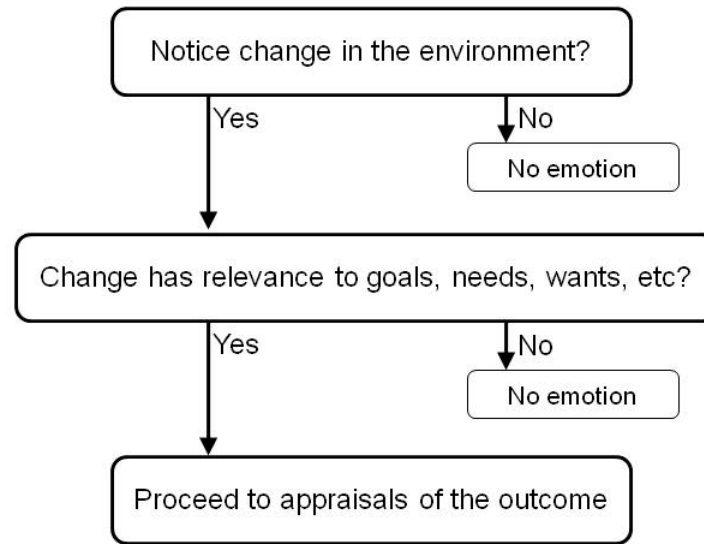
Novelty. Emotions arise in response to environmental conditions; therefore, the first step in feeling any emotion is noticing a change (i.e., something novel) in the environment (Scherer, 2001a). This appraisal is extremely rapid and is likely to be nonconscious and reflexive like an orienting response. However, it is possible that a conscious response and appraisal of novelty will also occur. For example, if someone were watching a television show and the show switched to a public service announcement (PSA) about the effects of plastic bags on the environment, the change from the television show to the PSA would cause an automatic orienting response. The individual might also consciously think that she has never before seen this PSA, which is also an appraisal of novelty.

Relevance. Once individuals notice a stimulus, they must assess whether the stimulus has implications for (i.e., relevance to) their well-being, goals, needs, and desires (Lazarus, 1991, 2001; Scherer, 2001a). If an individual appraises the stimulus as irrelevant, no further appraisals occur and the individual does not feel any emotions. If the individual who saw the PSA about the effects of plastic bags on the environment is interested in protecting the environment, then she will appraise the PSA as relevant. However, if she is not interested in protecting the environment or does not use plastic bags, then the message will be irrelevant, and she will not pay attention to it. Therefore, she will feel no emotion in response to the message.

Proposition 1: For hope to occur, individuals must encounter a novel change or stimulus in their environment and perceive that stimulus to be relevant to their goals, needs, or desires.

Figure 2.1 below illustrates the appraisals of the stimulus.

Figure 2.1: Appraisals of the Stimulus



Appraisals of the Outcome

The second set of appraisals focuses on a future or unknown outcome for which the stimulus has implications. Unlike most emotions, hope is directed *only* toward future outcomes or outcomes about which the individual does not have information (i.e., *unknown outcomes*). Thus, hope is associated with the human ability to “flexibly represent future events, imagine diverse possible outcomes, and act in light of those representations” (Bruininks & Malle, 2005, p. 327). The experience of hope requires that individuals generate expectations about the future and base their feelings on those expectations, rather than on what is currently happening (Bruininks & Malle, 2005; Reading, 2004). Thus, we can hope that our behavior helps slow climate change, we can hope our government creates legislation to regulate greenhouse gases, and we can hope that industry develops viable energy solutions.

Other emotions like joy, anger, and sadness can be evoked by the memory of a past event, in response to a current event, or as a result of imagining a future event. However, hope cannot be evoked by past or current events. People cannot hope that the government passed legislation regulating greenhouse gases when the government has already defeated the legislation.

They might *wish* that the government had passed the legislation, but they cannot *hope* for it.

Similarly, people cannot hope that the government will debate the legislation while the government is debating the legislation. Thus, hope is an emotion directed toward possible outcomes that have not yet occurred. The rare exception to this rule is that individuals can feel hope about outcomes that have occurred or are occurring, but about which the individuals have no information. Thus, if an individual did not know whether legislation regulating greenhouse gases had passed through Congress, he could still hope to find out that the legislation passed. Thus, the targets of hope are future or unknown outcomes.

The future or unknown outcome may be the achievement of a desired state or reward or the avoidance of a negative or punishing state (Ben-Ze'ev, 2000; Roseman, 1991, 2001). For example, a message may have implications for reducing greenhouse gas emissions (achievement of a desired outcome) or for avoiding dangerous climate change (avoiding a negative outcome). One might question whether hoping to avoid a negative outcome is really fearing the negative outcome. Although hope and fear are two sides of a coin, they are phenomenologically different. Which emotion an individual feels depends on his or her appraisals. Thus, individuals might hope to avoid dangerous climate change or fear the effects of dangerous climate change, depending on whether they assessed the stimulus as an opportunity (in which case they would feel hope) or as a threat (in which case they would feel fear). In the process of appraising and reappraising, hope can be transformed into fear, distress, or despair and vice versa (Lazarus, 2001). In studying suspenseful commercials, Alwitt (2002) found that suspense was created by alternating reactions of fear of a negative outcome and hope for escaping that outcome. Thus, hoping to escape a negative situation and fearing the same negative situation are empirically, as well as phenomenologically, different. The outcome appraisals that make up hope include evaluations of *goal congruence*, *possibility*, *importance*, and *future expectation*.

*Goal congruence.*⁷ Goal congruence is an assessment of whether conditions are favorable or unfavorable to achieving relevant goals (Lazarus, 2001). According to PHT, to feel hope, individuals must appraise the future or unknown outcome as consistent with, or favorable to, their goals or motives. If a future outcome is not consistent with their goals, individuals will not feel hope, but will feel another emotion, most likely fear. As mentioned previously, goals may be to attain desired outcomes or rewards, or to avoid negative outcomes or punishments. For example, a stimulus may be congruent with a person's goal of being healthy (achievement of a desired outcome) or with his goal of avoiding cancer (avoiding a negative outcome).

Appraisals about how directly the outcome affects goals and the number of goals affected can influence appraisals of goal congruence (Scherer, 2001a). For example, buying a fuel-efficient Toyota Prius might meet a person's goals of reducing her greenhouse gas emissions and saving money on fuel. However, this desired future outcome may conflict with her goal of having a roomy vehicle that allows for transportation of her two large dogs. Thus, this person might appraise buying a Prius as only slightly goal congruent.

PHT posits that the degree of goal congruence is related positively to the amount of hope experienced. Thus, the more goal congruent the future outcome is, the more hope a person feels. For example, if buying a Prius allows a person to fulfill his economic goals (saving money on gas), his moral goals (protecting the climate), and his esteem goals (being seen as an environmentally-friendly person), he would appraise buying a Prius as highly goal congruent and feel more hope about the future outcome than the person who appraised buying a Prius as only slightly goal congruent.

⁷ I use the term "goal" as shorthand for various learned and innate motivational constructs including needs, drives, instincts, motives, concerns, etc.

Proposition 2: To feel hope individuals must appraise a future or unknown outcome as goal congruent. The degree of hope they feel is directly and positively related to the degree of goal congruence.

Proposition 3: Goal congruence is related to how directly a future outcome influences goals and the number of goals affected, such that the more directly a future outcome influences goals and the greater the number of goals affected, the greater the goal congruence.

Possibility. An appraisal of possibility involves a subjective assessment of the likelihood of the future outcome (Scherer, 2001a). According to PHT, to experience hope, an individual must appraise the desired outcome as possible, but not certain.⁸ If the possibility of achieving the desired outcome is certain, then an individual experiences other positive emotions, such as happiness or relief, rather than hope. If an individual appraises the desired outcome as impossible, then he or she feels sadness or distress (Roseman, 2001). Thus, for someone to feel hope, he or she must appraise the future outcome as possible, but not certain or impossible. It is critical to note that an individual's subjective appraisal of possibility need not be related to actual probability. People can convince themselves that the possibility of the hoped-for outcome is more likely than it actually is (Averill, Catlin, & Chon, 1990) and people often continue to hope even when an outcome becomes increasingly unlikely (Bruininks & Malle, 2005).

Appraisals about resources and personal power affect appraisals of possibility. For example, appraisals about one's financial resources might make an outcome of buying a more

⁸ Certainty and uncertainty focus on the possible future outcome. Thus, climate skeptics may be certain that climate change is not happening, but this does not mean that they cannot feel uncertainty and/or hope about possible future outcomes related to the climate.

fuel-efficient vehicle seem more or less possible. Similarly, beliefs about one's personal power to affect a global issue like climate change, may affect appraisals about the possibility of helping to mitigate climate change. The greater a person's perceived resources and power, the greater her appraisals of possibility will be.

Unlike goal congruence, there is not a direct relationship between the degree of possibility and hope. It is reasonable to assume that environmental changes that lead to appraisals of increased possibility lead to more hope (as long as the future outcome does not become certain). However, this does not mean that the higher the possibility is, the greater the feeling of hope will be. Rather, PHT posits that it is the degree of positive change in possibility that predicts the amount of hope felt.

Proposition 4: To feel hope an individual must appraise a future or unknown outcome as possible, but not certain. The degree of hope he or she feels is directly and positively related to the amount of positive change in the appraisal of possibility from before the stimulus to after the stimulus, such that an individual feels more hope when he or she experiences greater positive changes in appraisals of possibility.

Proposition 5: Assessments of resources and personal power affect appraisals of possibility, such that perceptions of possibility are higher in the presence of greater resources and/or greater personal power.

Importance. An appraisal of importance is an assessment of how personally relevant the future outcome is. According to PHT, for hope to occur, the future or unknown outcome must be important or personally relevant to the individual. Thus, to feel hope in response to a message about climate change mitigation, slowing down or lessening climate change must be important to the individual (e.g., is part of his value system) or must be personally relevant (e.g., he lives in

coastal Florida only one foot above sea level). The appraisal of importance is distinguished from the appraisal of stimulus relevance in that the appraisal of relevance focuses on a stimulus or change in the environment, whereas the appraisal of importance focuses on the outcome for which the stimulus has implications.

Perceived effects of the future outcome on the individual and people important to the individual affect appraisals of importance. For example, a person might (incorrectly) believe that climate change will not happen for 100 years. This person might deem mitigating climate change as unimportant because it will not affect her. However, if that person has children and/or grandchildren, she might believe that mitigating climate change is important because of the potential effects of climate change on her progeny.

PHT predicts that the appraisal of importance is directly and positively related to hope. Thus, the more important a future outcome is, the more hope the individual will feel. For example, if a person (correctly) believes that climate change is occurring now, will affect him, and will have even greater effects on his children and grandchildren, he will experience more hope in response to a stimulus about climate change mitigation than will the person who does not believe that climate change will affect her.

Proposition 6: To feel hope, an individual must appraise a future or unknown outcome as important. The degree of hope he or she feels is directly and positively related to appraisals of importance, such that the individual feels more hope the higher he or she appraises importance.

Proposition 7: Appraisals of importance derive from personal relevance, perceived effects on the self, and perceived effects on significant others, such that appraisals of importance are higher in the presence of greater personal relevance, greater perceived effects on the self, and/or greater perceived effects on significant others.

Future expectation. Future expectation is an appraisal about whether the future will become better or worse if the outcome was to occur (Lazarus, 2001). According to PHT, to feel hope, the future outcome must be appraised as creating a better future. As discussed previously, this better future may include achievement of rewards or escape from punishments. For example, in the case of climate change, the better future may mean that climate change does not become as dangerous as projected, that dangerous climate change is prevented, or that the climate improves. Thus, a person who believes that reducing greenhouse gas emissions will make the future better will feel hope in response to messages that signal an opportunity to reduce her greenhouse gas emissions.

Appraisals of the current situation affect future expectation. For example, if a person believes that the current situation is wonderful, it may be harder for him to appraise the future as becoming better. Conversely, if a person appraises the current situation as terrible, she may be more likely to appraise the future as becoming better.

As with goal congruence and importance, PHT predicts that future expectation has a direct, positive relationship with hope. Thus, the more positive the future expectations are, the greater the hope is that an individual feels. For example, a person who believes that reducing greenhouse gases will make the future much better will feel more hope than a person who believes that reducing greenhouse gases will make the future only slightly better.

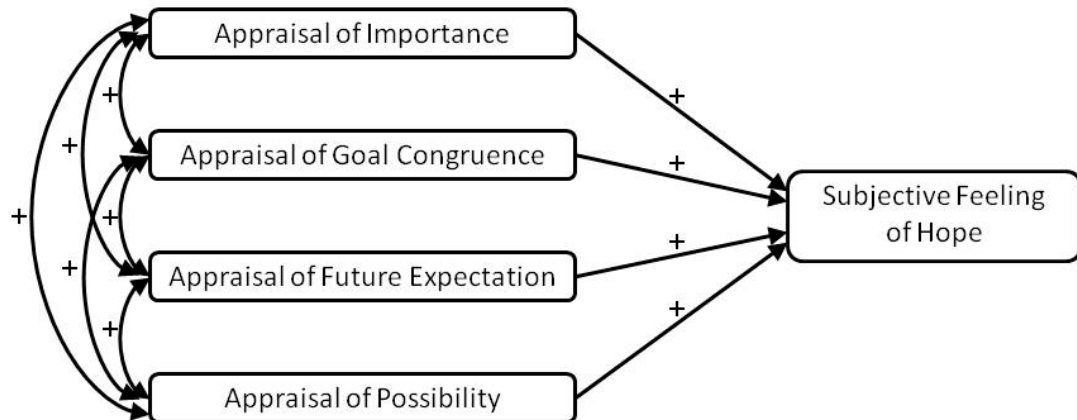
Proposition 8: To feel hope, an individual must appraise the future or unknown outcome as making the future better (i.e., a positive future expectation). The degree of hope he or she feels is directly and positively related to appraisals of future expectation, such that the individual feels more hope when he or she has more positive future expectations.

Proposition 9: The degree of positivity of future expectations derives from appraisals of the current situation, such that an individual who perceives the

current situation to be terrible is more likely to perceive the future as getting better than is an individual who perceives the current situation to be wonderful.

Relationships between appraisals. Although PHT does not currently specify relationships between the appraisals, I assume that the appraisals are mutually influencing. For example, an appraisal of high goal congruence might lead to a higher appraisal of importance. Similarly, a high appraisal of possibility might affect the appraisal of future expectation. Recall that PHT does not specify an order to the appraisals, but does require that all four appraisals are present for an individual to feel hope. Figure 2.2 illustrates the appraisals of the future or unknown outcome and indicates covariances between the appraisals.

Figure 2.2: Proposed Relationships between Appraisals of the Outcome and Subjective Feelings of Hope



Action Tendency, Physiology, Motor Expression, and Subjective Feeling

Although appraisals are a necessary component of emotions and a critical focus of PHT, emotions also consist of an action tendency, physiology, motor expression, and subjective feeling. I describe each of these components below.

Action tendency. The action tendency of hope is an approach tendency,⁹ stimulating actual or preparatory movement toward the desired outcome. The action tendency of hope functions to keep people focused on their goals, to sustain motivation, and to help control negative feelings. Thus, for individuals who want to help mitigate climate change or want to avoid the negative consequences of climate change, hope will cause them to take action to achieve these desired outcomes. In addition, hope may maintain current movement toward the desired outcome, causing the individuals to “remain vigilant, mobilized, and committed” to the outcome (Lazarus, 1991, p. 285). Thus, for individuals who are already taking action to help mitigate climate change, hope maintains their motivation to continue to take mitigation action and prevents them from becoming dispirited about the current situation related to climate change.

Proposition 10: Hope encourages individuals to take, or to continue, action to achieve desired outcomes.

Physiology. Because the action tendency of hope involves preparing to act, PHT posits that hope, like other emotions that prepare individuals to act, is physiologically manifested as an

⁹ Human behavior is motivated by approach (to gain rewards) and avoidance (to avoid punishment) tendencies. Approach and avoidance motivations are found in all organisms from humans to single cell amoeba (Elliott & Covington, 2001). These motivations guide survival, adaptation, and evolution (Cosmides & Tooby, 2000; Davidson, 1992). Different researchers have called these motivational systems by slightly different names, including approach and withdrawal systems (Davidson, 1993), behavioral approach and inhibition systems (Gray, 1990), and appetitive and aversive systems (LeDoux, 1995). No matter the name, the approach and avoidance motivational systems are distinct in the anatomy and chemistry of our brains. For example, approach behaviors are associated with activation of the left hemisphere whereas avoidance behaviors are associated with activation of the right hemisphere (Davidson, 1992).

increase in heart rate, heightened attention and focus, and an increase in neurological activity in the skin (i.e., skin conductance). The increase in heart rate speeds the provision of oxygen and nutrients to the muscles in preparation for physical action. Heightened attention and focus allow the individual to rapidly process environmental stimuli, which enables her to take advantage of the opportunity presented by the stimulus. The increase in neurological activity of the skin is an indication of an individual's increased preparation for faster neurological reactions that enable quick movement.

Proposition 11: Individuals physiologically experience hope as an increase in heart rate, heightened attention and focus, and an increase in neurological activity in the skin.

Motor expression. Like the physiological reactions, the motor expressions of hope allow individuals to rapidly take in and process environmental stimuli that prepare them for action. This action allows the individual to take advantage of the opportunity presented by the stimulus. The facial expression of hope is one of raised eyebrows, widened eyes, and focused attention (Roseman, 2001). PHT further hypothesizes that in hope, the body posture is erect, often with a slight forward lean and muscular tension. It is the combination of these motor expressions, rather than any one expression, that distinguishes hope from other emotions.

Proposition 12: Hope is expressed through raised eyebrows, erect body posture, muscular tension, and a forward leaning body position.

Subjective feeling. The subjective feeling of hope (i.e., how hope feels) is a feeling of eagerness, anticipation, and readiness (Roseman, 2001). Individuals feel this eagerness for achieving the desired outcome or avoiding the negative outcome. For example, a person who wants to buy a fuel-efficient car will feel hope in response to an ad about cash incentives for trading in inefficient cars (e.g., the 2009 Cash for Clunkers program). He will be eager to do what

he can to take advantage of this opportunity and will be ready to take action to replace his inefficient car.

Proposition 13: Hope is experienced as a subjective feeling of eagerness, anticipation, and readiness.

Summary

Hope is a discrete emotion that involves appraisals of a stimulus as novel and relevant to a future or unknown outcome, that is consistent with goals, possible but not certain, important, and consistent with a better future. I postulate that hope also involves (a) an approach action tendency that motivates individuals to take, or continue, action to achieve the desired outcome, (b) increased heart rate and skin conductance, (c) an open facial expression, heightened focus, and alert body posture, and (d) a feeling of eager attention.

Predicted Moderators of Hope

Several factors may affect feelings of hope. PHT predicts that the temporal distance between the experience of hope and the future outcome as well as the accessibility of the hoped-for outcome moderate hope. Temporal distance is predicted to have an inverse relationship with hope, whereas accessibility has a positive relationship with hope.

Temporal Distance

The temporal distance between the experience of hope and the hoped for outcome moderates the emotional experience. The farther away in time the outcome is, the less emotional impact it has. For example, if a rewarding outcome is likely to happen in the next few minutes, the experience of hope is stronger than if the same outcome is likely to happen in the next few decades. However, a temporally distant outcome may still be the focus of strong hope if the future

outcome is highly important and/or highly goal congruent. Although climate change mitigation is a distant outcome, many people believe that slowing climate change is critical to our future. These people will feel hope strongly in response to stimuli that have implications for climate change mitigation regardless of the temporal distance of this outcome. However, for others, the perceived temporal distance between any stimulus and the mitigation of climate change is so great that it will dampen their hope.

Proposition 14: Hope is inversely related to temporal distance, such that individuals feel less hope when they appraise greater temporal distance between the present and the future outcome.

Proposition 15: Appraisals of importance and goal congruence moderate the relationship between temporal distance and hope, such that in the presence of high appraisals of importance and/or goal congruence, individuals may feel hope strongly despite appraising a great temporal distance to the desired outcome.

Accessibility

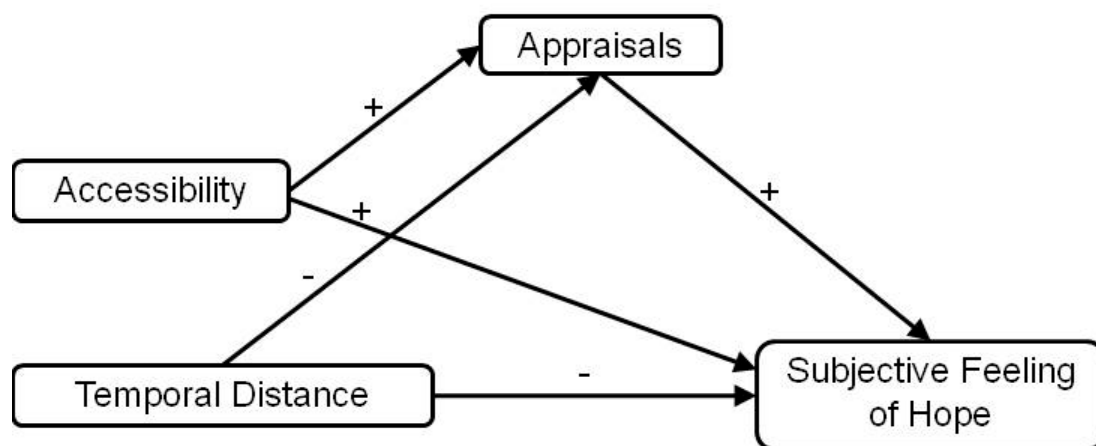
Unlike temporal distance, accessibility has a positive relationship with hope. Accessibility is the ease of activating a cognition from memory (Pfau et al., 2004). A cognition is more accessible if it has been recently activated or is frequently activated (see Roskos-Ewoldsen, Arpan-Ralstin, & St. Pierre, 2002 for a discussion of attitude accessibility and persuasion). Thus, the more frequently an outcome is reflected upon and hoped for, the more accessible it becomes. Cognitions about future outcomes that are more accessible seem more important and thus create stronger feelings of hope. For example, a person who is writing a paper on climate change mitigation might be thinking about climate change frequently, making her attitudes, beliefs, and behaviors related to this outcome more accessible. This accessibility increases her likelihood of feeling hope and increases the degree of hope she will feel in response to an opportunity to

mitigate climate change. An accessible attitude can influence attention to the stimulus, how information is interpreted, and how deeply the information is processed (Roskos-Ewoldsen, 1997; Roskos-Ewoldsen & Fazio, 1992). For example, having accessible cognitions about a future outcome might make an individual appraise that outcome as more important than she otherwise would. It is important to note that accessibility has a much different time scale than the other concepts (e.g., appraisals) discussed here. Whereas appraisals and assessments of temporal distance happen as part of the hope experience, accessibility develops over the years, months, days, and minutes preceding the stimulus that begins the hope experience.

Proposition 16: Accessibility is positively related to hope, such that greater accessibility of thoughts about the future outcome leads to greater hope.

Figure 2.3 below illustrates the direct and indirect relationships between temporal distance and accessibility and subjective feelings of hope.

Figure 2.3: Proposed Relationships between Temporal Distance, Accessibility, Appraisals, and Subjective Feelings of Hope



Termination of Hope

Hope ends when the possibility of the hoped for outcome goes below the individual's sense of a realistic possibility into impossibility, when the outcome occurs (or does not occur), or when the possibility of the outcome becomes certain. Thus, a person who has been hoping to buy a fuel-efficient car no longer feels hope if he either buys the car or discovers that he is unable to buy the car. Hope also ends when individuals no longer appraise the outcome as goal congruent and/or important. If the person decides that instead of buying a fuel-efficient car, he will use a bicycle as his primary transportation, buying a fuel-efficient car is no longer important. Thus, he will not feel hope about buying a fuel-efficient car.

Proposition 17: When an outcome becomes certain or impossible or it is no longer appraised as goal congruent or important, individuals cannot feel hope related to that outcome.

Implications of PHT for Message Design

The above description of hope, its appraisals, action tendency, physiology, motor expression, subjective feeling, moderators, and termination have implications for the design of persuasive messages that evoke hope. Messages that attempt to evoke specific emotions (e.g., fear, guilt, hope, or pride) to create changes in behavior and antecedents to behavior are called *emotional appeals*. According to PHT, a *persuasive hope appeal* is a message designed to create the appraisals that constitute hope. Thus, to induce hope, a message should emphasize that the future outcome is (a) possible, (b) important, (c) consistent with the receiver's goals, and (d) will create a more positive future. As recommended by O'Keefe (2003), I define persuasive hope appeals by intrinsic message features rather than the message's effects. Thus, a persuasive hope appeal is a hope appeal because it contains elements designed to create the appraisals of hope, not merely because a receiver feels hopeful after reading it. By focusing on intrinsic message

features, PHT provides clear guidance to message creators. It is important to note that because emotions are responses to appraisals about a message, a hope appeal may evoke other emotions in addition to, or instead of, hope. For example, one person may read a message, appraise the future outcome as possible, important, and consistent with his goals, and believe that the outcome will create a more positive future. This person will feel hope. However, another person may read the same message, appraise the future outcome as *impossible*, important, and consistent with her goals, and believe that it would create a more positive future. This person will feel despair, not hope, because she did not appraise the future outcome as possible.

Like other theoretical explications of emotional appeals (e.g., fear appeals as discussed by Witte, 1992; Witte & Allen, 2000), I advance a framework for persuasive hope appeals that focuses on two components, (a) the inducement of hope through the presentation of an opportunity and (b) the presentation of recommended actions to achieve the desired outcome. The recommended actions component should include information designed to (a) increase the receiver's perception of his or her ability to perform the recommended action (self-efficacy) and (b) demonstrate the ability of the recommended action to achieve the desired outcome (response efficacy). Table 2.1 contains an example persuasive hope appeal with its components identified.

Inducement of Hope

To induce hope, a message must present an *opportunity* to the receiver. Based on PHT, there are several tactics that can create this opportunity and induce hope, including (a) increasing the possibility of an important outcome, (b) raising the goal congruence of a possible, important outcome, (c) heightening the importance of a possible, goal congruent outcome, (d) creating a vision for a better future if the outcome occurs, and/or (e) making an important, possible, goal-congruent outcome seem temporally closer. A hope appeal does not have to employ all these tactics in one message. The appraisals of importance, goal congruence, positive future expectation and possibility all must be present for a person to feel hope. However, the hope

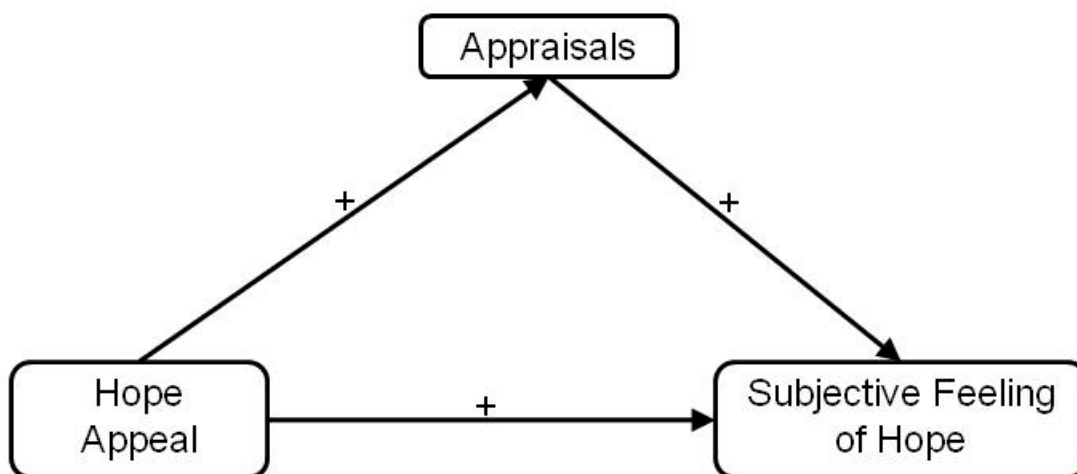
appeal does not need to address all four appraisals if the audience already holds beliefs and attitudes that are consonant with the appraisals. For example, if I were designing a climate protection message for environmentalists, I would not need to include components that address importance, goal congruence, or positive future expectation because my audience already believes climate protection to be important, goal congruent, and creating a positive future. Thus, the mere mention of climate protection will be enough to evoke these appraisals. Therefore, my message might only address the possibility of mitigating climate change, but will still evoke all four of the appraisals necessary to hope and hence meet the definition of a hope appeal.

Proposition 18: Hope appeals are messages designed to evoke appraisals of importance, goal congruence, positive future expectation, and possibility.

Proposition 19: Hope appeals evoke subjective feelings of hope.

Figure 2.4 illustrates the relationships between hope appeals, appraisals, and subjective feelings of hope.

Figure 2.4: Proposed Relationships between Hope Appeals, Appraisals, and Subjective Feelings of Hope



Recommended Actions

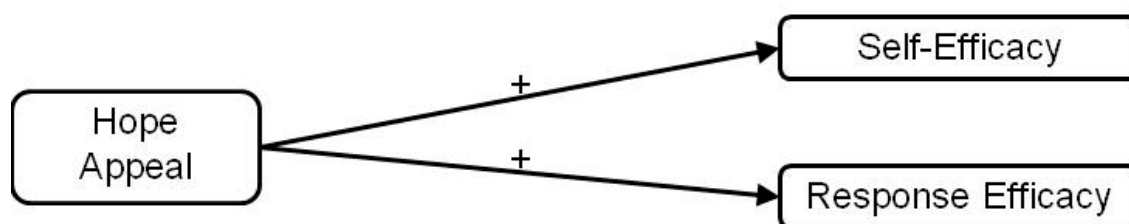
Once a message has induced hope via one or several of the above tactics, the message must present recommended actions that the audience can perform to achieve the hoped-for future outcome. It is important that messages explicitly link the recommended action to the desired future outcome. A message might include only one recommended action or might include multiple actions. These actions may range from seeking information to complete lifestyle changes. In general, explicitly identifying the recommended action and the steps, if any, involved in the action is more effective than implicitly hinting at recommended actions (Witte, Meyer, & Martell, 2001). As with other emotional appeals, the recommended actions component should include information designed to (a) increase the receivers' perception of their ability to perform the recommended action (self-efficacy) and (b) demonstrate the ability of the recommended action to achieve the desired outcome (response efficacy) (Witte, 1992; Witte, Meyer, & Martell, 2001).

Self-efficacy is the degree to which receivers believe that they are able to perform the recommended response successfully and to exert control over their lives (Bandura, 1986). Self-efficacy is an important predictor of individual behavior (e.g., Godin & Kok, 1996; Schwarzer & Fuchs, 1995). Communicators can enhance self-efficacy by describing actions as simple or easy and by clearly articulating the steps that are part of the action to reduce the receiver's uncertainty. In addition, messages can include statements of encouragement (e.g., "You can do it.") to raise self-efficacy.

Response efficacy is the receiver's perception of the ability of the recommended action to achieve the desired outcome (Witte, Meyer, & Martell, 2001). Like self-efficacy, response efficacy is related to behavioral intentions and behavior (Floyd, Prentice-Dunn, & Rogers, 2000). Messages can raise perceived response efficacy by demonstrating the connection between the recommended action and the future outcome. In addition, communicators can provide credible sources that support this connection.

Figure 2.5 illustrates the proposed relationships between a hope appeal and self- and response efficacy. Although self-efficacy and response efficacy are both beliefs about ability, they focus on different types of ability. Self-efficacy focuses on individual ability to perform behavior, whereas response efficacy focuses on the ability of a behavior to effect circumstances. Any relationship between self-efficacy and response efficacy is likely to be small and is not relevant to PHT at this stage of theoretical development. However, both self-efficacy and response efficacy are related to behavioral intentions and behavior, which is depicted later in Figure 2.6.

Figure 2.5: Proposed Relationships between Hope Appeals, Self-Efficacy, and Response Efficacy



Example of a Persuasive Hope Appeal

Table 2.1 presents a partial message about climate change protection that I developed for college students. The message illustrates the components of a persuasive hope appeal. The message induces hope by emphasizing the appraisals that evoke hope (i.e., importance, goal congruence, positive future expectation, and possibility) and provides recommended actions to achieve the desired outcome. First, the message attempts to evoke an appraisal of importance by describing the connection between the climate and the reader's well-being. By making climate change mitigation personally relevant, the message should lead a reader to believe that protecting the climate is important. Second, the message attempts to evoke an appraisal of goal congruence by linking climate protection to the goal of saving money, which formative research indicated

was important to the audience. By connecting climate protection to an important goal, the message should lead a reader to believe that protecting the climate is congruent with his or her goals. Third, the message attempts to evoke an appraisal of positive future expectation by describing how much better the future will be if we protect the climate. By helping the receiver visualize a future that is better than the present, the message should lead him or her to believe that protecting the climate will result in a much better future. Fourth, the message attempts to evoke an appraisal of possibility by describing the large number of people who are already trying to protect the climate. By making the receiver feel part of a larger climate protection movement, the message should lead him or her to believe that protecting the climate is possible. The appraisals of importance, goal congruence, positive future expectation, and possibility should lead the reader to feel hope in response to this message.

After the inducement of hope, the message presents two recommended actions that the reader can take to achieve the desired outcome of protecting the climate. The message explicitly details the recommended actions and their connection to the future outcome. Not only does the message describe the actions, but it also contains elements designed to raise self-efficacy and response efficacy. To raise self-efficacy, the message describes the actions as “easy” to make the reader feel confident in his or her ability to perform the behaviors. To raise response efficacy, the message identifies how the action can help protect the climate by indicating in what way, and how much, greenhouse gas emissions will be reduced by the action.

Table 2.1: Persuasive Hope Appeal for Climate Change Protection with Appeal Components Identified

Component	Message
Importance	The climate affects your well-being in many ways. The climate will affect your health. Your health is affected by air quality. A bad climate increases your chances of getting diseases. A bad climate also affects your finances. A bad climate will cost you money. You will pay more for air conditioning. Food and energy prices will be much higher. You will be healthier and wealthier in a good climate. Protecting the climate is very important for your well-being.
Goal	Protecting the climate saves you a lot of money. You can make simple
Congruence	changes to protect the climate. You can use less energy, use less hot water, and make less trash. These changes are free or cheap. These small changes will directly save you at least \$500 per year. In four years at this university, you will save \$2000! That is a lot of money.
Future	Protecting the climate will make the future much better. Protecting our climate
Expectation	will bring a wonderful future. Our air will be much cleaner. Our weather will be much less extreme. Our summers will be beautiful and mild. We will experience many fewer diseases and will live much longer. Growing food will be easier and more productive. By helping protect the climate, you can help create a wonderful future.

Possibility	<p>It is very likely that we can make the climate better. All over the world, people like you are taking action. They are using less energy, using less hot water, and making less trash. Billions of people are taking action to protect the climate. You can join the effort and make it even more likely that we will make the climate better.</p>
Recommended	<p>Want to help stop climate change? Take action with these two easy steps.</p>
Actions	<ol style="list-style-type: none">1) Unplug your cell phone charger when you are not using it. Your cell phone charger uses energy whenever it is plugged in, even when it is not attached to your phone. Cell phone chargers, DVD players, and other 'always on' electronics make up 5 percent of all home energy use. These devices put 18 million tons of carbon dioxide into the air every year. If you unplugging your cell phone charger, you will keep this carbon dioxide from going into the air.2) Use a reusable water bottle. Making and shipping the disposable plastic water bottles burns fossil fuels and emits carbon dioxide. The plastic water bottles used in one year in the U.S. use more than 17 million barrels of oil. Making these bottles emits more than 2.5 million tons of carbon dioxide. Trucking the bottles to stores emits even more. By using a reusable water bottle, you can stop these greenhouse gases from going into the air. You can buy a reusable water bottle at a grocery or sporting store for five to ten dollars.

Persuasive Effects of Messages that Evoke Hope

By manipulating the appraisals that are likely to be evoked by a message and thus inducing emotion, communicators can influence attitudes and behavior. According to Dillard and colleagues, emotions have predictive power for persuasion beyond that of cognition (Dillard & Peck, 2000, 2001) and have both direct and indirect paths to persuasion (Dillard & Nabi, 2006). The evocation of hope in a hope appeal should affect message attention and interest in the topic of the message. The combination of the evocation of hope and the recommended behavior and efficacy messages should affect self-efficacy, response efficacy, attitude toward the behavior, behavior intention, and behavior.

Message Attention

The focused, eager feeling and physiology of hope should increase generalized attention. As the source of the feeling of hope, attention is likely to be directed to the persuasive message. According to the cognitive-functional model (Nabi, 1999) a person's attention to a message is a function of his or her expectation that the message contains goal-relevant information. If a receiver expects the message to provide that information, he or she is motivated to process the information (Nabi, 1999, 2002). Thus, attention to a persuasive hope appeal is amplified by the extent to which the receiver expects the message to help him or her achieve desired outcomes.

Proposition 20: Subjective feelings of hope evoked in response to a message should lead to greater message attention.

Interest

Subjective feelings of hope evoked in response to a hope appeal should increase generalized interest in the topic of the message. Political science research nearly always operationalizes affect as bipolar mood; however, the research of Marcus and colleagues merits

further discussion. In the context of presidential campaigns, Marcus and MacKuen (1993) describe mood on orthogonal dimensions of enthusiasm and anxiety. They define enthusiasm as a response to stimuli that have positive implications for a person's goals whereas they define anxiety as a response to threatening stimuli (Brader, 2005). Marcus and colleagues often measured enthusiasm using hope as one of the items in their scale. Marcus and MacKuen (1993) found that anxiety motivates learning whereas enthusiasm leads to interest and involvement.

By making a positive outcome more important, goal congruent, and possible, a persuasive hope appeal stimulates increased interest in that outcome. Inherently, an important, goal-congruent outcome is interesting and involving. Heightening the importance, goal congruence, and/or possibility, and/or decreasing the temporal distance of that outcome should lead to increased interest. Additionally, increased interest and involvement should lead to more systematic processing (Petty & Cacioppo, 1986) and greater behavior intentions.

Proposition 21: Hope evoked in response to a message should lead to greater interest in the topic of the message.

Self-Efficacy and Response Efficacy

The recommended action component of the hope appeal, which includes self-efficacy and response efficacy statements, should directly increase self-efficacy and response efficacy. As mentioned previously, self-efficacy is the degree to which a receiver believes that he or she is able to perform the recommended response successfully and response efficacy is the receiver's perception of the ability of the recommended behavior to achieve the desired outcome. Stronger self-efficacy beliefs are associated with greater behavior intentions and actual behavior (Bandura, 1986). Higher response efficacy is associated with greater behavior intentions (Witte, Meyer, & Martell, 2001). Persuasive hope appeals directly attempt to increase both self-efficacy and

response efficacy, thus they should be associated with higher self-efficacy and higher response efficacy.

Proposition 22: A hope appeal should lead to greater self-efficacy and greater response efficacy than prior to the message.

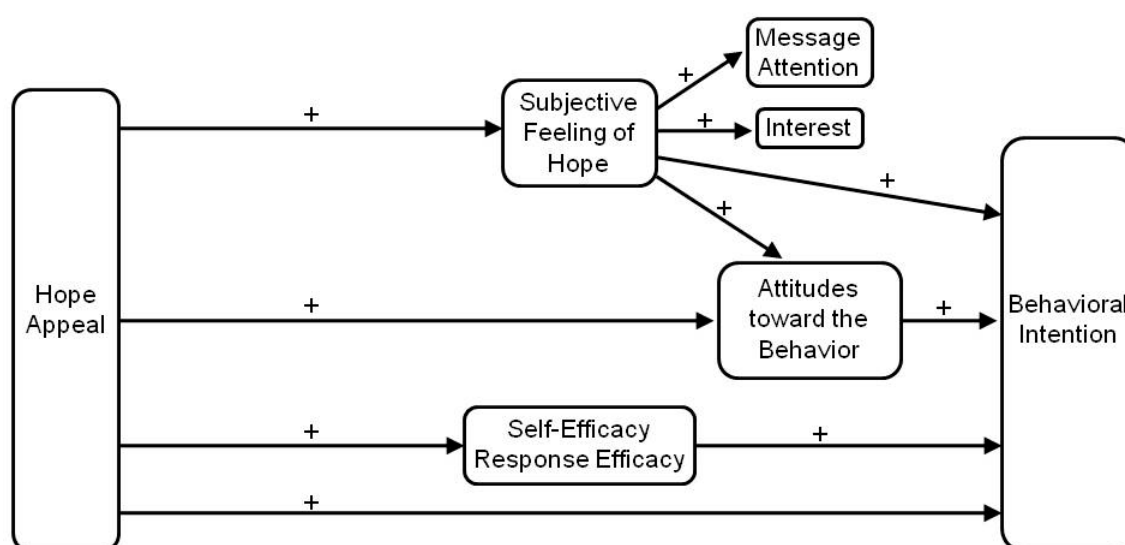
Attitudes Toward the Behaviors, Behavioral Intention, and Behavior

Hope appeals also affect attitudes toward the recommended behaviors, behavioral intentions, and behavior. The degree to which an individual feels positively or negatively toward the recommended behavior (attitude toward the behavior) is predictive of behavioral intention (Fishbein & Ajzen, 1975). By identifying how a desired future outcome can be realized through effective recommended behavior, persuasive hope appeals should result in more positive attitudes toward the behavior and greater behavioral intention. This effect may be a direct effect of the message or may be mediated through subjective feelings of hope. Emotions that are evoked by persuasive messages directly affect behavior intention by arousing the action tendency associated with the emotion. Persuasive hope appeals evoke an approach tendency that stimulates actual or preparatory action toward the desired outcome. Hope encourages the formation of subgoals for achieving the behavior, reinforces goal commitment, and strengthens motivation (de Mello & MacInnis, 2005; Marcus & MacKuen, 1993). Behavior intention, in turn, influences actual behavior (Fishbein & Capella, 2006). According to PHT, the action tendency evoked by a hope appeal should drive a receiver to perform the recommended behaviors that will enable him or her to achieve the desired outcome.

Proposition 23: Hope appeals should result in more positive attitudes toward the behavior, greater behavioral intentions, and more behavior than prior to the message.

Figure 2.6 illustrates the relationships between hope appeals, subjective feelings of hope, message attention, interest in the message topic, self-efficacy, response efficacy, attitudes toward the behaviors, and behavioral intentions.

Figure 2.6: Proposed Relationships between Hope Appeals, Subjective Feelings of Hope, Message Attention, Interest in the Message Topic, Self-Efficacy, Response Efficacy, Attitudes toward the Behaviors, and Behavioral Intentions



Individual Characteristics that May Affect Responses to Hope Appeals

Several individual characteristics are likely to affect receivers' responses to hope appeals. These characteristics include prior knowledge, trait optimism, trait anxiety, perceived severity and susceptibility, and identity. Individual characteristics may affect subjective feelings of hope directly or indirectly via effects on the appraisals individuals make in response to a hope appeal. Communicators should consider these characteristics when segmenting the target audience for hope appeals.

Prior Knowledge and Subjective Knowledge

Prior knowledge has been linked to persuasive outcomes including increased resistance to attitude change (Wood, 1982) and greater message processing (Wood & Kallgren, 1988). Recently Nabi and colleagues (Nabi, Roskos-Ewoldsen, & Carpentier, 2008) examined the impact of objective and subjective knowledge on responses to fear appeal messages. Objective knowledge is how much a person *actually* knows about the subject of the message before the presentation of the message. Subjective knowledge is how much a person *believes* she knows about the subject of the message. Nabi and colleagues found that higher subjective knowledge was associated with lower fear arousal, but objective knowledge did not relate to fear arousal (Nabi, Roskos-Ewoldsen, & Carpentier, 2008). Thus, subjective knowledge may similarly dampen arousal of hope in response to hope appeals.

Proposition 24: Subjective knowledge affects feelings of hope, such that greater subjective knowledge results in less hopeful feelings.

Trait Optimism

Chronic activation or accessibility of an emotion predisposes an individual to feeling that emotion (Frijda, 2001; Scherer, 2001b). Thus trait optimism may predispose a person to feel hope in response to a persuasive hope appeal. Trait optimism not only predisposes individuals to feel the emotion hope, but may also affect tendencies to appraise outcomes as goal-congruent (Roseman, 2001), possible, and leading to a better future.

Proposition 25: Trait optimism is positively related to the evocation of hope by hope appeals, such that individuals with high trait optimism are more likely to feel hope and feel greater in response to a hope appeal than do individuals with low trait optimism.

Trait Anxiety/Chronic Fear

It is possible that trait anxiety will also affect responses to hope appeals. In a study of emotional resonance, Roseman, Abelson, and Ewing (1986) found that fearful people, not hopeful people, were attracted to organizations that used hope appeals. Pooling across two studies, they found that the correlation between being fearful and preferring hope appeals was .28. Thus, a predisposition to experiencing fear may make individuals more susceptible to persuasive hope appeals.

Proposition 26: Trait anxiety is positively related to attention to hope appeals, such that individuals with high trait anxiety pay greater attention to hope appeals than do people with low trait anxiety.

Perceived Severity and Perceived Susceptibility

Hope appeals show individuals how to achieve desired outcomes as well as how to avoid negative outcomes. Thus, there may be a relationship between feelings of hope and an individual's perception of how threatening a potential outcome is (e.g., continued climate change). It is possible that the more threatening an individual perceives a negative outcome to be, the more likely the individual is to feel hope. Perceived severity, how bad the negative outcome is, and perceived susceptibility, the likelihood of the individual experiencing the negative outcome, combine to create perceptions of threat (Witte, 1992). Thus, perceived severity and susceptibility may affect feelings of hope.

Proposition 27: Perceived severity and perceived susceptibility affect feelings of hope evoked by hope appeals, such that an individual with high perceptions of severity and/or susceptibility is more likely to feel hope and to feel greater hope in response to a hope appeal than is an individual with low perceptions of severity and/or susceptibility.

Identity

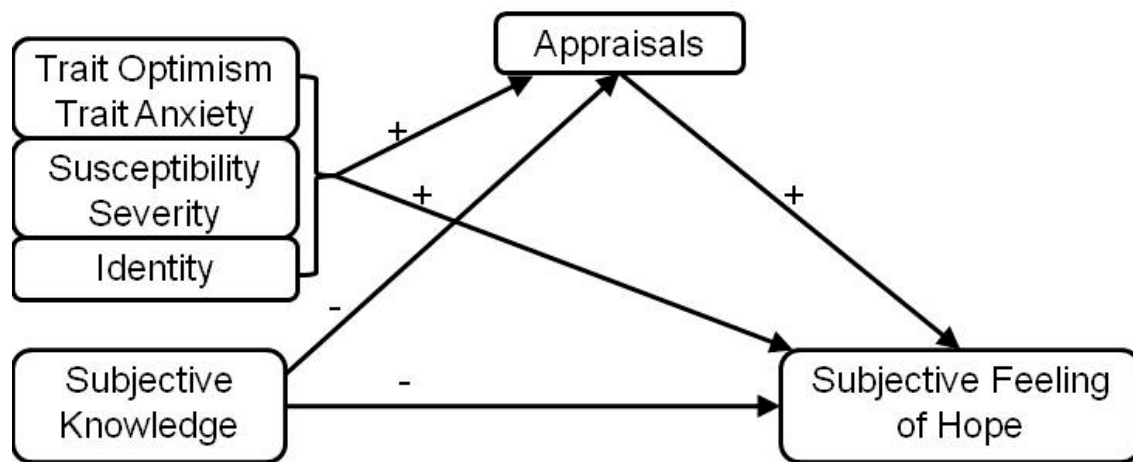
Identity is a multifaceted and complex construct that affects, and is affected by, communication (Hecht, Warren, Jung, & Kreiger, 2004). Broadly, identity can be defined as the degree to which an individual adopts the attitudes and values of a particular group and the degree to which she feels that she belongs to that group (Phinney, 1992). Identity can affect perceptions, judgments, decisions, and behavior (Oyserman, Coon, & Kemmelmeier, 2002). Thus, it makes sense that identity could affect appraisals and responses to hope appeals. The effect of identity on responses to hope appeals is likely to be particularly marked in cases where the topic of the message directly relates to an individual's identity (e.g., the individual identifies as an environmentalist and the message is about climate change).

Proposition 28: Identity affects appraisals and feelings of hope evoked by hope appeals.

Figure 2.7 below demonstrates the proposed relationships between trait optimism, trait anxiety, perceived susceptibility, perceived severity, subjective knowledge, identity, appraisals, and subjective feelings of hope. To be succinct, the four appraisals of the outcome are represented as one box; however, the individual characteristics may affect some appraisals and not affect others. For example, perceived susceptibility and perceived severity are most likely to have a positive relationship with appraisals of importance and goal congruence, whereas they may have no relationship with future expectations and possibility. Similarly, trait optimism and trait anxiety might have the strongest relationships with future expectations. As the figure indicates, trait optimism, trait anxiety, perceived susceptibility, and perceived severity have positive relationships with the appraisals and with subjective feelings of hope. Subjective knowledge has negative relationships with the appraisals and subjective feelings of hope. The direction of the relationships between identity and the appraisals and subjective feelings of hope is dependent on

the identity in question and the outcome that is the focus of the appraisals. For the model below, identity refers to environmental identity in the context of climate protection.

Figure 2.7: Proposed Relationships between Trait Optimism, Trait Anxiety, Perceived Susceptibility, Perceived Severity, Subjective Knowledge, Environmental identity, Appraisals, and Subjective Feelings of Hope



Developing Hope Appeals and Testing Persuasive Hope Theory

As mentioned previously, the purpose of this dissertation is twofold. First, I seek to enhance previous research on the role of emotions in persuasion, and I offer new insights by conceptualizing and operationalizing hope and hope appeals in a persuasive context. Second, I seek to empirically test the role of hope and hope appeals in persuasion by (a) examining relationships between subjective feelings of hope and appraisals, (b) exploring relationships between subjective feelings of hope and behavioral antecedents, (c) assessing the effects of hope appeals, and (d) identifying individual characteristics that affect the above relationships and effects. In this chapter, I have conceptualized hope in a persuasive context and conceptualized hope appeals through the development of persuasive hope theory. To operationalize hope appeals, I conducted qualitative and quantitative formative research studies, which I describe in chapter

three. I accomplished the second purpose of this dissertation through two experimental studies (Study 1 and Study 2). Study 1 was a message components study that examined separately the effects of the proposed components of a hope appeal (i.e., separate components designed to evoke each of the four appraisals hypothesized to create hope). Study 2 examined the effects of complete hope appeal messages. Below, I describe the hypotheses and research questions that I addressed in each of the two experimental studies.

Hypotheses and Research Questions

The propositions of persuasive hope theory lend themselves to the development of numerous hypotheses and research questions that can be empirically tested. Because PHT is a newly developed theory, this dissertation tested a small subset of the hypotheses and research questions that could be derived from the propositions. Specifically, I (a) tested PHT's proposed relationships between subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility, (b) examined the relationships between subjective feelings of hope and behavioral antecedents, (c) assessed the effects of hope appeals developed in accordance with PHT, and (d) identified individual characteristics that affect the appraisals and subjective feelings of hope. Table 2.2 details the hypotheses and research questions in each of these areas, identifies the proposition from which I derived the hypothesis or research question, and indicates in which study (Study 1 or Study 2) I addressed the hypothesis or research question. Figure 2.8 graphically represents the hypotheses and research questions. Persuasive hope theory and this dissertation begin what I hope will be a fruitful theoretic development and empirical testing of the role of hope and hope appeals in persuasion.

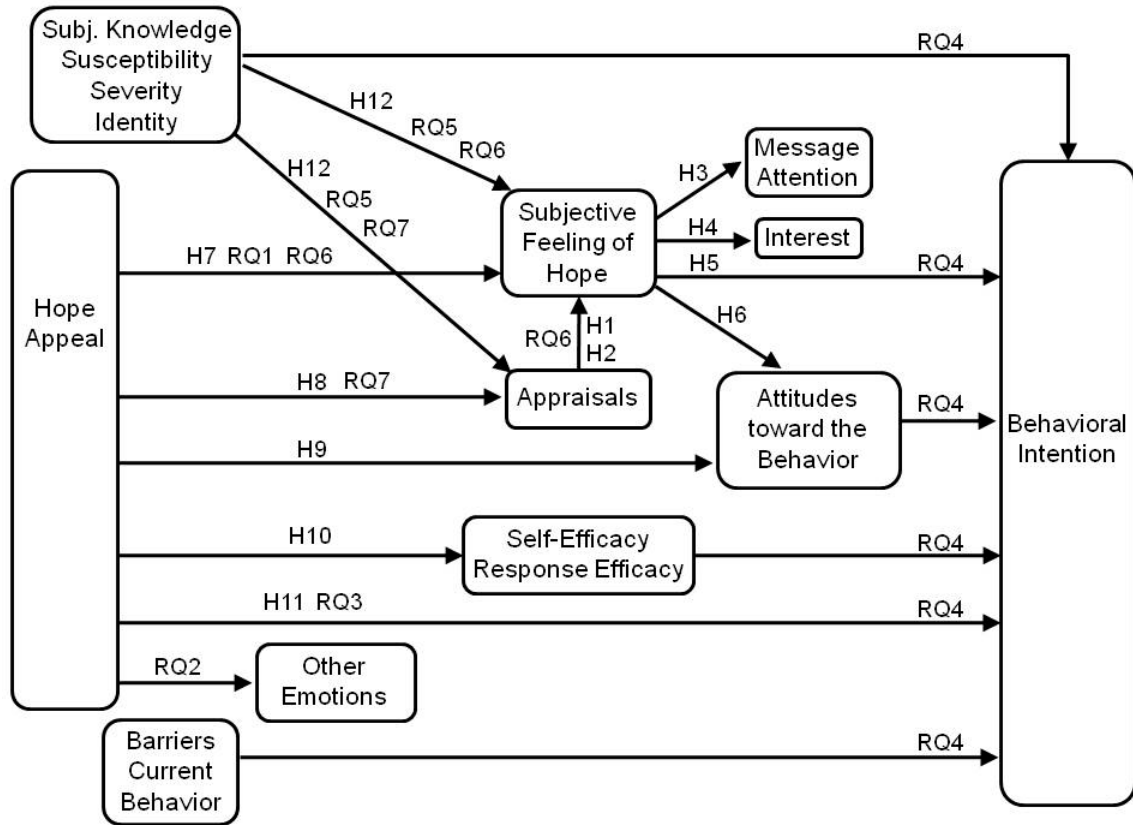
Table 2.2: Hypotheses and Research Questions, Related Propositions, and the Study(s) that Address Them

Prop	Hypothesis or Research Question	S1	S2
APPRAISALS AND SUBJECTIVE FEELINGS OF HOPE			
H1:	Subjective feelings of hope are positively related to appraisals of importance, goal congruence, possibility, and future expectation.	X	X
H2:	Appraisals of importance, goal congruence, possibility, and future expectation predict subjective feelings of hope.	X	X
HOPE AND BEHAVIORAL ANTECEDENTS			
H3:	Subjective feelings of hope are positively related to message attention.	X	X
H4:	Subjective feelings of hope are positively related to interest.	X	X
H5:	Subjective feelings of hope are positively related to behavioral intentions.	X	X
H6:	Subjective feelings of hope are positively related to attitudes toward the behaviors.		X
EFFECTS OF HOPE APPEALS			
H7:	A strong hope appeal leads to more hope than does a weak hope appeal.	X	X
RQ1:	What is the relative contribution of each of the hope appeal components in predicting feelings of hope?	X	
RQ2:	Do hope appeals result in emotions other than hope?	X	X
H8:	A hope appeal leads to higher appraisals of importance, goal congruence, positive future expectation, and possibility.	X	X
H9:	Hope appeals lead to more positive attitudes toward the behaviors.		X
H10:	Hope appeals lead to greater perceived self-efficacy and response efficacy.		X
H11:	Hope appeals lead to greater behavioral intentions.	X	X

RQ3: What is the relative contribution of each of the components in predicting behavior intention?	X	
RQ4: Do post-message subjective feelings of hope and type of hope appeal along with individual characteristics and behavioral antecedents predict behavioral intention?	X	
<hr/> INDIVIDUAL CHARACTERISTICS <hr/>		
H12: Subjective knowledge is inversely related to feelings of hope in response to a hope appeal and to the appraisals evoked by a hope appeal.	X	
RQ5: How are perceived susceptibility, perceived severity, and environmental identity related to subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility?	X	
RQ6: How much of the variance in post-message subjective feelings of hope can be explained by subjective knowledge, perceived severity, perceived susceptibility, environmental identity, message condition, and appraisals of importance, goal congruence, future expectation, and possibility?	X	X
RQ7: How much of the variance in each of the appraisals can be explained by subjective knowledge, perceived severity, perceived susceptibility, and environmentalist identity in addition to message condition and appraisals of importance, goal congruence, future expectation, and possibility?	X	X
RQ8: What is the best model for the relationships between message conditions, individual characteristics, appraisals, and subjective feelings of hope?	X	

Note. Prop = Proposition, H = Hypothesis, RQ = Research Question, S1 = Study 1, S2 = Study 2

Figure 2.8: Representation of Hypothesized Relationships



CHAPTER THREE:

FORMATIVE RESEARCH

Overview

To guide the development of hope appeal messages, I conducted formative research with my target audience. My formative research serves as the bridge between my conceptualizations of hope and hope appeals and the empirical studies that test those conceptualizations. The goals of the formative research were to understand how college students talk about climate change and climate protection, to guide the development of climate protection messages, and to inform the development of survey questions about antecedents to climate protection behaviors. The formative research consisted of two phases. The first phase was a qualitative focus group study and the second phase was a quantitative survey. The focus groups and survey examined college students' emotions, perceptions, barriers, behavior, and behavior intentions regarding climate change mitigation. Below, I first describe why I chose college students to be my target audience. Next, I present the methods and results of the focus group study. Then, I discuss the methods and results of the survey. Finally, I provide a brief summary of the formative research.

Target Audience

Numerous individuals and organizations will need to change their behavior to mitigate climate change. I chose college students as the target audience because they are at an age that is most susceptible to changes in attitudes, beliefs, and behaviors (Alwin, 1994; Alwin, Cohen, & Newcomb, 1991; Alwin & McCammon, 2003). Alwin (1994; 1995) described six models of human stability throughout the life course. The models that are most relevant to attitude, belief, and behavior change all indicate that an individual's personality, identity, attitudes, beliefs, and

values are extremely malleable between the ages of 18 and 25 and continue to be malleable until age 30 or 35 (Alwin & McCammon, 2003). Thus, interventions that aim to change mitigation behaviors are likely to be most effective if targeted to audiences aged 35 years or less, which includes college students. Although most college students do not typically exert political or financial influence related to climate protection, they are in the process of developing new life habits separate from their families. Communicators have an opportunity to affect those habits to make them protective of the climate.

Focus Groups

The first phase of my formative research consisted of a focus group study. I chose to conduct focus groups because they can be advantageous when examining complex behavior and motivations. First and foremost, focus groups allow for interaction between the participants, which often evokes reactions that delve deeper into less consciously-held attitudes, beliefs, and motivations than might be evoked by dyadic interviews (D. L. Morgan & Krueger, 1993). As participants discuss the issues presented to them, they offer a wide range of opinions, including multiple opinions held by each member, and identify conditions under which those opinions come into play. In addition, by conducting focus groups, I was able to collect data from a larger sample in a shorter amount of time than I would if I were doing interviews. I collected data via 10 in-person, audio-recorded focus groups that lasted approximately one hour. Participants also filled out a brief demographic survey. Participants discussed their attitudes and beliefs about: a) environmental issues, b) climate change, and c) behaviors to ameliorate climate change. I analyzed the transcripts of the focus groups by applying inductive and deductive codes to the transcripts.

Methods

Participants

Participants were a convenience sample of 80 undergraduate students (40 female and 40 male) taking an introductory communication course at The Pennsylvania State University. This course is required for all students at the university, thus the sample population mirrors the undergraduate population of the university. Students earn two percent of their grade in the course by participating in a research study, creating a pool of research participants. Participants had an option of completing an alternative assignment to earn their research credit. None of the students assigned to this study chose to complete the alternative assignment. Only students between the ages of 18 and 22 were included in this study because they were the target audience for my messages.

Sixty-six (82.5%) of the 80 eligible students participated in 10 focus groups. The number of participants in each group ranged from five to seven with a mean of 6.6 participants in each group. The participants ranged in age from 18 to 22 with an average age of 19.9 years old. Thirty-three (50.0%) of the participants were sophomores, 22 (33.3%) were juniors, 10 (15.2%) were seniors, and one (1.5%) was a “super senior.”¹⁰ Sixty (90.9%) of the participants identified themselves as Caucasian-American or White, three (4.5%) identified themselves as African-American or Black, two (3.0%) identified themselves as Hispanic or Latino/a, and one (1.5%) identified himself or herself as Native Hawaiian or Alaskan. None of the participants identified as Asian/Pacific Islander. Forty-four (66.7%) of the participants were from suburban locations, 15 (22.7%) were from rural locations, and seven (10.6%) were from urban locations. Fifty-four

¹⁰ Super seniors are undergraduates who are in their 5th year or beyond.

(81.8%) of the participants identified themselves as pro-environment and six (9.1%) identified themselves as environmentalists.

Setting

The focus groups took place between Tuesday, November 28 and Friday, December 1, 2006. Four focus groups had only female participants, four focus groups had only male participants, and two groups had both male and female participants. The focus groups met in classrooms on the university campus. All of the rooms had chairs with desks attached and at least one chalkboard. The desks were in a circle with one desk in the middle to hold the audio recorder. Because of my extensive training and experience as a focus group moderator, I facilitated all of the focus groups.¹¹ Although the focus groups occurred November 28 through December 1 in the Northeast United States, the weather was sunny and approximately 60°F for all groups except the final two groups on Friday, December 1. On that day, it was still warm (50-60°F); however, there was strong wind and periodic heavy rain. The weather may have had an effect on the conversations in the focus groups because several participants commented about the weather when discussing climate change.

¹¹ Although the prevailing wisdom is that researchers should not moderate their own focus groups, I chose to for several reasons. First, I am a trained focus group moderator and have conducted at least 30 groups on a variety of sensitive topics. My experience enabled me to control my verbal and nonverbal reactions so as not to influence responses. Second, my focus group research was exploratory and adjustments needed to be made to the guiding questions based on participant responses. I was in a better position to make these adjustments than an undergraduate research assistant would have been. Third, I did not have the funding to hire a professional moderator who would have been capable of adjusting the research questions during the groups.

Moderator's Guide

To begin the focus group, I introduced myself and described the study and the focus group process. I informed the participants that, with their permission, the group would be audio recorded. All groups consented to audio recording. Participants then read and signed an institutional review board (IRB) approved informed consent form and completed a brief demographic questionnaire (Appendix A).

The focus groups were conducted using a semi-structured focus group guide (Appendix B). The guide focused on key concepts related to the proposed persuasive effects of hope appeals. The three-part guide explored participants' attitudes and beliefs about a) environmental issues, b) climate change, and c) behaviors to mitigate climate change. Below, I describe only the portions of the focus group guide that are relevant to this dissertation. To capture the richness of information that respondents can provide in an open-ended focus group format, the guide was organized to encourage a naturally flowing conversation between the moderator and the participants. One of the advantages of focus groups as a method is that participants have an opportunity to react to each others' comments and the guide was designed to encourage this interaction.

To learn how participants spoke about environmental issues and whether climate change arose naturally in discussions of environmental issues, the first section of the guide focused on environmental issues in general. Participants discussed environmental issues that concerned them most, issues that concerned them the least, how the issues made them feel, and challenges to addressing the environmental issues.

The second part of the discussion focused on climate change. The purpose of this section was to learn more about how participants spoke about climate change and to guide the development of survey questions about antecedents to climate protection behaviors. Participants discussed a) emotions evoked by climate change, b) challenges to addressing climate change, c)

their perceived susceptibility to climate change impacts, and d) the perceived severity of climate change impacts.

The third part of the discussion focused on behaviors to mitigate climate change. In the first focus group, it became clear that not all participants believed that climate change is occurring or that it should be mitigated. However, a key purpose of the focus groups was to identify mitigation behaviors that participants believed that they could do and the barriers and motivators for these behaviors. Thus, at the beginning of the third section, participants were asked to assume: (a) that climate change exists and is happening and (b) that it needs to be slowed down. Participants did not have to agree with these assumptions, but the assumptions allowed for a discussion of mitigation behaviors without repeating discussions captured earlier in the focus groups about whether climate change exists and/or needs to be mitigated. Participants identified behaviors that individuals like them could perform to slow down climate change. I wrote the behaviors that they identified on a chalkboard and referred to them throughout the remaining discussion. Participants then discussed a) barriers they might face in performing the behaviors, b) what might motivate them and other students to do the behaviors, c) their confidence in performing the behaviors (i.e., self-efficacy), and d) how effective they thought those behaviors would be at slowing climate change (i.e., response efficacy).

The data reported in this dissertation is a subset of the data gathered in these focus groups. I analyzed a) the emotions that participants expressed when discussing climate change and environmental issues in general, b) challenges to addressing climate change, c) perceived susceptibility to climate change impacts, d) perceived severity of climate change, e) behaviors that participants thought they and others like them can do to mitigate climate change, f) barriers to engaging in these behaviors, g) motivators and facilitators for engaging in these behaviors, h) self-efficacy for performing the behaviors, and i) response efficacy for the behaviors.

Data Analysis

The focus groups were transcribed verbatim using the digital audio recordings. I masked the identity of the participants in the transcripts by replacing identifying information with numbers. I analyzed the data using thematic analysis, developing preliminary themes through repeated readings of the transcripts. I then organized the output by each theme and re-evaluated the categories for their conceptual fit with the data. I edited statements by participants to remove verbal fillers such as “like,” “you know,” and “um.” I tallied the data from the demographic questionnaire using SPSS.

Results

The primary goal of the focus groups was to identify salient attitudes toward climate change. Specifically, the groups identified emotions elicited by climate change, challenges to addressing climate change, perceptions of severity and susceptibility to climate change, behaviors that they believed would mitigate climate change, barriers to and motivators for these behaviors, and perceptions of self-efficacy and response efficacy.

Emotions Evoked by Climate Change

Participants discussed how they felt when they thought about environmental issues, including climate change. The purpose of this discussion was to identify key emotions to measure in the experimental portion of this dissertation. When thinking about climate change, participants predominantly felt apathy, hopelessness, and guilt or shame. They occasionally mentioned feeling fear, sadness, and anger.

Apathy. Many participants in all groups expressed that they did not care much about climate change or environmental issues in general nor did they think about them frequently. As a result, they did not experience emotional responses to climate change. Participants believed that they and others are apathetic because they do not believe that environmental issues will affect

them and they have priorities that are more important than environmental issues. For example, one female participant commented, “Some things like global warming, you want to be concerned about them, but because...it doesn’t seem like it’s affecting you right now, it’s really hard to be concerned about it.” Participants also mentioned that they have more important issues to worry about than the environment. Issues that participants mentioned as higher priorities included their schoolwork, having fun, and getting jobs. A minority reason participants gave for apathy about climate change and other environmental issues was that they believed they have little impact on the environment. One male participant commented, “I feel like in the grand scheme of things, my impact on the environment is pretty insignificant, so I don’t think it really matters that much.”

Hopelessness. Participants also expressed substantial feelings of hopelessness when confronting climate change and other environmental issues. They believed that as individuals there is little that they can do, particularly given the complex and large scale of climate change and other environmental issues. They most frequently mentioned that one person cannot affect global problems like climate change. For example, two male participants commented, “One single person can’t really make a difference” and “I feel like one person can’t really do anything.” Two female participants stated, “As an individual, I feel almost helpless because you feel like your voice doesn’t really count” and “You’re not going to be able to do anything about these big issues if you’re just one person. You’re not going to change anything.”

Guilt and Shame. Participants in nearly all groups expressed feelings of guilt for contributing to environmental problems through their behavior or for not caring more about the issues. Female participants were more likely to express feelings of guilt than were male participants. One female participant stated, “I feel kinda guilty because it seems like no matter what you do, in some way you’re causing some type of harm in every little thing that we do throughout the day.” Participants also expressed guilt and a sense of obligation due to the high consumption and pollution levels of the United States. One participant stated, “I think that we should start [protecting the climate] because America is the worst of everybody. So, it has to start

with us.... I think that *we*, really out of everyone, need to do something because it's mostly our fault." In a minority view, one male participant commented that guilt or shame is what individuals are supposed to feel, but that we should not feel shame because there have not been any negative effects of our consumption and pollution patterns.

Fear. In about half of the groups, participants mentioned feeling fear in response to climate change. Typically, participants related their fear to uncertainty about what the effects of climate change will be and how severe the effects will become. Males and females were equally likely to express fear. One female participant commented, "I'm kind of scared about what to expect if everything keeps progressing how it is. What's going to happen?" A male participant commented, "They don't really know how to stop [climate change] and they don't really know what's going to happen...it's the mystery behind it [that] is really scary."

Sadness. In a minority of groups, participants mentioned feeling sadness when they see examples of how people are negatively affecting the environment. In particular, irrevocable losses, like housing developments built where woods used to be or the extinction of animals, evoked sadness.

Anger. In some of the male groups, participants mentioned being angry about how apathetic and irresponsible humans are. For example, one participant commented, "There [are] small things you can do...I think it's pretty important. It bothers me every time I read something about [environmental issues] because I feel like we're pretty irresponsible in general."

Challenges to Addressing Climate Change

Participants identified several challenges to addressing climate change and other environmental issues. The purpose of this question was to understand general barriers to climate change mitigation. The primary challenge that participants identified was that environmental

problems are large¹² issues without clear solutions. They also mentioned that to solve these problems, everyone would have to be part of the solution, which they believed to be nearly impossible. One male participant commented that addressing environmental issues “requires society to change completely if you want to make a difference, but I don’t know if we’re ready for something like that.” Participants in most male groups and one female group mentioned that protecting the climate would negatively affect businesses and economic growth. In all groups, participants identified structural challenges, such as not having a good public transportation system or recycling facilities that are easy to access. Participants also believed that Americans lack the political will to address environmental issues. In a minority of groups, participants mentioned that uncertainty about the causes and effects of climate change inhibit actions to address climate change. One participant explained, “There are lots of people talking on both sides, so you don’t really know what to believe.” Several participants also mentioned that the lack of direct personal effects made the problem of climate change lack urgency. One participant commented, “The issues that are more localized and more immediate worry you because they actually have effects...and stuff like global warming...[is] so far away, and since...it’s hard to see effects...you’re like, ‘oh whatever, I’m not going to be around when that actually matters.’” A few participants also mentioned that there is not enough evidence to prove that climate change is happening.

¹² To the participants, “large” meant at a global scale, complex, and/or long-term.

Perceived Susceptibility to Climate Change Impacts

After discussing general effects of climate change and whom climate change will affect most,¹³ I asked each participant to identify how, if at all, climate change will affect him or her. The purpose of this discussion was to understand participants' sense of personal vulnerability and susceptibility to climate change impacts. The vast majority of participants in all groups stated that climate change will not affect them except perhaps for some minor positive and negative changes in the weather. Participants in half of the groups mentioned that climate change will affect their jobs or their health. In a minority of groups, participants believed that climate change would affect them, but they did not know how it would affect them. Some participants thought that climate change might affect their progeny. Rarely, participants mentioned that climate change might affect prices of commodities like energy and food.

No effect. Participants in all groups believed that climate change would not affect them. For example, two male participants in different groups stated, "I don't think it's going to have that much of an effect on me personally, but I guess future generations will have to deal with it" and "I don't see it really affecting me so much in the near future." A female participant stated, "I don't think that I'm going to be around long enough to see the drastic effects of global warming and climate change." Frequently, participants mentioned that because they did not foresee climate change affecting them, they did not care about the issue. One female participant said, "We don't

¹³ Prior to the conversation about personal effects of climate change, participants mentioned effects including melting ice caps and glaciers, flooding, sea level rise, disappearance of coastal areas, temperature increases, changes in weather patterns, increases in storms and natural disasters, human migration and overpopulation, animal migration, animal extinction, changes in crops, health effects, and extreme effects. They also discussed the people they thought would be most affected by climate change including future generations, people in poor and third world countries, countries close to the equator, people in polar regions, farmers, and people on the coast.

care because it doesn't affect us...and [even if] it does affect us it's not going to kill me ... so why should I care?" Similarly, a male participant stated,

I don't think it's going to affect me at all....I know the effects of it, if anything, [are] going to affect future generations. I guess I feel bad for them, but it's not like they will remember me ... so who cares?

Another female participant stated, "It kind of scares me and then I put it into perspective and say, 'That's not going to happen in my lifetime.' So then I stop worrying about it."

Minor weather changes. When participants did identify effects that climate change will have on them, they often cited both positive and negative weather changes. Some comments on positive weather changes included, "It just means that I [will] shovel less snow," "I'll have a nice tan," "It's not a bad thing that I can wake up at the end of November and wear short sleeves outside," "You won't need snow tires," and "I like warmer weather." Comments about negative weather changes included, "The ski season will be shorter and I won't be able to ski as much," "I won't be able to wear that big puffy jacket my parents bought me for Christmas," "I want it to snow," and "I like to have our seasons." One male participant elaborated, "I see it just getting annoying like...one weekend it will be cold and like Monday it could be hot. [I see it] just getting annoying...like you don't know what to wear."

Jobs. Participants in several groups explained that they are going into careers that climate change might affect. One male participant said he wants "to be a pathologist ... so I might have to treat people that have skin cancer or other diseases related to climate change." Another male participant said that the effects of climate change will affect his career. He said, "I could be getting into some kind of engineering where I'd be working with fuels and stuff and I'd have to come up with alternate [fuels] maybe." A female participant said that climate change will be a focus of her career. She said, climate change will "affect my job and everything because I will definitely be studying it hard core and I'm a meteorology major so a severe storm or something along those lines... will affect my job." One male participant said that climate change could positively affect his career,

I guess it will affect the kind of job I am going to get. Personally I was going to go to law school...so I think I might go into environmental law as opposed to something else, because I know it's going to be a big issue and I know I can get money there.

Two women in another group were concerned that climate change will hurt the economy and have a negative effect on their jobs. One woman explained,

It will affect how much [money] people have to pay [me]. ...I'm going to be a teacher so if I'm going to work at schools and be supported by taxes and people don't have money, it all goes into how much they want to pay in taxes to the school, and how much I'll get paid and how much I'll be able to support my family.

Health. Participants in half of the groups mentioned that climate change will negatively affect their health. They mentioned that they might get sunburns or skin cancer from the heat.¹⁴ Other participants were concerned about depression or suicide from not seeing the sun if it is cloudy and stormy all the time. A female participant said, "I'd just be stressed out about [climate change] if I was watching the news or something and hearing about [how] the water level rose and California's under water."

Do not know. In most groups, participants either said that they did not know *if* climate change is going to affect them or that they did not know *how* climate change will affect them. Two female participants said, "I definitely think it will affect me, but I think what's scary is I don't know how" and "I definitely think it will affect me in some way, but I really honestly have no idea what it will be." Other participants were unsure about whether climate change is going to affect them. Two male participants said, "I don't know how it's going to impact me in the future" and "I don't know too much about it, so I really don't really know what the effects are."

¹⁴ Several participants believed that the temperature (not exposure to ultraviolet radiation from the sun) would have an impact on sunburns and skin cancer. A few participants linked skin cancer to the ozone hole.

Effects on progeny. In a small minority of groups, participants said that climate change will affect them because it will affect their children or grandchildren. For example, one male participant said, “I don’t really think it’s going to affect me, but future generations will be my kids or my kids’ kids. So that’s a concern ... so I want to do everything I can now, but it won’t affect me otherwise.” A female participant was concerned about possible effects on her progeny, saying, “Maybe my children will have to suffer.”

Prices. Participants in a minority of groups mentioned that climate change might make prices for commodities higher or that the government will impose taxes as a strategy to mitigate climate change. One female participant explained,

I think things will just be more expensive for us like our bills for air conditioning will be higher and our food at the store will be more expensive because there’s less of it that can be grown, so I think we’ll end up paying a lot more for things.

A male participant talked about government taxes, saying, “I think maybe there will be a tariff or something on energy to stop releasing carbon into the atmosphere. Maybe that will affect me because I’ll have to pay more to drive [and] pay more for groceries.”

Perceived Severity of Climate Change

Participants’ perceptions of the severity of climate change were closely tied to their perceptions of susceptibility. Overall, participants said that climate change is not a serious problem right now because they are not experiencing any negative effects. A few participants commented that they were more concerned about issues other than climate change. They believed that the effects of climate change could be severe in the distant future and to other people, but that climate change will not affect them personally. One participant commented, “I think global warming is a problem that will affect us so far down the road that I’m not going to see it. My grandchildren will probably never see it. So I’m less concerned [about] global warming [than other environmental issues].”

Mitigation Behaviors

After discussing climate change, I asked participants to identify behaviors that they and others like them could do to slow down climate change. The purpose of this discussion was to identify potential recommended behaviors for the climate protection messages I was developing. Most frequently, participants mentioned limiting their driving by walking, biking, carpooling, or taking mass transportation. In every group, participants mentioned recycling and buying hybrid cars. Participants in most groups mentioned buying energy efficient products, educating themselves and others, and turning off lights and computers. In one or two groups, participants mentioned keeping their cars tuned up, turning down their heat, supporting environmental groups, planting trees, conserving water, growing their own food, buying organic food, limiting consumption, reducing waste, and buying solar panels.

Barriers to Mitigation Behaviors

After identifying potential mitigation behaviors, participants discussed barriers to those behaviors. The purpose of this discussion was to understand why participants do not engage in mitigation behavior and ultimately to develop strategies to overcome these barriers. The primary barriers that participants mentioned were a lack of urgency, cost, inconvenience, and hopelessness. In addition, participants frequently mentioned that they have priorities that are more important than mitigation and that mitigation behaviors take too much time. Participants in a few groups mentioned lack of knowledge, habits, freedom, the belief that others will deal with the problem, and technology as barriers to action.

Lack of urgency. Overall, participants believed that climate change is not an urgent problem and believed that this perception prevents them from taking mitigation action. Participants discussed several factors that contribute to this lack of urgency. First, participants stated that they did not see any direct effects of climate change, so they are not motivated to take action. One male participant explained, “People as a whole are just naturally selfish and if it

doesn't affect them, they just don't care. I'm the same way." Second, participants in several groups also believed that there is not enough evidence about the effects of climate change to motivate them to take mitigation action. Finally, a few participants said that climate change is happening so slowly that people do not notice it.

Cost. In every group, participants mentioned that mitigation behaviors cost more than other behaviors. They specifically mentioned that alternative energy, hybrid cars, and organic foods cost more. One participant explained the effects of cost on his behavior saying, "If I go to Staples to buy paper I'm not going to buy the recycled paper because it costs more...on the other hand I'm not going to drive as much because gas is expensive."

Inconvenience. Several participants said that they do not take mitigation action because it is inconvenient. They particularly mentioned recycling and taking public transportation as the most inconvenient behaviors. One participant explained, "A lot of [the behaviors] are easy, it's just an inconvenience to us. We think it's easier to just leave the light on or to not recycle...it's easier to walk into your driveway and get in your car and drive."

Hopelessness. As described above, many participants believed that they cannot make a difference through their own actions. They believed that as individuals they would have only a small impact on climate change mitigation. Therefore, they do not bother to perform mitigation actions.

Other priorities. Participants mentioned that they have other priorities that are more important than performing mitigation behaviors. Most frequently, these barriers were related to school or lifestyle. One male participant explained,

We're so focused on getting jobs and working ...and making money and leading whatever stereotypical life you're expected to lead that you don't want to take the time out of your routine to sit down and become educated. That's one of the greatest barriers to having any of these solutions.

Time. Participants in several groups believed that mitigation behaviors take too much time. One male participant commented, "It's a fast moving world and this slows you down."

Worry[ing] about the environment...slows you down too much.” Participants were not specific about which behaviors take too much time; however, they often equated time and effort. One female participant stated, “A lot of these [behaviors] also require a lot of effort. Busy people can’t be bothered.”

Lack of knowledge. Participants in a few groups mentioned lack of knowledge as a barrier to climate change mitigation. Participants believed that others lack general knowledge about climate change mitigation. One participant stated, “A lot of people don’t really know what they can do to help.” In addition, a few participants believed that others lacked specific knowledge, such as how to read energy efficiency and Energy Star labels on appliances.

Habits. Participants in several groups mentioned that their current habits are a barrier to mitigation behaviors. A male participant commented, “[mitigation behaviors are] outside of your daily routine.” A female participant explained, “We’re just used to doing it one way and it’s hard to change your routine.” Although some participants believed that mitigation behaviors could become part of people’s lifestyles, they believed it would be difficult to change their current behaviors. One female participant stated, “It’s like any bad habit. It’s hard to break.”

Interference with freedom. In the male groups, participants believed that addressing climate change would interfere with their freedom or would affect their free will. One participant said, “You can’t mess with a person’s free will. If I don’t want to do something I’m not going to do it...that’s just the way it is.” Other male participants commented that if they earn the money then they have the right to spend it however they wish, even if it affects the environment.

Belief that someone else will deal with it. Participants in all the male and a few of the female groups mentioned that climate change is a problem that future generations will address. In a few male groups, participants linked this belief to their own lack of mitigation behaviors, stating, “someone else will get to all this, so we don’t have to.”

Technology. In a few groups, participants mentioned that humans do not yet have the technology that will allow us to take mitigation actions (e.g., stable alternative energy sources). In

addition, a few participants believed that they will not have to perform mitigation behaviors because humans will develop technological solutions to climate change so that they will not have to change their lifestyles.

Motivators and Facilitators of Mitigation Behaviors

In addition to describing what prevents them from engaging in mitigation behaviors, participants described what would motivate or facilitate their performance of these behaviors. The purpose of this discussion was to identify ways to motivate participants to take action to protect the climate. Participants mentioned several motivators including, positive and negative monetary incentives, saving money, convenience, seeing drastic impacts, education, feeling like part of a larger movement, competition, cues to action, and the precautionary principle.

Positive and negative monetary incentives. Participants in all the male groups and a few of the female groups emphasized the importance of positive and negative monetary incentives to motivate mitigation behaviors. The positive incentives they mentioned included discounts for buying products that are more efficient or for donating to environmental organizations. One male participant explained, “Since money drives the world, people need some sort of incentive to change their lifestyle...everyone’s selfish.” Another male participant explained, “In this day and age, people don’t really do stuff just because it’s nice. They do it...because it gets them something.” The negative incentives that participants mentioned were primarily taxes on gas, waste, and electricity. A participant stated, “If you make things more expensive, it will get people’s attention...like if you tax electricity.” One female participant commented that incentives are necessary to encourage people to initiate the behaviors, but that people will soon develop mitigation habits and will no longer need incentives.

Saving money. Participants frequently mentioned that one of the reasons they replace their incandescent light bulbs, turn off lights, or turn off electronics is to save money on their electric bills. A male participant explained, “The only time I really think about [mitigation

behavior] is when...it affects my wallet.” A female participant commented, “I am paying for my electric in my apartment and that makes me...run through [the apartment] and turn everything off because you have to pay for it.” Participants also mentioned that emphasizing the monetary savings from using products that are more efficient will encourage people to buy them. One participant stated, “Things like insulating your home, turning off lights, you can convince people to do that because it will actually cost them less because the heating bill and the electric bills [will be less].”

Convenience. A few participants said that if mitigation actions were more convenient, people would be more likely to do them. One participant took it one step further saying that the mitigation action should be more convenient than other actions. He stated, “If it’s more convenient for you to do [behaviors that harm the climate] that’s probably what you will do until it becomes more convenient for you to do the alternative [behaviors that help the climate].”

Seeing drastic impacts. A few participants believed that they would be motivated to perform mitigation actions if they saw drastic, severe impacts from climate change. One male participant said that, “If something big happened...we’d be able to pressure the government [into addressing climate change].” Similarly, participants in two groups said that fear of severe consequences would motivate them. However, one female participant commented that scaring people does not work if the recommended behaviors are out of proportion to the fear evoked. She stated, “You can’t scare them and say turn off [your] lights. That doesn’t work.”

Education and evidence. Participants in several groups believed that if people were more aware of the effects of their behaviors that they would be more motivated to take mitigation actions. One female participant explained, “If [I] actually see this is going to happen, then it will motivate me to say, ‘Wow, I don’t want to ruin the Earth, so I need to start doing this stuff.’” Participants also believed that materials that explain how climate change will affect their lives will motivate them to take action. One participant stated, “Break it down to such a level that the person can identify with it.” Similarly, participants in several groups believed that it is important

to explain to people how their behavior can make a difference in slowing climate change. One participant explained, “Put it on a personal level.... Make sure people know what their efforts are going toward.” One participant also mentioned that it is important for communicators to tie climate change mitigation into other goals that people may have like losing weight (e.g., walking instead of driving will not only help the environment, but will also help with weight loss).

Feeling like part of a larger movement. Participants in several groups commented that feeling like they are part of a larger group of people taking mitigation action would help motivate them. One male participant explained, “You need to feel like more people would be on board. I wouldn’t want to feel like I would be the only person doing it.” Similarly, one participant talked about how peer pressure changes behavior, “We could affect others too. I know my roommate never really recycled or didn’t care and then I made her throw all her bottles in this little crate, so now she does it. Now she cares.”

Competition or goal setting. In several of the male groups, participants mentioned that creating competitions would motivate people to take action. One participant suggested a global competition stating, “That’d be pretty cool to make [reducing greenhouse gas emissions] a global competition.... We’d probably hop on pretty quick if it turned into a competition.” Similarly, one male participant said that goal setting is motivating. He stated, “I think the only way I could do most of those [mitigation behaviors] is by setting a goal for each one. Like how much...water I want to use or how much I want to spend on gas per month.”

Cues to action. Participants said that they sometimes forget to do easy mitigation behaviors like turning off the lights. A few participants mentioned that having reminders to do these behaviors would help them remember to do them. One female participant described reminders in the dorms to turn off lights or to take shorter showers, saying, “Little reminders like that could definitely help make you aware and say ‘oh I should do this.’”

Personal satisfaction. Participants in a few groups believed that the personal satisfaction that comes from “doing good” might motivate people. One male participant commented, “I think

a lot of people feel like they get some kind of satisfaction from contributing [and] helping the environment.”

Precautionary principle. Only one participant in all the groups brought up the idea of preventing possible harms by taking a precautionary approach. He commented, “It’s kind of like wearing a seat belt. You don’t know if you’re going to get in an accident, so are you going to just not wear your seat belt? What if [the negative effects of climate change] do happen and we didn’t try to prevent it... You don’t know what’s going to happen, so why not try to make a best educated guess to counteract whatever negatives are happening.”

Self-Efficacy for Mitigation Behaviors

After identifying barriers to and motivators for mitigation behaviors, participants discussed how confident they felt about performing the mitigation behaviors (i.e., their degree of self-efficacy). The purpose of this discussion was to understand participants’ degree of self-efficacy for mitigation behaviors and to inform the development of self-efficacy statements in climate protection messages. Overall, participants believed that most of the mitigation behaviors are easy to do. One factor they identified that made the behaviors easy to do is that participants do not need to rely on anyone else to do the behaviors. One participant explained,

I think what’s easy about [mitigation behaviors] is that they’re all pretty much things that we can do ourselves and it’s not something that we’re depending on some government agency or someone else to change for us... We can walk. We can set up a carpool. We can go become educated. We can ride a bike. We can change our lifestyle. That’s the best part, it’s in our hands.

However, even though the behaviors are easy, most participants did not do them, primarily because of the barriers of apathy and inconvenience. A few of the behaviors like buying energy efficient appliances and using solar panels were perceived to be difficult because the participants did not own their own homes. In addition, participants believed that buying a hybrid car is too expensive.

Response Efficacy of Mitigation Behaviors

After discussing their self-efficacy for mitigation behaviors, participants discussed how effective they thought the behaviors to be in mitigating climate change (i.e., response efficacy). The purpose of this discussion was to understand the perceived response efficacy of the mitigation behaviors and to inform the development of response efficacy statements in climate protection messages. Participants in several groups doubted the ability of the mitigation behaviors to slow climate change. One male participant explained, “I don’t think those [behaviors] are effective almost at all because [the change that students can make] is such a little change compared to the truck that drives from Pennsylvania to California.” These comments were often countered by participants who said, “every little bit counts” or “Each individual person will make such a small effect, but if a lot of people do it then it will have a huge impact.”

Discussion

The goals of the focus groups were to understand how college students think and talk about climate change and climate protection, to guide the development of climate protection messages, and to inform the development of survey questions about antecedents to climate protection behaviors. The focus groups reveal a need for communication about climate change mitigation behaviors that is positive, connects climate change to the target audience’s lives and goals, makes the target audience feel like they are part of a larger group that is addressing climate change, addresses barriers to mitigation behaviors, and increases self-efficacy and response efficacy. Hope appeals have the potential to meet this need. A quantitative survey further explored the issues identified in the focus groups.

Quantitative Survey

The second phase of my formative research consisted of a quantitative survey. Based on the focus groups, I created a survey to investigate college student's attitudes toward climate change as well as their behavior and behavior intentions. The goals of the survey were to guide the development of climate protection messages, to identify target behaviors for intervention, and to begin the measurement development process for the experimental studies (Studies 1 and 2). Specifically, participants indicated their emotional responses to climate change, perceived severity of climate change, perceived susceptibility to climate change impacts, barriers to mitigation action, current mitigation behavior, and behavior intentions.

Methods

Participants and Procedures

Participants were a convenience sample of 148 undergraduate students taking an introductory communication course at The Pennsylvania State University. This course is required for all students at the university. Students earn two percent of their grade through participation in a research study, creating a pool of research participants. Participants had an option of completing an alternative assignment to earn their research credit. None of the students assigned to this study chose to complete the alternative assignment.

Students registered for research credit and answered general screening questions via a Web site. The research pool administrator then assigned participants to this study based on the screening questions. There were no inclusion or exclusion criteria for participation in this study. Once the administrator assigned participants to the study, they received an e-mail from an online survey program that provided them with a unique link to the survey. During the fielding of the survey, participants who had not completed the survey received reminder e-mails approximately

every five days during the two-week study period and received a final reminder the day before the study closed.

The final sample consisted of 148 participants (75 male, 71 female, and 2 who did not indicate their gender). Although participants ranged in age from 18 to 32, 96.5% of respondents fell between the ages of 18 and 23 ($M = 20.17$, $SD = 1.83$, $MD = 20$). Twenty-two (14.9%) of the participants were freshmen, 78 (52.7%) were sophomores, 30 (20.3%) were juniors, 11 (7.4%) were seniors, and six (4.1%) were “super seniors.” One hundred and nine¹⁵ (73.6%) of the participants identified themselves as Caucasian-American or White, 18 (12.2%) identified themselves as Asian or Pacific Islander, 11 (7.4%) identified themselves as African-American or Black, seven (4.7%) identified themselves as Hispanic or Latino/a, and eight (5.4%) identified themselves as “other.” None of the participants identified themselves as Native Hawaiian or Alaskan. One participant did not provide race/ethnicity data. Eighty-three (56.1%) of the participants primarily grew up in suburban locations, 29 (19.6%) were from urban locations, 20 (13.5%) were from rural locations, and 14 (9.5%) were from small towns. Two participants did not provide information about the place in which they primarily grew up. One hundred and six (71.6%) participants identified themselves as pro-environment and 19 (12.8%) identified themselves as environmentalists. One respondent did not answer either of these questions.

Survey Instrument

I collected the data via an online survey. Before beginning the survey, participants read an IRB-approved consent form and checked a box indicating their consent. Once participants

¹⁵ Participants selected as many races/ethnicities as they desired to describe themselves. Six respondents indicated multiple races/ethnicities; therefore, the number of responses is greater than the number of participants.

gave their consent, they completed the survey online. The survey (Appendix C) measured emotions experienced when thinking about climate change, perceived severity of climate change, perceived susceptibility to climate change impacts, barriers to mitigation action, current mitigation behavior, and behavior intentions.

Missing data. Before beginning the examination of scale properties, I examined the missing data. Most cases had zero or one missing data points. Several cases had two missing data points and only three cases had three missing data points. All three of the cases with three missing data points were missing responses from the first page of the survey. These items are not relevant to the analyses I describe below. Thus, out of the 360 cases, all cases had less than one percent missing data.

Item analyses. I examined all the items for normality. First, I examined histograms of the responses to each item to check for bimodality. Then, I examined skew and kurtosis, dividing the skew and kurtosis statistics by their standard errors to obtain a t-statistic. Due to the sample size, I applied a loose criteria of $p < .01$ ($t > 2.58$) to identify items that were statistically significantly skewed or kurtotic (Tabachnick & Fidell, 2007). Next, I examined the standard deviations of the items to ensure that the variance was at least equal to one-fifth of the range. The scales in my survey were 5-point scales; therefore I wanted to have $SD \geq 0.80$. I describe the results of this examination in the survey section below.

Scale analyses. To examine the potential for items to be combined into composite scales, I first examined the face validity of the items to see if the items appeared to measure the same construct. I removed items from the analysis that did not appear to measure the same construct as the other items on the same scale. Next, I checked the items for internal consistency (i.e., that the items had approximately equal means, standard deviations, and intercorrelations). I removed (or flagged for possible removal) items that were not internally consistent. Then, I conducted exploratory factor analysis (EFA) using principal axis extraction and oblimin rotation. Exploratory, rather than confirmatory, factor analyses is appropriate due to the early stage of

development of these scales. I also calculated the Kaiser, Meyer, Olkin (KMO) measure of sampling adequacy to assess the merit of factor analyzing the items. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) compares the size of the observed correlation coefficients to the size of the partial correlation coefficients. Large values (greater than .50) of the KMO index indicate that factor analysis of the variables is appropriate (Kaiser, 1974). I removed (or flagged for possible removal) items that did not load highly on the factor(s). After assessing the unidimensionality of the measures using EFA, I assessed the reliability of the scale using Cronbach's alpha.

Emotions. Survey participants identified the emotions that they felt when thinking about climate change by responding to 26 items measured on a five-point scale (1 = *none of this emotion*, 5 = *a great deal of this emotion*). These items measured 10 emotions: hope, guilt, fear, apathy, happiness, anger, sadness, surprise, disgust, and pride. I developed the items measuring hope specifically for this research because no extant empirical studies used a multi-item measure of hope. The other emotion items are based on items that are commonly used in emotion research (e.g., Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996; Hullett, Loudon, & Mitra, 2003; Nabi, 2002; O'Keefe, 2000; Roseman, Abelson, & Ewing, 1986).

The four items that measured hope were *hopeful*, *enthusiastic*, *optimistic*, and *expectant*. All of the items were normally distributed with no significant skew or kurtosis. Each item had a standard deviation greater than or equal to 0.80. The face validity of the items was good. In terms of internal consistency, the item *enthusiastic* had a slightly lower mean and the item *hopeful* had a slightly larger standard deviation than the other items, but neither was a significant enough deviation to require removal from the scale. The inter-item correlation between *hopeful* and *optimistic* was higher than the other correlations and the correlation between *hopeful* and *enthusiastic* was lower than the other correlations. This was expected because *enthusiastic* is conceptually farther away from the central concept of hope than is *optimistic*. Thus, I flagged *enthusiastic* for possible removal pending the other analyses. The KMO measure indicated a

mediocre adequacy of sampling ($KMO = .63$). The factor analysis yielded one factor that accounted for 46.7% of the variance. A composite scale formed from these items had a reliability of $\alpha = .62$ ($M = 2.79$, $SD = 0.60$). Given the importance of measuring hope well to this dissertation, I added items to this scale for the Study 1 pilot test. These items were *eager*, *positive*, and *encouraged*.

Three items measured guilt; they were *guilty*, *ashamed*, and *remorseful*. All of the items were normally distributed with no significant skew or kurtosis. *Remorseful* had a slightly smaller standard deviation ($SD = .78$) than was ideal, but it was not a matter of statistical concern. The face validity of the items was good. The items were internally consistent. The inter-item correlations were consistent. The correlation between *guilty* and *ashamed* was slightly higher than their correlations with *remorseful*. The factor analysis ($KMO = .71$) revealed one factor that accounted for 75.7% of the variance. A composite scale formed from these items had a reliability of $\alpha = .84$ ($M = 2.77$, $SD = 0.75$). This scale had good measurement properties. I added the item *embarrassed* to the scale for the pilot test to see if the addition improved the measure.

The items measuring fear were *afraid*, *distressed*, *worried*, and *anxious*. All of the items were normally distributed with no significant skew or kurtosis. Each item had a standard deviation greater than or equal to 0.80. The face validity of the items was good. In terms of internal consistency, *worried* had a slightly higher mean and *distressed* had a slightly lower mean and standard deviation than the other items. However neither were cause for removal from the scale. The inter-item correlations were consistent. *Worried* and *afraid* correlated slightly higher than the other items. The factor analysis revealed a meritorious KMO ($KMO = .80$) and one factor that accounted for 67.9% of the variance. A composite scale formed from these items had a reliability of $\alpha = .84$ ($M = 2.97$, $SD = 0.76$). I added two additional items to this already strong measure for the pilot test. These items were *fearful* and *scared*.

The two items that measured happiness were *happy* and *elated*. The item *happy* was significantly positively skewed. *Elated* was normally distributed. The face validity of the items

was good. The items were internally consistent. The factor analysis revealed a borderline KMO ($KMO = .50$), which was expected because there were only two items in the scale. The EFA extracted one factor that accounted for 76.3% of the variance. A composite scale formed from these items had a reliability of $\alpha = .69$ ($M = 2.34$, $SD = 0.69$). Given that the scale only had two items, its reliability was surprisingly good. However, I added two items to this scale for the Study 1 pilot test. They were *cheerful* and *joyful*.

The two items measuring anger were *angry* and *frustrated*. Both of the items were normally distributed with no significant skew or kurtosis. Each item had a standard deviation greater than 0.80. The face validity of the items was good and the items were internally consistent. The factor analysis revealed a borderline KMO ($KMO = .50$), which was expected because there were only two items in the scale. The analysis extracted one factor that accounted for 81.3% of the variance. A composite scale formed from these items had a reliability of $\alpha = .77$ ($M = 2.86$, $SD = 0.80$). Given that the scale only had two items, its reliability was surprisingly good. To improve the scale, I added three items for the Study 1 pilot test. They were *mad*, *irritated*, and *annoyed*.

Two items measured sadness *sad* and *sorrowful*. Both of the items were normally distributed with no significant skew or kurtosis. Each item had a standard deviation greater than 0.80. The face validity of the items was good and the items were internally consistent. The factor analysis revealed a borderline KMO ($KMO = .50$), which was expected because there were only two items in the scale. The analysis extracted one factor that accounted for 81.0% of the variance. A composite scale formed from these items had a reliability of $\alpha = .77$ ($M = 2.74$, $SD = 0.80$). Given that the scale only had two items, its reliability was surprisingly good. However, I added two items to this scale for the pilot test. They were *dreary* and *dismal*.

Perceived susceptibility to personal effects. Participants identified the effects that they thought will happen to them as a result of climate change by responding to four five-point Likert scale items (1 = *strongly disagree*, 5 = *strongly agree*). I developed the items based on the focus

group results and the Risk Behavior Diagnosis Scale (Witte, Meyer, & Martell, 2001). The items were: (a) It is likely that climate change will affect my job, (b) It is likely that climate change will affect my family, (c) It is likely that climate change will make prices for products like food higher, and (d) I am at risk for developing health problems because of climate change. The items were normally distributed with no significant skew or kurtosis. Each item had a standard deviation greater than 0.80. The face validity of the items was good because each item measured a personal effect of climate change. However, the items measured different personal effects, thus they should be loosely related. Internal consistency was good. Items b and c had higher means than a and d did. Inter-item correlations were consistent. The factor analysis revealed a middling KMO ($KMO = .78$) and one factor that accounted for 63.5% of the variance. All the items loaded highly on the factor. I created a composite scale by averaging the responses to all four items ($M = 3.21$, $SD = 0.72$, $\alpha = .81$).

Perceived severity of climate change. Participants indicated their perceived severity of climate change by responding to six five-point Likert scale items. I developed the items based on the focus group results and the Risk Behavior Diagnosis Scale (Witte, Meyer, & Martell, 2001). The items began with the stem “Climate change is...” followed by the items (a) a serious problem, (b) overblown, (c) severe, (d) exaggerated, (e) a big deal, and (f) nothing to worry about. Items b, d, and f were reverse coded so that higher numbers indicated that respondents believed climate change to be more severe. Items e and f were significantly negatively skewed. All the other items were normally distributed with no significant skew or kurtosis. Each item had a standard deviation greater than 0.80. The face validity of the items was good and the items were internally consistent. Items b, c, and d had lower means than items a, e, and f, but not substantially so. Items b and d had larger standard deviations, but not so much larger that they merited removal from the scale. The inter-item correlations were consistent. I conducted an exploratory factor analysis to examine the dimensionality of the scale. The KMO measure was meritorious ($KMO = .85$). Using principle axis factoring and an oblique rotation, the analysis

revealed one factor that accounted for 73.7% of the variance with all items highly loading on the factor. I created a composite scale by averaging the responses to all six items ($M = 3.54$, $SD = 0.85$, $\alpha = .93$).

Barriers to reducing greenhouse gas emissions. Participants responded to five five-point Likert scale items about barriers to reducing their greenhouse gas emissions. I developed these items based on the focus group results. The items began with the stem, “Reducing my greenhouse gas emissions” followed by the items (a) takes too much time, (b) costs too much, (c) will decrease my quality of life, (d) is a waste of effort, and (e) is inconvenient. The items were normally distributed with no significant skew or kurtosis. Each item had a standard deviation greater than 0.80. The face validity of the items was good because each item measured a type of barrier. However, the items measured different barriers and thus, they should be loosely related. Internal consistency and inter-item correlations were satisfactory given the broad conceptual scope of this construct. I conducted an exploratory factor analysis to examine the dimensionality of the scale. The KMO for the scale was middling ($KMO = .77$). Principle axis factoring with oblique rotation revealed one factor that accounted for 52.7% of the variance. I created a composite scale by averaging the responses to the five items ($M = 2.89$, $SD = 0.68$, $\alpha = .77$).

Self-efficacy. Participants indicated how easy they perceived 28 climate change mitigation behaviors to be. The items used a five-point Likert response scale and had three different stems: (a) It is hard for me to..., (b) It is easy for me to..., and (c) It is inconvenient for me to.... The stems were followed by different behaviors, including (a) replace my incandescent light bulbs with compact fluorescent light bulbs, (b) turn off my computer when I am not using it, (c) eat less meat, and (d) educate others about what they can do to slow climate change. Items with stems a and c were reversed so that higher scores indicate greater self-efficacy. I did not intend these items to form a composite scale. Their primary purpose was to inform the choice of appropriate behaviors for intervention.

Response efficacy. Participants indicated on a five-point Likert scale how efficacious they believed 28 behaviors to be in slowing down climate change. The stem “Climate change can be slowed down by...” was followed by various behaviors including: (a) using less hot water by taking shorter showers, (b) unplugging electronics like cell phone chargers when they are not in use, (c) recycling, and (d) keeping personal vehicles like cars and trucks tuned up. I did not intend these items to form a composite scale. Their primary purpose was to inform the choice of appropriate behaviors for intervention.

Current behavior. Participants indicated which of 28 mitigation behaviors they performed. These items, measured on a five-point Likert scale, began with the stem, “Currently I...” followed by various behaviors. These behaviors included: (a) eat fewer dairy products, (b) write policy makers about slowing down climate change, (c) bring reusable bags to the grocery store, and (d) run my dishwasher only with a full load. I did not intend these items to form a composite scale. Their primary purpose was to inform the choice of appropriate behaviors for intervention.

Behavior intentions. Participants also indicated how likely they were to engage in 28 behaviors in the next month. The stem, “In the next month, I intend to...” was followed by various behaviors including, (a) turn my heat two degrees colder, (b) drive a fuel-efficient car, (c) buy fresh instead of frozen foods, and (d) plant a tree. These items were measured on a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). I did not intend these items to form a composite scale. Their primary purpose was to inform the choice of appropriate behaviors for intervention.

Results

One goal of the survey was to analyze the measurement properties of the scales on the survey as described above. Another goal was to describe participants’ attitudes and behaviors related to climate change. I present these descriptive results below.

Perceived susceptibility to personal effects. The survey asked participants about personal effects of climate change. More participants believed that climate change will affect prices for products like food (58.1%) and will affect their families (48.7%) than believed that climate change will affect their jobs (28.4%) or health (23.0%). Table 3.1 breaks out the level of agreement into participants who *strongly agreed* and those who *agreed* with each item. In addition, the table presents mean and standard deviation information for these items.

Table 3.1: Personal Effects College Students Expect from Climate Change

	Percentages		Mean	SD
	Strongly Agree	Agree		
Prices	10.8	47.3	3.58	0.85
Family	8.8	39.9	3.39	0.91
Job	6.8	21.6	2.96	1.00
Health	4.1	18.9	2.93	0.89

Barriers to reducing greenhouse gas emissions. Participants responded to questions about barriers to reducing their greenhouse gas emissions. Participants were most likely to believe that reducing greenhouse gas emission is inconvenient (48.0%) and costs too much (39.2%). Participants were least likely to believe that reducing greenhouse gas emission takes too much time (26.3%), will decrease their quality of life (15.5%), or is a waste of effort (12.8%). Table 3.2 breaks out the level of agreement into participants who *strongly agreed* and those who *agreed* with each item. In addition, the table presents mean and standard deviation information for these items.

Table 3.2: College Students' Perceived Barriers to Reducing Greenhouse Gas Emissions

Reducing my greenhouse gas emissions...	Percentages		Mean	SD
	Strongly Agree	Agree		
Is inconvenient	5.4	42.6	3.25	0.98
Costs too much	6.1	33.1	3.19	0.94
Takes too much time	4.7	21.6	2.96	0.94
Will decrease my quality of life	2.7	12.8	2.62	0.94
Is a waste of effort	2.0	10.8	2.41	0.94

Perceived severity. Overall, participants believed that climate change is severe.

Approximately one-third (30.4%) did not believe that climate change was a severe problem.

Another third fell in the range between *neutral* and *agree* on the scale, indicating that they thought climate change was a fairly severe problem (32.4%). The final third of the population selected the responses between *agree* and *strongly agree*, indicating that they believed climate change was a severe problem (37.2%).

Self-efficacy. Participants indicated how easy they thought 28 mitigation behaviors were.

Participants perceived the easiest behaviors to be recycling (66.9%), using a reusable water bottle instead of plastic bottles (61.5%), using less hot water by washing clothes in warm or cold water (60.8%), running the dishwasher only with a full load (60.1%), and replacing incandescent light bulbs with compact fluorescent light bulbs (58.7%). The behaviors perceived to be the least easy were writing policy makers (18.9%), buying a fuel-efficient car (22.3%) eating less meat (27.0%), educating others about slowing climate change (27.0%), and driving less by biking (27.0%).

Appendix D includes Table D.1 that breaks out the level of agreement into participants who *strongly agreed* and those who *agreed* with each item. In addition, the table presents mean and standard deviation information for these items.

Response efficacy. Participants indicated whether they believed that the 28 behaviors can slow down climate change. Overall, most participants believed in the efficacy of nearly all the behaviors. With the exception of educating people about what they can do to mitigate climate change (80.4%), the behaviors that respondents perceived to be the most effective focused on reducing greenhouse gas emissions from motor vehicles. These behaviors were reducing greenhouse gas emissions (84.4%), buying a fuel-efficient car (82.5%), walking instead of driving (82.4%), carpooling (81.8%), biking instead of driving (79.7%), and taking mass transportation (79.1%). Participants were least likely to believe that eating fewer dairy products (37.8%), eating less meat (38.5%), writing policymakers (49.3%), and buying organic products (57.4%) were effective in slowing climate change. Table D.2 in Appendix D breaks out the level of agreement into participants who *strongly agreed* and those who *agreed* with each item. In addition, the table presents mean and standard deviation information for these items.

Current behavior. Participants identified their current climate change mitigation behaviors. Participants were most likely to report that they recycled (67.6%), walked instead of driving (67.5%), ran their dishwashers only with a full load (56.7%), used less hot water by washing their clothes in cold or warm water (49.4%), and took mass transportation (49.3%). Participants were least likely to bring reusable bags to the grocery store (14.9%), eat fewer dairy products (14.9%), eat less meat (14.3%), bike instead of driving (14.2%), plant trees (10.2%), and write policymakers (5.5%). Table D.3 in Appendix D breaks out the level of agreement into participants who *strongly agreed* and those who *agreed* with each item. In addition, the table presents mean and standard deviation information for these items.

Behavior intentions. Participants indicated the mitigation behaviors that they intended to perform in the next month. Participants were most likely to plan to recycle (72.2%), walk instead of drive (66.2%), run their dishwashers only with a full load (62.1%), unplug their cell phone chargers when not using them (58.8%), and turn off their computers when not using them (56.1%). Participants were least likely to intend to eat fewer dairy products (20.3%), eat less meat

(18.3%), plant a tree (17.6%), and write their policymakers (6.8%). Table D.4 in Appendix D breaks out the level of agreement into participants who *strongly agreed* and those who *agreed* with each item. In addition, the table presents mean and standard deviation information for these items.

Choosing Recommended Behaviors

A key goal of the formative research was to guide the development of messages. In particular, the results from the formative survey guided my choice of recommended behaviors for the messages. I considered a number of factors when selecting the recommended behaviors for the Study 2 climate protection messages. The first factor I considered was the ability of students to perform the behavior regardless of their housing situation (e.g., dorm, apartment building, house, owning or renting). I did not want participants' living situations to affect their responses to the messages. For example, in dorm rooms and some apartment buildings, residents do not have control over the heat and air conditioning. Therefore, they cannot choose to turn their heat down two degrees in the winter or their air conditioning up two degrees in the summer. Similarly, students may not have control over the lighting and may not be able to replace incandescent light bulbs with compact fluorescent light bulbs. Additionally, students might not have a place in which they are able to plant a tree. The second factor I considered was cost. I did not want the costs of the behavior to affect my results. For example, buying a fuel-efficient car and buying organic products may not be within the financial means of all students. The third factor I considered was availability. Locally grown foods are plentiful during summer and fall, but many local foods such as fruits and vegetables are not available during winter and early spring.

After applying the three criteria above, 19 behaviors remained (Table 3.3). Next, I considered students' actual and intended behavior from the formative survey. I chose behaviors that had a current behavior mean below the mid-point on the scale (i.e., less than 3.0) to avoid

encountering a ceiling effect. Next, I considered students' behavior intentions. I included recommended behaviors for which students' future intentions fell above 2.75 on the 5-point scale. Behaviors for which the mean for students' intentions fell below 2.75 were behaviors that likely had substantial barriers. After applying these criteria, eight behaviors remained as viable candidates for intervention. From these eight, I chose two behaviors that focused on reducing energy use (turning off computers when they are not in use and unplugging cell phone chargers when they are not in use) and two behaviors that focused on reducing the use of plastic (bringing a reusable bag to the grocery store and using a reusable water bottle rather than plastic bottles). The target behaviors are included in the messages for Study 2.

Table 3.3: Means and Standard Deviations of College Students' Climate Change Mitigation Behavior and Behavior Intentions

Behavior	Current Behavior	Behavior Intentions
Turn off my computer when I am not using it.	2.74 (1.18)	3.39 (1.12)
Use less hot water by taking shorter showers.	2.92 (1.18)	3.11 (1.11)
Use less hot water by taking fewer showers. ^	2.51 (1.08)	2.71 (1.17)
Use less hot water by washing my clothes in warm or cold water. #	3.24 (1.21)	3.27 (1.13)
Unplug my cell phone charger when I am not using it.	2.64 (1.15)	3.43 (1.13)
Recycle. #	3.61 (1.16)	3.76 (1.08)
Buy recycled paper.	2.90 (1.15)	3.22 (1.09)
Buy fresh instead of frozen foods.	2.98 (1.10)	3.31 (1.05)
Eat little or no meat. ^	2.14 (1.10)	2.43 (1.15)
Eat few or no dairy products (e.g., milk, ice cream, cheese). ^	2.27 (1.08)	2.46 (1.11)
Walk instead of driving. #	3.70 (1.05)	3.60 (1.05)

Take mass transportation. #	3.26 (1.13)	3.24 (1.16)
Carpool. #	3.01 (1.17)	3.19 (1.14)
Keep my car or truck tuned up. #	3.26 (1.04)	3.39 (0.97)
Write policy makers about slowing down climate change. ^	1.95 (0.85)	2.22 (0.93)
Run my dishwasher only with a full load. #	3.56 (1.13)	3.68 (1.02)
Bring reusable bags to the grocery store.	2.37 (1.02)	2.76 (1.14)
Use a reusable water bottle instead of plastic bottles.	2.96 (1.22)	3.20 (1.19)
Air dry my clothes instead of drying them in the dryer.	2.38 (1.13)	2.75 (1.20)

Note. Behaviors eliminated for current behavior means above 3.0 are indicated with #. Behaviors eliminated for behavior intentions below 2.75 are indicated with a ^.

Summary

The goals of the formative survey were to understand how college students' attitudes and beliefs related to climate change and climate protection, to guide the development of climate protection messages, and to inform the development of survey questions about antecedents to climate protection behaviors. The online survey met all these goals. In particular, the survey guided the development of measures and messages for the experimental studies (Study 1 and Study 2).

CHAPTER FOUR:

STUDY 1

Overview

Study 1 was a message components study that examined separately the effects of the proposed components of a hope appeal (i.e., the components designed to create appraisals of importance, goal congruence, positive future expectation, and possibility). The goals of Study 1 were (a) to test persuasive hope theory's (PHT) proposed relationships between subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility; (b) to examine the relationships between subjective feelings of hope and behavioral antecedents; (c) to assess separately the effects of the different components of hope appeals; and (d) to identify individual characteristics that affect the above relationships and effects. To achieve these goals, I created message components designed to evoke appraisals of importance, goal congruence, positive future expectation, and possibility. For each of the four appraisals, I created two versions of the components, one version I designed to evoke a high appraisal (strong component) and the other version I designed to evoke a low appraisal (weak component). I developed these components based on persuasive hope theory and the results of my formative research. Once I had designed these components, I created messages using all possible combinations of the strong and weak components for the four appraisals. I describe the components, the messages, and their development in the pilot message design section below. After designing the messages, I piloted these messages with members of my target audience. Based on the results from the pilot test, I revised the message components. Using messages created with the revised components, I conducted Study 1. In Study 1, participants responded online to questions about climate protection before and after reading one of the messages.

Below, I first explain how I developed the pilot messages. Second, I describe the methods and results from the pilot study. Third, I explain how I modified the message components based on the pilot study results. Next, I present the methods and results from Study 1. Finally, I provide a brief summary and implications of the results.

Pilot Message Design

In this dissertation, I advance a framework for persuasive hope appeals that focuses on two components, (a) the inducement of hope through the presentation of an opportunity and (b) recommended actions to achieve the desired outcome. For Study 1, I systematically varied the inducement of hope component. I did not include the recommended action component in this study (it is included in Study 2). I constructed the pilot study messages to systematically vary the components (strong/weak) related to each appraisal (importance, goal congruence, future expectation, and possibility). For each component, I designed two variations. The first variation (strong component) was designed to create high appraisals on the component. The second variation (weak component) was designed to evoke low appraisals on the component. Below, I first describe the strong/weak manipulation for each message component. Then, I explain how I combined the components to create the messages. Finally, I describe other message design variables that I held constant across the messages, including organizational pattern, source credibility, clarity, readability, and typeset.

Appraisal Component Manipulations

Each message contained four components designed to evoke the four appraisals hypothesized to be part of the hope experience. Within each message, I held the organizational pattern constant. The first component related to the importance of protecting the climate. The second component described how congruent protecting the climate is with the readers' goals. The

third component addressed how much better protecting the climate would make the future. The fourth component indicated how possible it is to protect the climate. I manipulated each appraisal component to have a strong and weak condition. The strong condition was designed to evoke high appraisals (e.g., that it is very possible to protect the climate) and the weak condition was designed to evoke low appraisals (e.g., that it is not very possible to protect the climate). I describe each appraisal component and its strong/weak manipulation below.

Importance. An appraisal of importance is an assessment of how personally relevant the future event is to the individual. The importance component included the key concepts associated with importance. For the strong importance component, the first sentence connected the climate to individual well-being, creating the perception that the climate is personally relevant. The second sentence indicated that the climate affects the individual's well-being in many ways. The subsequent sentences detailed effects on the individual's health, food supply, finances, and home. The next-to-last sentence indicated that a good climate will improve the reader's health and wealth. The final sentence stated that protecting the climate is important and reinforced the connection between the climate and well-being. The strong importance condition read as follows:

The climate affects your well-being! The climate affects your well-being in many ways. It affects your health through air quality and the likelihood of disease. A bad climate causes death through extreme events like hurricanes, floods, and heat waves. The climate also affects the food you eat. Heat, floods, droughts, and extreme weather can harm our food supply. The climate can also affect your finances. A bad climate can cost you money. You will pay more for heating and cooling. Food and energy prices will be higher. Extreme weather may damage your home or workplace. A good climate makes you healthier and wealthier. Protecting the climate is important for your well-being.

The structure and overall content of the weak importance condition was the same as the strong condition. However, the weak condition differed from the strong importance condition by using less immediate language forms. I replaced the denotatively specific form “you” with the less immediate form “people” to decrease the personal relevance of the climate (see Parrott, 1995 for a discussion of language in messages). In addition, the component stated that the climate affects people in few ways and used qualifiers like “few” and “little” to minimize the effects of

the climate on health, the food supply, finances, and housing and to indicate that any climate effects that occur will be minor. The next-to-last sentence indicated that a bad climate will not affect people greatly. The final sentence stated that it is not very important to protect the climate. The weak importance component read,

The climate affects people's well-being. The climate affects people's well-being in few ways. It may affect people's health through air quality, disease, or death. Hurricanes, floods, and heat waves may occur. If they do occur, they will affect only a few people. If the climate becomes bad, it may be harder to grow some foods. But the food supply will still be good. A bad climate might cost people a little more money. Any increases in energy or food prices should be small. It is unlikely that extreme weather will damage many homes. Thus, a bad climate should cause little harm to people. Protecting the climate is not very important for people's well-being.

Goal congruence. Goal congruence is an assessment of whether conditions are favorable or unfavorable to achieving relevant goals. The formative research indicated that saving money is an important goal and motivator for students. Thus, the goal congruence components connected climate protection to saving money. Goal congruence is affected by how directly or indirectly the conditions affect relevant goals. Thus, the strong goal congruence component indicated that protecting the climate directly saves money, whereas the weak goal congruence component indicated that protecting the climate has an indirect effect. The strong and weak conditions also differed in their use of immediate language. The strong condition used the more immediate "you" and the weak condition used the less immediate "people" as the subject. The last three sentences in each component indicated how much money students could save per year by protecting the climate. In the strong condition, the amount they could save was \$500 and in the weak condition, it was \$50. The next sentence multiplied that number by four to indicate how much students could save in four years at The Pennsylvania State University. The final sentence indicated that the amount saved is "a lot" in the strong condition, and "a little" in the weak condition. The strong and weak goal congruence components read,

Protecting the climate puts money directly in your pocket. You can make simple changes to protect the climate. You can use less energy, use less hot water, and make less trash. These changes are free or cheap. These changes will

save you at least \$500 per year. In four years at Penn State, you will save \$2000! That is a lot of money.

Protecting the climate may indirectly put money in people's pocket. People can make simple changes to protect the climate. They can use less energy, use less hot water, and make less trash. These changes are free or cheap. These changes might save them up to \$50 per year. In four years at Penn State, a student could save \$200. That is a little money.

Future expectation. Future expectation is an appraisal about whether the future will become better or worse if the target event occurs. Thus, the future expectation component stated that protecting the climate would make the future “much” better in the strong condition and “a little” better in the weak condition. Each component detailed how the climate would be better in terms of weather, health, extreme events, and food production. In the weak condition, the sentences used modifiers like “little” and “a bit” to make the future seem only slightly better. In addition, the weak condition used weaker verbs like “may” and “could,” whereas the strong condition used stronger verbs like “will.” The strong and weak future expectation components read,

You can help make the climate much better than it currently is. Protecting our climate will bring a much better future. Our air will be cleaner. Our weather will be less extreme. Our summers will be milder. We will experience fewer diseases and death from heat waves, extreme weather, and floods. Growing food will be easier and more productive. We will save money on energy and food costs. By helping protect our climate, you can make your future much healthier and brighter.

People can help make the climate a little better. Protecting the climate may bring a little better future. The air may be a bit cleaner. The weather could be less extreme. Summers might be milder. There could be fewer diseases and death from heat waves, extreme weather, and floods. Growing food might be a little easier and more productive. People could save some money on energy and food costs. By helping protect the climate, people can make the future a little bit better.

Possibility. An appraisal of possibility involves an assessment of the likelihood of the future event. Thus, the possibility components indicated the likelihood of making the climate better. Because climate change is a global issue that requires the effort of numerous actors, the

components connected this likelihood to the number of people around the world who are taking action to protect the climate. The strong and weak possibility components read,

It is likely that we can make the climate better. All over the world people like you are using less energy, using less hot water, and making less trash. Millions of people are taking action. You can join the effort and make it even more likely that we will make the climate better.

It is unlikely that people can make the climate better. All over the world, people would need to use less energy, use less hot water, and make less trash. Not many people are taking action. People can join the effort and make it a little more likely that people will make the climate better.

Length and Readability. To maintain consistency between the conditions, I kept the length and readability of the strong and weak appraisal component manipulations consistent. I calculated the number of words in each component as well as the number of words per sentence and the number of characters per word. I calculated readability in Microsoft Word using the Flesch reading ease index. For reading ease, the higher the number is, the more readable the text is. I also calculated the Flesch-Kincaid reading level for each component. Table 4.1 presents this information for each component.

Table 4.1: Pilot Study Message Component Length and Readability Characteristics

Component					
Manipulation	Words	Words/Sent	Char/Word	Ease	Level
Importance					
Strong	111	8.5	4.9	75.4	4.8
Weak	113	9.4	4.7	75.2	5.1
Goal Congruence					
Strong	63	9.0	4.1	79.5	4.4
Weak	64	9.1	4.3	78.5	4.5
Future Expectation					

Strong	82	9.1	4.6	77.9	4.6
Weak	83	9.2	4.6	76.1	4.9
Possibility					
Strong	53	13.2	4.2	75.2	6.0
Weak	54	13.5	4.2	75.6	6.0

Note. Sent = sentence, Char = characters

Message Creation

Once I had created the manipulated components, I created the messages by combining the components. I combined the strong and weak conditions in all possible ways while maintaining a consistent organizational pattern to create the 16 messages for the pilot study. Table 4.2 below details how I combined the manipulated components to create the messages.

Table 4.2: Pilot Study and Study 1 Message Conditions

	Strong Importance		Weak Importance	
	Strong	Weak	Strong	Weak
	Possibility	Possibility	Possibility	Possibility
Strong Goal Congruence				
Strong Future Expectation	1	2	3	4
Weak Future Expectation	5	6	7	8
Weak Goal Congruence				
Strong Future Expectation	9	10	11	12
Weak Future Expectation	13	14	15	16

Message Design Variables

To control for variation in the messages beyond the manipulations of the strong/weak components, I constructed each message similarly along the following message design variables: (a) organizational pattern and source credibility, (b) message clarity, (c) readability, (d) length, and (e) typeset.

Organizational pattern and source credibility. Each message followed a consistent organizational pattern. Each message addresses importance first, followed by goal congruence, future expectation, and possibility, in that order. The source information is included at the bottom of the message. All of the messages contain the same source information. Specifically, at the bottom of each message the following sources are referenced, “Sources: Center for Disease Control and Prevention National Center for Environmental Health, Climatecrisis.net, Intergovernmental Panel on Climate Change, United Nations Environmental Programme, U.S. Department of Energy, and U.S. Environmental Protection Agency.”

Clarity. I wrote the message content in a straightforward, easy to understand manner. Because the strong/weak component manipulations used consistently clear language, the 16 messages created from the components were similarly clear. The messages used short paragraphs with an average paragraph length of 8.1 sentences. The messages’ paragraph length ranged from 8.0 to 8.2 sentences per paragraph. The messages also used simple sentence structure. The average sentence length was 9.5 words with a range of 9.3 to 9.8 across messages. I also used simple words in the messages. The messages had an average word length of 4.5 characters per word with a range of 4.4 to 4.6. Calculations excluded the source information. Clarity characteristics by message are in Table 4.3.

Readability. I also kept the readability of the messages as close to constant as possible. I calculated the readability of each message in Microsoft Word using the Flesch reading ease and Flesch-Kincaid reading level statistics. The average reading ease across all messages was 76.7 and the average reading level was 4.9. The reading ease ranged from 76.3 to 77.2. As mentioned

previously, the higher the reading ease number is, the more clear the message is. The reading level ranged from 4.8 to 5.0. Calculations excluded the source information. Table 4.3 contains readability characteristics by message.

Length. Because of the consistency in the length of the strong/weak manipulation components, message length was relatively constant across the 16 combinations of the components. The messages ranged in length from 309 to 314 words with an average of 311.5 words. All messages were well within 5% of the mean message length. Word counts do not include the source citations. Table 4.3 contains message length by message.

Typeset. The fonts and font usage were constant across all messages. All messages were in Arial, 12-point font. The first sentence of each component was in bold font. The remainder of each component was in regular font and I used underlining to accent the differences between the strong and weak components. The source information was in Arial, 10-point font.

Table 4.3: Pilot Study Message Length, Clarity, and Readability Characteristics by Message

Message	Words	Char	Sent/ Parag	Words/ Sentence	Char/ Word	Reading Ease	Reading Level
1	309	1471	8.2	9.3	4.6	77.1	4.8
2	310	1479	8.2	9.3	4.6	77.2	4.8
3	311	1451	8.0	9.7	4.5	77.0	4.9
4	310	1470	8.2	9.3	4.5	76.6	4.8
5	310	1484	8.2	9.3	4.6	76.9	4.8
6	312	1459	8.0	9.7	4.5	77.0	4.9
7	311	1478	8.2	9.4	4.5	76.7	4.8
8	312	1450	8.0	9.7	4.4	76.5	5.0
9	311	1492	8.2	9.4	4.6	77.0	4.8

10	312	1464	8.0	9.7	4.5	76.8	4.9
11	311	1483	8.2	9.4	4.6	76.4	4.9
12	313	1458	8.0	9.7	4.5	76.6	5.0
13	313	1472	8.0	9.7	4.5	76.8	4.9
14	312	1491	8.2	9.4	4.6	76.5	4.9
15	313	1463	8.0	9.7	4.5	76.3	5.0
16	314	1471	8.0	9.8	4.5	76.4	5.0

Note. Char = characters, Sent = sentence, Parag = paragraph

Pilot Study

Methods

The purpose of the pilot study was to (a) test the strong/weak manipulations in the messages (b) assess perceived message clarity, and (c) evaluate and refine the survey instruments. It is important that participants perceive the messages to be clear and perceive differences between the strong and weak components. The study is a 16-condition between subjects pre-message, post-test design. Participants read one message about climate protection. As mentioned previously, I created the 16 message conditions by combining all possible combinations of the strong and weak conditions for each of the four appraisals, thus the study has a 2 (strong/weak importance) x 2 (strong/weak goal congruence) x 2 (strong/weak future expectation) x 2 (strong/weak possibility) factorial design. Table 4.2 in the previous section illustrates the message conditions.

Via an Internet site, participants completed pre-message measures, read one of the 16 messages, and then completed the post-message measures. The pre-message measures were current behavior, perceived severity, perceived susceptibility, subjective feelings (hope, fear,

guilt, sadness, happiness, and anger), and appraisals of importance, goal congruence, future expectation, and possibility. The post-message measures were manipulation checks, perceived message clarity, subjective feelings, message attention, appraisals (importance, goal congruence, future expectation, and possibility), environmental identity, interest, perceived barriers, behavioral intention, and demographics. To assess order effects, I created three orders of the survey. I randomized blocks of the pre-message measures, post-message message reaction measures, and post-message attitude and belief measures to produce the three different orders. Then, I combined the randomized blocks to produce three orders for the complete survey. For all orders, the demographic questions were the last items.

Recruitment

I recruited students in-person and via e-mail from communication courses during the spring 2009 semester. Students earned 1-3% extra credit for participation at the discretion of their instructor. I assigned the students to one of the 48 study conditions (16 messages x 3 orders) using a random list generator. To begin the study, I sent participants an e-mail from the online survey program with the link to their assigned survey Web site. The link to the survey site was unique for each participant for authentication purposes. During the fielding of the survey, I sent reminder e-mails via the online survey program to all participants who had not yet accessed the survey and to those who had begun, but not completed, the survey. I sent up to three reminder e-mails (approximately every two days during the one-week study period). I also sent one final reminder the day the study closed.

Participants

Of the 93 students who signed up for the study, 89 (95.70%) completed the survey. I offered students an alternative assignment to earn credit if they did not want to participate in the

study. No students chose to complete the alternative assignment rather than participate in the study. All participants received extra credit in their courses for participating in the study.

Although participants ranged in age from 18 to 32 years old, 89.41% of respondents fell between the ages of 18 and 22 ($M = 21.08$, $SD = 1.97$, $MD = 21$). More than two-thirds of the participants indicated that they are female ($n = 64$, 71.91%) and the rest indicated that they are male ($n = 25$, 28.09%). Most participants identified as Caucasian-American or White ($n = 68$, 76.40%); 6.74% ($n = 6$) identified as African-American or Black; 5.62% ($n = 5$) identified as Asian-American, Asian, or Pacific Islander; 5.62% ($n = 5$) identified as Hispanic or Latino/a; and 4.49% ($n = 4$) identified as “other.” One participant did not provide his or her race or ethnicity. Three percent ($n = 3$) of the participants were freshmen, 13.48% ($n = 12$) were sophomores, 47.19% ($n = 42$) were juniors, 28.09% ($n = 25$) were seniors, 5.62% ($n = 5$) were “super seniors,” and two participants did not provide their year in school. About two-thirds of the participants indicated that they primarily grew up in suburban locations ($n = 59$, 66.29%), 14.61% ($n = 13$) indicated that they grew up in small towns, 8.99% ($n = 8$) indicated that they grew up in urban locations, and 8.99% ($n = 8$) indicated that they grew up in rural locations. One participant did not indicate where he or she grew up. More than half of the participants ($n = 50$, 56.18%) considered themselves to be pro-environment, whereas 8.99% ($n = 8$) did not and 34.83% ($n = 31$) were unsure. However, only 23.60% ($n = 21$) considered themselves to be environmentalists, whereas 39.33% ($n = 35$) did not and 37.08% ($n = 33$) were unsure.

Procedures

Before beginning the survey, students read an online IRB-approved informed consent form and checked a box indicating their consent. Once participants consented, they gained access to the online survey. When they accessed the survey, participants read an introductory screen that told them that the survey was about climate change and would take them approximately 45 minutes to complete. The formative research indicated that participants were more familiar with

global warming than they were with climate change and few had any understanding of climate change. Thus, participants were told that for the purposes of the survey, climate change and global warming mean the same thing.¹⁶

Because the formative research indicated that participants were unfamiliar with what the climate is, what climate change is, how humans can affect the climate, and what changes are occurring because of climate change, they read an introduction to climate change before beginning the survey. The first component defines what the climate is. The second component defines climate change. The third component explained how humans affect the climate through greenhouse gas emissions and identified sources of those emissions. The fourth component described current climate changes. This introduction also gave participants a stimulus for the pre-message subjective feeling questions. The introduction read:

The climate is the average weather of a particular location over many decades or longer. Thus, the climate is made up of the air, living beings, earth, water, and frozen components.

Climate change is changes in the average weather and the air, living beings, earth, water, and frozen components beyond natural variation.

Did you know that our behavior affects our climate? When we drive, use electricity, or take a hot shower, our actions emit carbon dioxide into the air. Producing and transporting the products we buy also emits carbon dioxide. Carbon dioxide is a greenhouse gas that traps heat from the sun. The heat warms the planet and changes our climate.

Our climate is already changing. Our actions that emit greenhouse gases have caused the global temperature to rise. Glaciers and polar ice caps are melting. Sea levels are rising. Plants and animals are migrating toward the poles. Precipitation patterns are changing. Insects that cause diseases are moving into new areas. Air quality is decreasing. Extreme events like hurricanes, floods, droughts, and heat waves are becoming more common. We will see more changes in the near future.

¹⁶ Climate change and global warming are not the same. Global warming is both an example of a climate change and a cause of other changes in the climate. However, students did not have the scientific literacy to make this distinction.

After reading the introductory message, participants completed the pre-message measures (current behavior, perceived severity, perceived susceptibility, subjective feelings, and appraisals of importance, goal congruence, future expectation, and possibility). The online survey program presented each measure on a separate screen and the program's randomizer presented the items in random order within measures. After the fourth pre-message measure, participants reported anything that was confusing or needed improvement related to the measures (i.e., "Is there anything about the instructions, questions, or responses so far that is confusing or needs improvement? If so, please explain."). Participants responded to this question after every fourth measure throughout the pre-message and post-message measures. By analyzing the responses to this question, I identified potential problems in measure instructions, question wording, and response options.

After completing the pre-message measures, participants read the message manipulation to which I assigned them. Instructions at the top of the page read, "Please read this message carefully! The rest of the questions on this survey are about this message! Once you have carefully read the message, please click 'Next' to continue the survey." Once participants pressed the "Next" button, they began the post-message measures.

The post-message measures consisted of manipulation checks and questions about (a) message reactions and (b) attitudes and beliefs. The message reaction questions included measures of perceived message clarity, subjective feelings (hope, fear, guilt, sadness, happiness, and anger), and message attention. The attitude and belief measures asked about appraisals of importance, goal congruence, future expectation, and possibility; environmental identity; interest; perceived barriers; and behavioral intention. The last page of the survey contained demographic measures. The results section below more completely explains the survey instrument.

Data Analysis

Measurement. I analyzed all the pre-message and post-message items and measures for their measurement qualities. First, I analyzed the items for normal distribution, calculating *t*-statistics for skew and kurtosis (the skew or kurtosis statistic divided by its standard error) to identify meaningful deviations from normality. As recommended by Tabachnick and Fidell (2007), I applied the criterion of $p < .01$, $t < 2.58$ to identify variables of concern. Next, I analyzed the item-level properties of the items intended to form scales. First, I re-examined the face validity of the items to make sure the items appeared to measure the same construct. Next, I checked the internal consistency of the scale items by comparing their means, standard deviations, and intercorrelations. Then, I performed exploratory factor analyses using principal axis as the method of extraction and direct oblimin as the factor rotation to check for unidimensionality of the measures. Because I developed or modified many of the scales specifically for this research, I used exploratory rather than confirmatory methods to assess dimensionality. Finally, I calculated the reliability of the scales using Cronbach's alpha. Based on the findings from this analysis, I modified measures for the main study.

Perceived message clarity. In analyzing perceived message clarity, I first examined the means for each message on the perceived message clarity scale to determine if the messages were clear. Next, I performed four *t*-tests to ensure that perceived message clarity did not differ by message condition (strong versus weak for each of the four component manipulations). In addition to analyzing the quantitative perceived message clarity data, I examined the open-ended questions about perceived message clarity to identify components of the messages that were unclear.

Manipulation checks. To determine if the strong/weak manipulations were successful, I perform a series of chi-square analyses on the dichotomous (no/yes) manipulation check variables. In the analyses, the message conditions (i.e., strong or weak on each component) were the independent variables and the manipulation check items were the dependent variables. I also

examined the percent of participants in each message condition who answered the questions correctly.

Results

Measurement

One goal of the pilot study was to test the measurement properties of the scales on the survey. The survey consisted of pre-message and post-message measures. The pre-message measures were current behavior, perceived severity, perceived susceptibility, subjective feelings (hope, fear, guilt, sadness, happiness, and anger), and appraisals of importance, goal congruence, future expectation, and possibility. The post-message measures were manipulation checks and measures of perceived message clarity, subjective feelings, message attention, appraisals (importance, goal congruence, future expectation, and possibility), interest, perceived barriers, behavioral intention, and environmental identity. I describe these scales and their measurement properties below.

Current behavior. Participants reported their current climate protection behaviors by responding to 11 items measured on a five-point scale (*never, rarely, sometimes, usually, and always*). Participants reported their behavior in the past 30 days on the four target behaviors (turning off computers, unplugging cell phone chargers, using reusable grocery bags, and using a reusable water bottle) as well as seven additional behaviors (using compact fluorescent light bulbs, driving less, washing clothes in cold water, adjusting their thermostats by two degrees, taking shorter showers, taking fewer showers, and buying recycled paper). See Appendix E for the complete measure. I did not intend these items to form a unidimensional scale, but rather to be an index of climate protection behavior. To create the index, I averaged the responses to the items ($M = 2.77, SD = 0.72$).

Perceived severity. Participants indicated their perceptions of the severity of climate change by responding to six five-point Likert scale items (1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, and 5 = *strongly agree*). The items asked if respondents think that climate change is (a) a serious problem, (b) overblown, (c) severe, (d) exaggerated, (e) a big deal, and (f) nothing to worry about. See Appendix F for the complete measure. After reversing the second, fourth, and sixth items, I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO^{17} = .80$). The items formed a unidimensional scale that accounted for 64.21% of the variance in the items. I created the scale by averaging item responses ($\alpha = .88$, $M = 3.83$, $SD = 0.73$). The standard deviation of this scale was slightly smaller than the guideline of one-fifth of the range (i.e., 0.80), which indicated that there might not be enough variance in the results. Therefore, for the main study, I made the items more extreme by adding “very” to the items.

Perceived susceptibility. Participants indicated their perceptions of their personal risk of experiencing effects of climate change by responding to five five-point Likert scale items (1 = *strongly disagree* to 5 = *strongly agree*). These items are based on the Risk Behavior Diagnosis Scale (Witte, Meyer, & Martell, 2001). Example items include, “It is likely that I will personally experience negative effects of climate change,” “I am at risk for personally experiencing negative effects of climate change,” and “I am susceptible to negative effects of climate change.” See Appendix G for the complete measure. After reversing the fifth item, I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .86$). The items formed a unidimensional scale that accounted for 73.31% of the variance in the measures. I

¹⁷ The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) compares the size of the observed correlation coefficients to the size of the partial correlation coefficients. Large values (greater than .50) of the KMO index indicate that factor analysis of the variables is appropriate (Kaiser, 1974).

created the scale by averaging item responses ($\alpha = .91$, $M = 3.54$, $SD = 0.72$). The standard deviation for this scale is a bit more narrow than desirable. Therefore, for the main study, I adjusted the scale items to make them more extreme.

Subjective feelings. Participants indicated their subjective feelings of hope, fear, guilt, sadness, happiness, and anger by responding to five-point Likert scale items (1 = *none of this emotion*, 5 = *a great deal of this emotion*). All the items followed the stem, “When I read this message, I felt....” The six subjective feeling scales were *hope* (hopeful, eager, enthusiastic, optimistic, positive, encouraged), *fear* (fearful, worried, afraid, anxious, scared, distressed), *guilt* (guilty, ashamed, embarrassed, remorseful), *sadness* (sad, sorrowful, dreary, dismal), *happiness* (happy, elated, cheerful, joyful), and *anger* (angry, mad, irritated, annoyed, frustrated). See Appendix H for the complete measures.

I conducted exploratory factor analyses on each of the scales to determine if the scales were unidimensional. Because this was a preliminary study, exploratory factor analysis was the appropriate tool. Table 4.4 contains the KMO index and percentage of variance explained for each of the pre-message and post-message subjective feeling scales. Within the happiness scale, the item “elated” was not equally consistent with the other items in the scale and had a smaller loading than the other items on the factor in the exploratory factor analysis. For the pre-message scale, deleting “elated” would improve the reliability of the scale. Given that elated is a more extreme version of happiness than the other items on the scale, these results made sense. To a lesser extent, on the sadness scale, the item “dismal” was not equally consistent or as reliable as the other items on the scale. I replaced these items for the main Study 1 data collection.

Table 4.4: Pilot Study Factorability and Percentage of Variance Explained for the Pre-Message and Post-Message Subjective Feeling Scales

	Pre-Message		Post-Message	
	KMO	% Variance	KMO	% Variance
Hope	.86	62.69	.86	65.23
Fear	.87	63.83	.90	68.97
Guilt	.75	60.69	.82	73.14
Sadness	.80	68.00	.80	75.64
Happiness	.80	71.40	.81	76.15
Anger	.83	68.18	.89	81.32

After factor analyzing the scales, I created each subjective feeling scale by averaging the item responses. Table 4.5 presents the pre-message and post-message reliability for each scale as well as their means and standard deviations.

Table 4.5: Pilot Study Cronbach's Alpha, Means, and Standard Deviations for Pre-Message and Post-Message Subjective Feeling Measures

	Pre-Message			Post-Message		
	α	Mean	SD	α	Mean	SD
Hope	.88	1.82	0.78	.89	2.46	0.98
Fear	.89	2.78	0.91	.91	2.30	0.96
Guilt	.78	2.37	0.84	.87	2.15	0.96
Sadness	.84	2.39	0.86	.89	2.13	0.99
Happiness	.86	1.49	0.70	.89	1.80	0.87
Anger	.88	2.44	0.97	.94	2.23	1.10

Appraisal of importance. Believing in the importance of an event is fundamental to feeling hope about that event. Thus, eight items measured participants' perceptions of the importance of protecting the climate. I drew the items from the revised Personal Involvement Inventory (Zaichkowsky, 1994) and the operationalization of involvement by Pfau and colleagues (e.g., Pfau et al., 1997). Although both operationalizations measure involvement, the items measure two unacknowledged subcomponents of involvement: importance of, and interest in, the issue. Items that measure interest (e.g., exciting, interesting, etc.) were not included in my measure of importance. Participants responded to seven items on five-point semantic differential scales. For example, participants rated whether protecting the climate was *important* or *unimportant*, *relevant* or *irrelevant*, and *of no concern* or *of much concern*. See Appendix I for the complete measure. After reversing the second, fifth, and seventh items, I conducted exploratory factor analyses on the items to determine if they formed a unidimensional scale (pre-message KMO = .84; post-message KMO = .93). The items formed a unidimensional scale that accounted for 69.62% and 75.64% of the variance in the pre-message and post-message measures, respectively. To create the scale, I averaged the responses to the items (pre-message: $\alpha = .93$, $M = 4.52$, $SD = 0.61$; post-message: $\alpha = .95$, $M = 4.40$, $SD = 0.67$). The means for the scale items as well as the scale as a whole were very high, whereas the standard deviations were very small. Therefore, to improve this scale, I made the endpoints of the semantic differentials more extreme by adding "very" to them.

Appraisal of goal congruence. To feel hope, readers must believe that protecting the climate is consistent with their goals. Thus, seven items measured goal congruence. The items asked participants if protecting the climate (a) is one of their goals, (b) is relevant to their personal goals, (c) would keep them from achieving other important goals, (d) interferes with meeting their personal goals, (e) fits with their personal values, (f) is consistent with their ideals, and (g) is important to meeting their personal goals. See Appendix J for the complete measure. I

conducted exploratory factor analyses on the items to determine if they formed a unidimensional scale (pre-message KMO = .83; post-message KMO = .78). For both the pre-message and post-message measures, the items formed two factors. Items c and d loaded on the second factor, whereas all the other items loaded on the first factor. Items c and d have an element of interference with goals that is not present in the other items and could account for the different factors. In the pre-message scale, the first factor accounted for 56.55% of the variance and the second factor accounted for 19.20%. For the post-message scale, the first factor accounted for 57.20% and the second accounted for 24.00% of the variance. For both the pre-message and post-message measures, when I forced the items to load on one factor, items c and d did not load well on the factor. Therefore, I concluded that the scale was multidimensional. In examining the reliability of the items, deleting items c and d would improve substantially the reliability of the scales (pre-message: from $\alpha = .86$ to $\alpha = .88$, post-message: from $\alpha = .85$ to $\alpha = .88$). To improve this scale, I reworded items c and d.

Appraisal of future expectation. To feel hopeful, people must think that a future event will make circumstances better than they currently are. Thus, participants answered six five-point Likert scale questions about their future expectations. Examples of items include, “Protecting the climate will make the future better,” “If we do not protect the climate, we will create a worse future,” and “A better climate creates a better future.” See Appendix K for the complete measure. I conducted exploratory factor analyses (EFA) on the items to determine if they formed a unidimensional scale (pre-message KMO = .84; post-message KMO = .79). On the pre-message measure, the items formed a unidimensional scale that accounted for 66.48% of the variance in the measure. On the post-message measure, I received a two-factor solution. The first factor accounted for 66.69% of the variance and the second factor accounted for 20.52%. The first factor contained all the positively worded items, whereas the second factor contained all the negatively worded items. When I forced the post-message items to one factor, all items loaded above .70 on that factor. I averaged item responses to create the future expectation scale (pre-

message: $\alpha = .89$, $M = 4.18$, $SD = 0.64$; post-message: $\alpha = .90$, $M = 4.02$, $SD = 0.70$). Because the item and scale means are high and the standard deviations are low, for the main study I made the items more extreme. In addition, because of the two-factor EFA solution for the post-message measure, I slightly modified the negatively worded items to make them more consistent with the positively worded items.

Appraisal of possibility. To experience hope, readers must appraise the outcome as possible. Thus, six five-point semantic differential items measured the possibility of protecting the climate. For example, participants indicated whether they thought protecting the climate is *likely* or *unlikely*, *improbable* or *probable*, and *not feasible* or *feasible*. See Appendix L for the complete measure. After reversing the second, fourth, and sixth items, I conducted exploratory factor analyses on the items to determine if they formed a unidimensional scale (pre-message $KMO = .81$; post-message $KMO = .89$). The items formed a unidimensional scale that accounted for 63.34% and 74.21% of the variance in the pre-message and post-message measures, respectively. To create the scale, I averaged the responses to the items (pre-message: $\alpha = .88$, $M = 4.01$, $SD = 0.76$; post-message: $\alpha = .92$, $M = 3.98$, $SD = 0.89$). The means of the possibility items and scale are high. Thus, for the main study, I revised the scale to make the endpoints more extreme by adding “very” to the endpoints.

Manipulation checks. Eighteen dichotomous items assessed the manipulation of the messages. The items asked about the elements unique to each message component manipulation. For example, the manipulation checks for the importance component asked if the message stated that (a) the climate affects your well-being, (b) the climate affects people's well-being, (c) the climate affects people's well-being in few ways, and (d) the climate affects your well-being in many ways. Participants responded to the items by choosing either *no* or *yes*. See Appendix M for the complete measure. I present the analysis of the manipulation checks in a later section.

Perceived message clarity. I measured perceived message clarity using three open-ended questions that asked for participants' understanding of the message content (i.e., “What

information is missing [included] that made it hard for you to understand the message?” and “What suggestions do you have to improve the message?”). Participants also indicated their perceptions of message clarity by responding to five five-point semantic differential scale items. The stem for these questions was, “The information in the message is...” followed by the response choices of *well-explained* or *unclear*, *supported* or *unsupported*, *technical* or *straightforward*, *understandable* or *confusing*, and *helpful* or *not helpful*. These items were included to evaluate if all messages were understandable and equally clear in their language and organization. See Appendix N for the complete measure. After reversing the first, second, and fourth items, I conducted exploratory factor analysis to determine if the items formed a unidimensional scale ($KMO = .63$). The items formed a two-factor solution that accounted for 52.24% and 21.18% of the variance in the measures. However, the items did not load onto the factors in a clear way. I forced the items to one factor and the item “technical” did not load on the factor. With “technical” removed from the scale ($KMO = .65$), the EFA revealed a one-factor solution that accounted for 64.76% of the variance. I created the scale by averaging item responses ($\alpha = .73$, without *technical* $\alpha = .82$, $M = 3.80$, $SD = 0.76$). By examining the scale, I determined that the semantic differentials might not be appropriate opposites (e.g., the opposite of *unclear* might be better as *clear* rather than *well-explained*). In addition, some of the items seemed to measure argument quality in addition to perceived message clarity. Thus, I modified the scale for Study 1.

Message attention. Three items on a five-point Likert scale from *strongly disagree* to *strongly agree* measured message attention, a covariate for message responses. The items were: (a) I paid close attention to the message, (b) What the message said was very important, and (c) I carefully read the message. See Appendix O for the complete measure. I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .52$). The items formed a unidimensional scale that accounted for 60.98% of the variance in the measures; however, the second item did not load on the factor. I determined that the second item measured

importance rather than attention. I created the scale by averaging item responses ($\alpha = .63$ and without the second item $\alpha = .87$, $M = 3.63$, $SD = .64$). For the main study, I removed the second item and added three items that more clearly measure message attention.

Interest in climate protection. I hypothesized that hope appeals increase interest in the topic of the appeal. Thus, five semantic differential items measured issue interest. For example, these items measured if participants believe that learning about ways to protect the climate is *boring or interesting*, *exciting or unexciting*, and *appealing or unappealing*. See Appendix P for the complete measure. After reversing the second, third, fourth, and fifth items, I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .85$). The items formed a unidimensional scale that accounted for 70.14% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .89$, $M = 3.51$, $SD = 0.86$).

Perceived barriers. Five items measured perceived barriers to protecting the climate. Participants responded to five five-point Likert scale items that began with the stem, “Protecting the climate...” The stem was followed by the items (a) takes too much time, (b) costs too much, (c) will decrease my quality of life, (d) is inconvenient, and (e) is a waste of effort. See Appendix Q for the complete measure. I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .79$). The items formed a unidimensional scale that accounted for 57.49% of the variance in the measures. The item “is a waste of effort” did not load highly on the factor. I created the scale by averaging item responses ($\alpha = .83$, $M = 2.14$, $SD = 0.73$). For the main study, I revised the item, “is a waste of effort” to read, “takes too much effort.”

Behavioral intention. Participants indicated how likely they were to engage in 11 behaviors in the next month. The stem “In the next month, I intend to...” was followed by various behaviors including the four target behaviors (turning off computers, unplugging cell phone chargers, using reusable grocery bags, and using a reusable water bottle) as well as seven

additional behaviors (using compact fluorescent light bulbs, driving less, washing clothes in cold water, adjusting their thermostats by two degrees, taking shorter showers, taking fewer showers, and buying recycled paper). The response options on the five-point scale were *strongly disagree*, *disagree*, *neither agree nor disagree*, *agree*, and *strongly agree*. See Appendix R for the complete measure. I did not intend these items to form a unidimensional scale, but rather to be an index of climate protection behavioral intentions. To create the index, I averaged the responses on the items ($M = 3.52$, $SD = 0.74$).

Environmental identity. Participants indicated their environmental identity by responding to four five-point Likert-type items. Three items measured identification with the general environmental movement (e.g., I consider myself to be an environmentalist) and one item measured identification with the climate protection movement. See Appendix S for the complete measure. I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .67$). The items formed a unidimensional scale that accounted for 60.82% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .77$, $M = 3.56$, $SD = 0.63$).

Demographics. Participants provided demographic information about their age, year in school, gender, race/ethnicity, and major. They also indicated what type of area they grew up in (i.e., urban, suburban, small town, or rural). See Appendix T for the complete measure. I did not analyze the measurement properties of the demographics because the items do not form indices or scales.

Perceived Message Clarity

To examine perceived message clarity, I conducted four independent-samples *t*-tests to compare the perceived message clarity scores for the strong and weak conditions for each of the manipulated components. Because my analyses for the main study focused on the effects of the manipulated components (rather than the effects of the whole messages), I examined the effects

of the strong/weak conditions on perceived message clarity rather than examine the clarity of the individual messages. For the importance component there was an unintended significant difference in perceived message clarity for the strong ($n = 46$, $M = 3.88$, $SD = 0.69$) and weak ($n = 43$, $M = 3.51$, $SD = 0.79$) conditions, $t(87) = -2.34$, $p = .022$ (two-tailed). For the goal congruence component there was an unintended significant difference in scores for the strong ($n = 47$, $M = 3.89$, $SD = 0.66$) and weak ($n = 42$, $M = 3.49$, $SD = 0.82$) conditions, $t(87) = -2.54$, $p = .013$ (two-tailed). For the future expectations component there was no significant difference in scores for the strong ($n = 48$, $M = 3.73$, $SD = 0.75$) and weak ($n = 41$, $M = 3.67$, $SD = 0.78$) conditions, $t(87) = -0.38$, $p = .704$ (two-tailed). For the possibility component there was no significant difference in perceived message clarity for the strong ($n = 42$, $M = 3.85$, $SD = 0.68$) and weak ($n = 47$, $M = 3.56$, $SD = 0.81$) conditions, $t(87) = -1.86$, $p = .066$ (two-tailed). Given the significant differences in perceived message clarity for the importance and goal congruence manipulations, I used perceived message clarity as a covariate for all the analyses that assessed effects of these manipulations.

In addition to analyzing the quantitative perceived message clarity data, I examined the open-ended questions about perceived message clarity to identify components of the messages that were unclear. The themes that arose from the open-ended questions were that participants wanted to know more about what they could do to protect the climate (the behavior components were not included in Study 1), that they wanted more statistics, and that they wanted more examples. A few participants felt that their message was confusing or that it was very negative.

Component Manipulation Checks

To determine if the strong/weak manipulations were successful, I perform a series of chi-square analyses on the dichotomous (no/yes) manipulation check variables. In the analyses, the message conditions (strong or weak) were the independent variables and the manipulation check items were the dependent variables. I used a Bonferroni correction ($.05/18$) to set the significance

level to $p = .003$. Several of the manipulation checks had significant or nearly significant differences between the strong and weak conditions in the correct directions; however, the percentage of correct responses was usually far below ideal. The manipulation checks for goal congruence and future expectation were particularly problematic. Table 4.6 shows the chi-square with continuity correction, significance level, effect size phi (Φ), as well as the percentage of participants in each condition that correctly marked each manipulation check.

Table 4.6: Pilot Study Messages Chi-squared, Significance, Effect Size, and Percent Correct by Component Manipulation Check

Check	χ^2	p	Φ	% Correct	
				Strong	Weak
Importance					
1	11.51 [*]	< .0005	.39	95.65	34.88
2	0.00	1.00	.01	13.04	86.05
3	7.10	.008	-.31	82.22	46.51
4	12.81 [*]	.001	.41	91.30	44.19
5	4.06	.044	.25	95.56	20.93
6	2.41	.120	-.20	95.65	16.67
Goal Congruence					
7	18.03 [*]	.001	.47	89.36	54.76
8	5.52	.019	-.27	44.68	80.95
9	20.32 [*]	.001	.50	91.49	54.76
10	20.59 [*]	.001	-.48	76.60	71.43

Future Expectation					
11	4.61	.032	.25	68.75	56.10
12	0.26	.611	-.08	41.67	65.85
13	0.21	.642	.07	75.00	31.71
14	0.05	.819	-.05	58.33	46.34
Possibility					
15	10.04*	.002	.36	95.24	34.04
16	5.46	.021	-.27	90.48	31.91
17	13.96*	.001	.42	73.81	68.09
18	7.99	.005	-.32	61.90	70.21

Note. * = $p < .003$

Discussion

Based on the manipulation checks and perceived message clarity results, it was evident that the manipulations within the pilot messages were not obvious to the participants, nor were the message components clear. Therefore, I substantially modified the messages before conducting the main data collection for Study 1. The details of my modifications are in the following section. In addition, as described above, I modified the measures on the survey that were not unidimensional, internally consistent, and/or reliable.

Message Modification

Based on the results from the pilot study, I substantially revised the manipulations within the messages. In the revised messages, I removed the use of third person in the weak manipulations so that both the strong and weak manipulations were in the second person and focused on how protecting the climate would or would not affect the reader. As with the previous

messages, each message contained four components designed to evoke the four appraisals hypothesized to be part of the hope experience. The order of the components was the same as in the pilot with importance first, followed by goal congruence, future expectation, and possibility. I describe each appraisal component and the changes to its strong/weak manipulation below.

Importance. To shorten and simplify the strong and weak importance conditions, I removed all references to extreme weather events and the food supply. In addition, I added to the first sentence the number of ways that the climate affects the reader's well-being ("many" for the strong condition, "few" for the weak condition). In the strong importance condition, I added modifiers like "very" and "much" to increase the perceived level of importance of climate protection. In the weak importance condition, the message acknowledged that some changes might occur due to climate change, but emphasized that these changes would not affect the reader. The strong and weak importance components read:

The climate affects your well-being in many ways. The climate will affect your health. Your health is affected by air quality. A bad climate increases your chances of getting diseases. A bad climate also affects your finances. A bad climate will cost you money. You will pay more for heating and cooling. Food and energy prices will be much higher. You will be healthier and wealthier in a good climate. Protecting the climate is VERY important for your well-being.

The climate does not affect your well-being. The climate may affect other people's well-being, but it will not affect yours. The climate may affect people's health through air quality. It may also increase their chances of getting diseases. But, the climate will not affect your health. A bad climate will not cost you money. Any increases in energy or food prices will be very small. Thus, a bad climate will not affect your health or wealth. Protecting the climate is NOT important for your well-being.

Goal congruence. To clarify the goal congruence components, I changed the focus of the initial bold statement from the indirect/direct effects of climate protection to how much money the reader might save ("a lot" in the strong condition and "only a little" in the weak condition). In addition, for the weak condition, I decreased the amount of money that the readers could save from \$50 per year to \$22. The revised strong and weak goal congruence components read,

Protecting the climate saves you a lot of money. You can make simple changes to protect the climate. You can use less energy, use less hot water, and make less

trash. These changes are free or cheap. These small changes will directly save you at least \$500 per year. In four years at Penn State, you will save \$2000! That is a lot of money.

Protecting the climate saves you only a little money. You can make simple changes to protect the climate. You can use less energy, use less hot water, and make less trash. These changes are free or cheap. These small changes might indirectly save you up to \$22 per year. In four years at Penn State, you could save \$88. That is not very much money.

Future expectation. To improve the clarity of the future expectation components, I changed the focus of the first sentence from how much better the *climate* was going to be to how much better the *future* was going to be. I removed all references to saving money in the future to avoid confusion with the goal congruence components. In addition, I added modifiers like “many” and “much” to the strong future expectation component and “slightly” and “a little” to the weak future expectation component. These modifiers helped create a greater distance between the two components. The revised strong and weak future expectation components read,

Protecting the climate will make the future much better. Protecting our climate will bring a wonderful future. Our air will be much cleaner. Our weather will be much less extreme. Our summers will be beautiful and mild. We will experience many fewer diseases and will live much longer. Growing food will be easier and more productive. By helping protect the climate, you can help create a wonderful future.

Protecting the climate will have little effect on the future. Protecting the climate may make the future slightly better. The air might be a little bit cleaner. The weather could be slightly less extreme. Summers might be slightly less hot. There could be fewer diseases and death. Growing food might be a very little bit easier and slightly more productive. By helping protect the climate, you would only make the future a tiny bit better.

Possibility. In the pilot test, participants perceived the possibility components to be clear and distinguishable. Therefore, I made only a few minor changes to the components. I added modifiers like “very” to the components to create greater distinctions between the strong and weak components. I changed “millions of people” in the strong condition to “billions of people” in the strong possibility component. I also changed “not many people” to “very few people” in the weak condition. The revised strong and weak possibility components read,

It is very likely that we can make the climate better. All over the world, people like you are taking action. They are using less energy, using less hot water, and making less trash. Billions of people are taking action to protect the climate. You can join the effort and make it even more likely that we will make the climate better.

It is very unlikely that we can make the climate better. All over the world, people would need to use less energy, use less hot water, and make less trash. Very few people are taking action to protect the climate. You can join the effort and make it slightly more likely that we will make the climate better.

Length and readability. To maintain consistency between the conditions, the length and readability of the strong and weak components were as consistent as possible. The weak condition components had slightly higher reading levels due the greater number of words need to make negative statements than to make positive statements (e.g., “I do not like” versus “I like”). I calculated the number of words in each component as well as the number of words per sentence and the number of characters per word. I also calculated readability in Microsoft Word using the Flesch reading ease index. For reading ease, the higher the number is, the more readable the text is. In addition, I calculated the Flesch-Kincaid reading level for each component. Table 4.7 presents this information for each component.

Table 4.7: Study 1 Message Component Length and Readability Characteristics

Component					
Manipulation	Words	Words/Sent	Char/Word	Ease	Level
Importance					
Strong	79	7.9	4.7	74.5	4.8
Weak	85	9.4	4.8	75.8	5.0
Goal Congruence					
Strong	65	9.2	4.0	85.4	3.6
Weak	65	9.2	4.2	82.4	4.0

Future Expectation

Strong	68	8.4	4.8	71.3	5.4
Weak	76	9.5	4.7	72.5	5.5

Possibility

Strong	62	12.4	4.2	74.1	5.9
Weak	58	14.5	4.2	76.8	6.1

Note. Sent = sentence, Char = characters

Message Creation

Once I had created the manipulated components, I combined the strong and weak conditions in all possible ways to create the 16 messages for the study. Table 4.2 in the pilot study message section above details how I combined the manipulated components to create the messages.

Message Design Variables

As with the pilot study, to control for variation in the messages beyond the component manipulations, I constructed each message similarly along the following message design variables: (a) organizational pattern and source credibility, (b) message clarity, (c) readability, (d) length, and (e) typeset. The organizational pattern and typeset is unchanged from the pilot study. Therefore, I only discuss the clarity, readability, and length of the messages below.

Clarity. I wrote the messages in a straightforward, easy to understand manner. Because the strong/weak component manipulations used consistently clear language, the 16 messages created from the components were similarly clear. The messages used short paragraphs with an average paragraph length of 3.6 sentences. The messages' paragraph length ranged from 3.5 to 3.7 sentences per paragraph. The messages also used simple sentence structure. The average sentence length was 9.6 words with a range of 9.1 to 10.1 across messages. I also used simple

words in the messages. All messages had an average word length of 4.5 characters per word with a range of 4.4 to 4.5. Calculations excluded the source information. Clarity characteristics by message are in Table 4.8.

Readability. I calculated the readability of each message in Microsoft Word using the Flesch reading ease and Flesch-Kincaid reading level statistics. The average reading ease across all messages was 76.8 and the average reading level was 4.9. The reading ease ranged from 75.9 to 77.6. As mentioned previously, the higher the reading ease number is, the more clear the message is. The reading level ranged from 4.7 to 5.0. Calculations excluded the source information. Table 4.8 contains readability characteristics by message.

Length. Because of the consistency in the length of the strong/weak manipulation components, message length was relatively constant across the 16 combinations of the components. The messages ranged in length from 270 to 288 words with an average of 279 words. All messages were well within 5% of the mean length. Word counts did not include the source citations. Table 4.8 contains message length by message.

Table 4.8: Study 1 Message Length, Clarity, and Readability Characteristics

Message	Words	Char	Sent/ Parag	Words/ Sentence	Char/ Word	Reading Ease	Reading Level
1	274	1274	3.7	9.1	4.5	76.5	4.8
2	270	1252	3.6	9.3	4.5	77.3	4.7
3	280	1307	3.6	9.6	4.5	76.7	4.9
4	282	1307	3.7	9.4	4.5	76.6	4.8
5	274	1282	3.7	9.1	4.5	75.9	4.9
6	276	1285	3.5	9.8	4.5	77.5	4.8
7	278	1285	3.6	9.5	4.4	77.5	4.8

8	288	1340	3.6	9.9	4.5	76.9	4.9
9	270	1260	3.6	9.3	4.5	76.7	4.8
10	280	1315	3.6	9.6	4.5	76.1	5.0
11	282	1315	3.7	9.4	4.5	76.0	4.9
12	284	1318	3.5	10.1	4.5	77.6	4.9
13	276	1293	3.5	9.8	4.5	76.9	4.9
14	278	1293	3.6	9.5	4.5	76.8	4.9
15	288	1348	3.6	9.9	4.5	76.3	5.0
16	284	1326	3.5	10.1	4.5	77.0	5.0

Note. Char = characters, Sent = sentence, Parag = paragraph

Study 1

The goals of Study 1 were to (a) test the PHT's proposed relationships between the subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility, (b) examine the relationships between subjective feelings of hope and behavioral antecedents, (c) assess the effects of the different components of hope appeals developed in accordance with PHT, and (d) identify individual characteristics that affect the relationships between hope appeals, subjective feelings of hope, and the four appraisals.

Methods

The study had a 2 x 2 x 2 x 2 between subjects pre-test, post-test design. For the study, participants completed the pre-message measures, read one of the 16 climate protection messages, and completed the post-message measures. Each message contained four components, one designed to evoke each of the four appraisals hypothesized to constitute hope (importance, goal congruence, future expectation, and possibility). For each of the four components I developed a

strong hope and weak hope condition as described above. I created the 16 message conditions by combining all possible combinations of the strong and weak condition for each of the appraisal. Thus the study has a 2 (strong/weak importance) x 2 (strong/weak goal congruence) x 2 (strong/weak future expectation) x 2 (strong/weak possibility) factorial design. Table 4.2 in the pilot study message development section illustrates the message conditions.

Prior to reading the message, participants completed measures of current behavior, perceived severity, perceived susceptibility, subjective feelings, and appraisals of importance, goal congruence, future expectation, and possibility. After reading one of the sixteen messages, participants completed manipulation checks and measures of perceived message clarity, subjective feelings (hope, fear, guilt, sadness, happiness, and anger), message attention, perceived message effectiveness, interest, perceived barriers, behavioral intention, environmental identity, and appraisals of importance, goal congruence, future expectation, and possibility. To assess order effects, I created three orders of the survey. I randomized blocks of the pre-message measures, post-message message reaction measures, and post-message attitude and belief measures to produce the three different orders. Then, I combined the randomized blocks to produce three orders for the complete survey. For all orders, the demographic questions were the last items.

Sample Size

I used G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) to calculate the sample size for a one-way, fixed effect, omnibus ANOVA (the least-powerful test I anticipated using). I expected a single component within a message to have a small effect on the outcome variables. Therefore, I entered an effect size of .18, an alpha of .05, and a power of .80 for an ANOVA with two groups (i.e., strong/weak on any one component). This calculation indicated that I needed 246 participants to detect an effect size of .18.

Recruitment

Students taking the University-required public speaking course earn 2% of their grade for participation in a research study, creating a subject pool. I drew participants from this subject pool during two summer sessions in 2009. For each session, the administrator of the pool assigned participants to my study. Once I received the subject list, I e-mailed the students to let them know that they were assigned to my study and to tell them when the study would begin. I assigned the students to one of the 48 study conditions (16 messages x 3 orders) using a random list generator. Once the study was open, participants received an e-mail from the online survey program with the link to their assigned survey Web site. The link to the survey site was unique for each participant for authentication purposes. During the fielding of the survey, I sent reminder e-mails via the online survey program to all participants who had not yet accessed the survey and to those who had begun, but not completed, the survey. I sent up to three reminder e-mails (approximately every two days during the one-week study period). I also sent one final reminder the day the study closed.

Participants

Of the 286 students assigned to the study, 257 (89.86%) participated. The final sample contained 245 students (149 from the first summer session and 96 from the second summer session). The final sample excluded two participants who did not complete the pre-message subjective feeling questions and two participants who skipped nearly all of the survey questions. In addition, I removed from the sample three participants who described themselves as active opponents to the climate protection and/or environmental movements because their data were outliers that substantially skewed the data. These participants represent a portion of the population that is likely to react in unique ways to the climate protection messages; however, this portion of the population was represented in such a small number and their data were extreme outliers that comparisons could not be made to participants who were not active opponents of

these movements. Therefore, the conclusions of this study will not apply to the portion of the population that contains active opponents of the climate protection and/or environmental movements. I also removed from the sample five cases in which the participants self-reported that they experienced absolutely no pre-message or post-message subjective feelings. Because the focus of this study is on subjective feelings, particularly hope, these outliers are not consistent with study aims. All participants received course credit for participating in the study. I offered students an alternative assignment to earn credit if they chose not to participate in the study. One student chose to complete the alternative assignment rather than participate in the study.

Although participants ranged in age from 18 to 45 years old, 90.20% of respondents fell between the ages of 18 and 22 ($M = 20.15$, $SD = 2.36$, $MD = 20$). Seven participants (2.86%) did not indicate their age. About half the participants indicated that they are female ($n = 126$, 51.43%) and about half indicated that they are male ($n = 119$, 48.57%). Most participants identified as Caucasian-American or White ($n = 184$, 75.10%); 12.24% ($n = 30$) identified as Asian-American, Asian, or Pacific Islander; 6.12% ($n = 15$) identified as African-American or Black; 2.45% ($n = 6$) identified as Hispanic or Latino/a; 1.22% ($n = 3$) identified as multi-racial or multi-ethnic; and 2.86% ($n = 7$) identified as “other.” Participants were 13.06% ($n = 32$) freshmen, 22.04% ($n = 54$) were sophomores, 33.88% ($n = 83$) were juniors, 25.71% ($n = 63$) were seniors, 4.08% ($n = 10$) were “super seniors,” and 1.22% ($n = 3$) were “other.” About half of the participants indicated that they primarily grew up in suburban locations ($n = 125$, 51.02%), 27.35% ($n = 67$) indicated that they grew up in small towns, 11.02% ($n = 27$) indicated that they grew up in urban locations, and 10.61% ($n = 26$) indicated that they grew up in rural locations. More than half of the participants ($n = 144$, 58.78%) considered themselves to be pro-environment, whereas 15.92% ($n = 39$) did not and 25.31% ($n = 62$) were unsure. However, only 22.86% ($n = 56$) considered themselves to be environmentalists, whereas 42.86% ($n = 105$) did not and 34.29% ($n = 84$) were unsure. Finally, the participants were split fairly evenly between those who considered

themselves to be “green” ($n = 87, 35.51\%$), those who did not ($n = 69, 28.16\%$), and those who were unsure ($n = 88, 35.92\%$).

Procedures

The procedures for the main data collection for Study 1 were the same as for the pilot study with one exception. In addition to telling participants about the length of the survey and that climate change and global warming are the same, the introductory screen also told participants that they would be reading a brief introductory message and another message later in the survey. Because a few participants in the pilot study indicated that they did not know how important the messages were to the study, the introductory screen also stated, “Please read both these messages carefully as they are the basis for the rest of the survey.” Finally, because participants in the pilot study commented on the repetitive nature of the questions, the introductory screen read, “Some of the questions you read may seem repetitive. This is intentional. Please just answer each one honestly.”

Survey Instrument

As with the pilot study, the main study consisted of pre-message and post-message as described above. Many of the measures on the Study 1 survey are the same or similar to the pilot test. However, based on the measurement analysis and qualitative responses from the pilot study, I revised several of the measures. Unless otherwise noted, the items on the main survey remain the same as the pilot survey. To be succinct, I also describe below the results of my analysis of each scales’ measurement qualities.

To create the scales, I first analyzed items for normal distribution. I calculated the t -statistics for skew and kurtosis (the skew or kurtosis statistic divided by its standard error) with a significance level of $p < .001$. After I examined normality, I checked the internal consistency of the scale items by comparing their means, standard deviations, and intercorrelations. Then, I

performed exploratory factor analyses using principal axis as the method of extraction and direct oblimin as the factor rotation to check for unidimensionality of the measures. Because I developed or modified many of the scales specifically for this research, I used exploratory rather than confirmatory methods to assess dimensionality. Finally, I calculated the reliability of the scales using Cronbach's alpha.

Current behavior. As in the pilot test, participants reported their climate protection behaviors in the past 30 days by responding to 11 items measured on a five-point scale (*never, rarely, sometimes, usually, and always*). This scale was unchanged from the pilot test and I describe it in that section. See Appendix E for the complete measure. I did not intend these items to form a unidimensional scale, but rather to be an index of climate protection behaviors. To create the index, I averaged the responses to the items ($M = 2.79$, $SD = 0.76$).

Perceived severity. Participants indicated their perceptions of the severity of climate change by responding to six five-point Likert scale items (1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, and 5 = *strongly agree*). Based on the pilot study, I revised this scale to make the responses more extreme by adding "very" to all but the last item. Thus, the items asked if respondents think that climate change is (a) a very serious problem, (b) very overblown, (c) very severe, (d) very much exaggerated, (e) a very big deal, and (f) nothing to worry about. See Appendix F for the complete measure. After reversing the second, fourth, and sixth items, I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .85$). The items formed a unidimensional scale that accounted for 68.08% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .90$, $M = 3.67$, $SD = 0.80$).

Perceived susceptibility. Participants indicated their perceptions of their personal risk of experiencing effects of climate change by responding to five five-point Likert scale items. Based on the pilot test, I revised the perceived susceptibility items to make them more extreme by adding words like "very" to the items. Thus, example items include, "It is very likely that I will

personally experience negative effects of climate change,” “I am very much at risk for personally experiencing negative effects of climate change,” and “I am very susceptible to negative effects of climate change.” See Appendix G for the complete measure. After reversing the fifth item, I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .88$). The items formed a unidimensional scale that accounted for 73.59% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .91$, $M = 3.24$, $SD = 0.83$).

Subjective feelings. Based on the results of the pilot study, I made slight changes to the sadness and happiness scales to make them less extreme. Thus, in the sadness scale, I replaced *dismal* with *blue* and *down*. On the happiness scale, I replaced *elated* with *glad* and *pleased*. See Appendix H for the complete measures. I conducted exploratory factor analyses on each of the scales to determine if the scales were unidimensional. Table 4.9 contains the KMO index and percentage of variance explained for each of the subjective feeling scales.

Table 4.9: Study 1 Factorability and Percentage of Variance Explained for the Pre-Message and Post-Message Subjective Feeling Scales

	Pre-Message		Post-Message	
	KMO	% Variance Explained	KMO	% Variance Explained
Hope	.88	62.65	.91	72.90
Fear	.88	64.11	.91	71.93
Guilt	.79	67.60	.82	73.25
Sadness	.86	68.56	.89	76.17
Happiness	.89	76.87	.91	81.87
Anger	.85	69.74	.86	74.64

After factor analyzing the scales, I created each subjective feeling scale by averaging the item responses. Table 4.10 presents the pre-message and post-message reliability for each scale as well as their means and standard deviations.

Table 4.10: Study 1 Cronbach's Alpha, Means, and Standard Deviations for Pre-Message and Post-Message Subjective Feeling Measures

	Pre-Message			Post-Message		
	α	Mean	<i>SD</i>	α	Mean	<i>SD</i>
Hope	.88	1.64	0.73	.93	2.02	0.98
Fear	.89	2.39	0.89	.92	1.97	0.91
Guilt	.84	2.13	0.92	.88	1.85	0.91
Sadness	.89	2.11	0.91	.92	1.83	0.89
Happiness	.92	1.34	0.61	.94	1.71	0.92
Anger	.89	2.24	0.98	.91	2.15	1.05

Appraisal of importance. Based on the pilot study, I removed one item from the importance scale, made the remaining seven items more extreme, and labeled each point on the scale. Thus, participants rated, for example, whether protecting the climate is (a) *very important, important, neither, unimportant, or very unimportant*; (b) *very relevant, relevant, neither, irrelevant, or very irrelevant*; and (c) *of no concern, of very little concern, neither, of much concern, or of very much concern*. See Appendix I for the complete measure. After reversing the second, fourth, and sixth items, I conducted exploratory factor analyses on the items to determine if they formed a unidimensional scale (pre-message KMO = .89; post-message KMO = .94). The items formed a unidimensional scale that accounted for 57.46% and 71.32% of the variance in the pre-message and post-message measures, respectively. To create the scale, I averaged the

responses to the items (pre-message: $\alpha = .86$, $M = 4.14$, $SD = 0.60$; post-message: $\alpha = .93$, $M = 4.00$, $SD = 0.67$).

Appraisal of goal congruence. As with the pilot test, seven items measured goal congruence. However, based on the pilot test, I revised the items to be all positively-worded rather than a combination of positively and negatively worded. Thus, the items asked participants if protecting the climate (a) is one of their goals, (b) relates to their personal goals, (c) would help them achieve other important goals, (d), helps them meet their personal goals, (e) fits with their personal values, (f) is consistent with their ideals, and (g) is important to meeting their personal goals. See Appendix J for the complete measure. I conducted exploratory factor analyses on the items to determine if they formed a unidimensional scale (pre-message KMO = .90; post-message KMO = .91). The items formed a unidimensional scale that accounted for 70.83% and 76.73% of the variance in the pre-message and post-message measures, respectively. To create the scale, I averaged the responses to the items (pre-message: $\alpha = .93$, $M = 3.28$, $SD = 0.84$; post-message: $\alpha = .95$, $M = 3.23$, $SD = 0.87$).

Appraisal of future expectation. Based on the pilot test, I modified the future expectation scale to be more extreme. Thus, examples of items include, “Protecting the climate will make the future wonderful,” “Failing to protect the climate will create a bleak future,” and “A better climate equals a much better future.” See Appendix K for the complete measure. I conducted exploratory factor analyses on the items to determine if they formed a unidimensional scale (pre-message KMO = .80; post-message KMO = .83). The items formed a unidimensional scale that accounted for 53.67% and 65.37% of the variance in the pre-message and post-message measures, respectively. I averaged item responses to create the future expectation scale (pre-message: $\alpha = .83$, $M = 3.76$, $SD = 0.67$; post-message: $\alpha = .89$, $M = 3.45$, $SD = 0.80$).

Appraisal of possibility. Based on the pilot test, I revised the possibility scale to be more extreme by adding “very” to the endpoints of the semantic differentials. In addition, I labeled each point on the scale. Thus, participants indicated, for example, whether they thought

protecting the climate is *very likely*, *likely*, *neither*, *unlikely* or *very unlikely*; *very improbable*, *improbable*, *neither*, *probable*, or *very probable*; and *not at all feasible*, *mostly infeasible*, *neither*, *feasible*, or *very feasible*. See Appendix L for the complete measure. After reversing the second, fourth, and sixth items, I conducted exploratory factor analyses on the items to determine if they formed a unidimensional scale (pre-message KMO = .87; post-message KMO = .86). The items formed a unidimensional scale that accounted for 60.84% and 64.57% of the variance in the pre-message and post-message measures, respectively. To create the scale, I averaged the responses to the items (pre-message: $\alpha = .86$, $M = 3.72$, $SD = 0.65$; post-message: $\alpha = .89$, $M = 3.66$, $SD = 0.70$).

Appraisals. To verify that the four appraisals are separate, I conducted an exploratory factor analysis using all the items making up the four appraisal scales (importance, goal congruence, future expectation, and possibility). For both the pre-message and post-message items, I performed a principle axis factor extraction with oblique (direct oblimin) rotation on the 26 items. Prior to performing the EFA, I assessed the suitability of the data for factor analysis.

For the pre-message items, inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The KMO value was .92 and the Bartlett's Test of Sphericity was statistically significant, supporting the factorability of the correlation matrix. The factor analysis revealed the presence of four factors with eigenvalues exceeding 1, explaining 39.05%, 10.60%, 7.91%, and 5.61% of the variance, respectively. The four-factor solution explained 63.18% of the variance. The four factors fall along the four appraisals, indicating that they are indeed separate appraisals. Table 4.11 below provides the pattern matrix for the pre-message items with the primary loadings in bold font.

Table 4.11: Study 1 Pattern Matrix from an Exploratory Factor Analysis of the Pre-Message Appraisal Items Using Principal Axis Factoring and Oblique Rotation

Appraisal	Factors			
Item	1	2	3	4
Future Expectation				
Protecting the climate will make the future wonderful.	-.29	.00	-.18	.75
Not protecting the climate will make the future awful.	.12	-.01	-.02	.63
Failing to protect the climate will create a bleak future.	.23	-.13	.06	.51
Protecting the climate will create a bright future.	-.02	-.03	-.01	.60
A better climate equals a much better future.	.10	-.03	.04	.63
A worse climate equals a much worse future.	.15	-.01	.12	.67
Importance				
Does not matter at all to me/Matters very much to me	.36	-.36	-.12	.15
Is very important/Is very unimportant R	.33	-.01	-.09	.07
Is very nonessential/Is very essential	.55	-.04	-.16	.25
Is very significant/Is very insignificant R	.48	.07	-.25	.11
Is of no concern/Is of very much concern	.54	-.25	-.09	.18
Is very relevant/Is very irrelevant R	.42	-.07	-.33	.09
Is not needed at all/Is needed very much	.61	-.03	-.18	.25
Possibility				
Very Impossible/very possible	.11	-.08	-.42	.16
Very Likely/very unlikely R	-.08	.02	-.74	-.08
Very Improbable/very probable	.00	-.01	-.67	.01
Very Achievable/very unachievable R	.09	-.04	-.80	-.01
Not at all feasible/Very feasible	.09	-.08	-.67	-.01

Very Attainable/Very unattainable R	.08	-.01	-.81	.05
<hr/>				
Goal Congruence				
Is one of my goals.	.06	-.77	-.12	-.01
Relates to my personal goals.	-.04	-.88	-.06	.01
Would help me achieve other important goals.	-.05	-.73	-.02	.08
Helps me meet my personal goals.	-.16	-.90	-.02	.11
Fits with my personal values.	.46	-.57	.10	-.07
Is consistent with my ideals.	.33	-.67	.07	-.06
Is important to meeting my personal goals.	-.15	-.94	-.04	.00

Note. Primary loadings are in bold font for ease of reading. R = item reverse coded

For the post-message items, inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The KMO value was .93 and the Bartlett's Test of Sphericity was statistically significant, supporting the factorability of the correlation matrix. The factor analysis revealed the presence of four factors with eigenvalues exceeding 1, explaining 45.39%, 10.82%, 9.27%, and 6.27% of the variance, respectively. The four-factor solution explained 71.74% of the variance. The four factors fall precisely along the four appraisals, indicating that they are indeed separate appraisals. Table 4.12 below provides the pattern matrix for the post-message items with the primary loadings in bold font.

Table 4.12: Study 1 Pattern Matrix from an Exploratory Factor Analysis of the Post-Message Appraisal Items Using Principal Axis Factoring and Oblique Rotation

Appraisal	Factors			
Item	1	2	3	4
Future Expectation				
Protecting the climate will make the future wonderful.	-.17	-.01	.08	.83
Not protecting the climate will make the future awful.	.13	-.11	-.08	.63
Failing to protect the climate will create a bleak future.	.24	-.11	.02	.61
Protecting the climate will create a bright future.	-.01	-.01	.08	.74
A better climate equals a much better future.	.13	-.01	.02	.76
A worse climate equals a much worse future.	.27	-.04	-.14	.64
Importance				
Does not matter at all to me/Matters very much to me	.61	-.20	.11	.09
Is very important/Is very unimportant R	.66	-.01	.13	.08
Is very nonessential/Is very essential	.64	.00	.19	.18
Is very significant/Is very insignificant R	.65	.06	.16	.14
Is of no concern/Is of very much concern	.64	-.19	.09	.12
Is very relevant/Is very irrelevant R	.71	.05	.11	.12
Is not needed at all/Is needed very much	.68	-.04	.06	.17
Possibility				
Very Impossible/very possible	.28	-.01	.55	-.04
Very Likely/very unlikely R	-.08	-.01	.69	.14
Very Improbable/very probable	.01	-.01	.84	.01
Very Achievable/very unachievable R	.09	-.04	.74	-.07
Not at all feasible/Very feasible	.07	-.01	.74	.02

Very Attainable/Very unattainable R	-.01	-.08	.77	-.05
<hr/>				
Goal Congruence				
Is one of my goals.	.09	-.74	.12	.05
Relates to my personal goals.	-.02	-.91	.05	.02
Would help me achieve other important goals.	-.03	-.84	.05	.03
Helps me meet my personal goals.	-.09	-.92	.07	.09
Fits with my personal values.	.46	-.56	-.07	-.10
Is consistent with my ideals.	.51	-.57	-.11	-.14
Is important to meeting my personal goals.	-.13	-.95	.04	.10

Note. Primary loadings are in bold font for ease of reading. R = item reverse coded

Manipulation checks. Because I substantially revised the messages between the pilot test and the main study, I also completely revised the manipulation checks. Eighteen dichotomous items assessed the strong/weak manipulations of the messages. The items asked about the elements unique to each message appeal. For example, the manipulation checks for the importance component asked if the message stated that (a) the climate affects your well-being in many ways, (b) the climate does not affect your well-being, (c) protecting the climate is very important for your well-being, and (d) protecting the climate is not important for your well-being. Participants responded to the items by choosing either *no* or *yes*. See Appendix M for the complete measure.

Perceived message clarity. As with the pilot, I measured perceived message clarity using three open-ended questions and five closed-ended questions. The open-ended questions were the same as in the pilot. However, I substantially revised the closed-ended questions to make sure that they only measured perceived message clarity, not argument quality. Thus, the five-point semantic differentials were *clear* or *unclear*, *easy to read* or *hard to read*, *complicated* or *straightforward*, *well-explained* or *confusing*, and *hard to understand* or *easy to understand*. See

Appendix N for the complete measure. After reversing the first, second, and fourth items, I conducted exploratory factor analysis to determine if they formed a unidimensional scale ($KMO = .84$). The items formed a unidimensional scale that accounted for 72.87% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .91$, $M = 3.66$, $MD = 5.00$, $SD = 1.02$).

Message attention. Based on the pilot test, I added three items to the message attention scale and removed one item. I removed the item that asked about the importance of the message content because it measured importance, not message attention. I added the other three items to improve the scale. Thus, five items on a five-point Likert scale from *strongly disagree* to *strongly agree* measured message attention, a covariate for message responses. The items were: (a) I paid close attention to the message, (b) I focused on what the message said, (c) I carefully read the message, (d) I concentrated when I read the message, and (e) I thoroughly read the message. These items were measured on a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). See Appendix O for the complete measure. I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .89$). The items formed a unidimensional scale that accounted for 79.68% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .94$, $M = 3.48$, $SD = .87$).

Interest. Based on the pilot test, I revised the interest scale to be more extreme by adding “very” to the semantic differentials. I also labeled each point on the scale. Thus, five items measured participants’ interest in learning about ways to protect the climate. For example, the items asked if learning about protecting the climate is (a) *very boring*, *boring*, *neither*, *interesting*, or *very interesting*; (b) *very exciting*, *exciting*, *neither*, *unexciting*, or *very unexciting*, and (c) *very appealing*, *appealing*, *neither*, *unappealing*, or *very unappealing*. After reversing the second, third, fourth, and fifth items, I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .88$). The items formed a unidimensional scale that

accounted for 73.26% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .91$, $M = 3.38$, $SD = 0.81$). See Appendix P for the complete measure.

Perceived barriers. The perceived barriers scale remained nearly unchanged from the pilot study. Based on the pilot study, I revised the fifth item to read, “Protecting the climate takes too much effort.” See Appendix Q for the complete measure. I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .80$). The items formed a unidimensional scale that accounted for 61.84% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .84$, $M = 2.35$, $SD = 0.78$).

Behavioral intention. The behavioral intention scale was unchanged from the pilot test. That section describes the scale fully. See Appendix R for the complete measure. I did not intend these items to form a unidimensional scale, but rather to be an index of climate protection behavioral intentions. To create the index, I averaged the responses to the items ($M = 3.44$, $SD = 0.79$).

Environmental identity. I added one item to the environmental identity scale (i.e., I consider myself to be “green.”) as this term is more neutral than the term “environmentalist” is and more specific than the term “pro-environment” is. The other items on the scale remained the same. See Appendix S for the complete measure. I conducted exploratory factor analysis on the items to determine if they formed a unidimensional scale ($KMO = .83$). The items formed a unidimensional scale that accounted for 70.52% of the variance in the measures. I created the scale by averaging item responses ($\alpha = .89$, $M = 3.41$, $SD = 0.79$).

Demographics. The demographics remained unchanged from the pilot study. See Appendix T for the complete measure.

Data Analysis

Perceived message clarity. In analyzing perceived message clarity, I first examined the means for each message on the perceived message clarity scale to determine if the messages were

clear. Next, I performed four *t*-tests to assess whether perceived message clarity differed by message component manipulation (strong/weak). In addition to analyzing the quantitative perceived message clarity data, I examined the open-ended questions about perceived message clarity to identify components of the messages that were unclear.

Manipulation checks. To determine if the strong/weak manipulations were successful, I performed a series of chi-square analyses on the dichotomous (no/yes) manipulation check variables. In the analyses, the message component manipulations (strong or weak) were the independent variables and the manipulation check items were the dependent variables. I also examined the percent of participants in each message condition who answered the questions correctly.

Order effects. Due to the length of the survey, three versions of the survey controlled for order effects. I tested order effects using a series of analyses of variance with all the pre-message and post-message items as the outcome variables and the three survey orders as the predictor. In addition to examining the effects of order on individual items, I also used a one-way analysis of variance to examine the effects of order on the scales formed from the items.

Evaluation of random assignment. To evaluate possible significant and salient group differences between the participants randomly assigned to the 16 different message conditions, I conducted a one-way analysis of variance with the message conditions as the predictor and the pre-message scales, environmental identity scale, and demographic items as the outcomes.

Hypotheses and research questions. I tested hypotheses 1, 3-5, and 12 as well as research question 5 using bivariate or partial correlation coefficients. I tested hypotheses 2 and research questions 4, 6 and 7 using multiple regression analyses. I used factorial analyses of covariance to test hypothesis 7, 8, 11, and research questions 1-3.¹⁸

¹⁸ Hypotheses 6, 9, and 10 are tested exclusively in Study 2.

Preliminary Analyses

Perceived message clarity

To examine perceived message clarity, I conducted four independent-samples *t*-tests to compare the perceived message clarity scores for the strong and weak message manipulations for each of the components. Because my analyses focused on the effects of the manipulated components (rather than the effects of the individual messages), I examined the effects of the strong/weak message manipulations on perceived message clarity. For the message manipulation of importance, there was an unintended significant difference in perceived message clarity for the strong ($n = 119$, $M = 3.87$, $SD = 0.87$) and weak ($n = 126$, $M = 3.47$, $SD = 1.12$) conditions, $t(234) = -3.13$, $p = .002$ (two-tailed, equal variances not assumed). For the message manipulation of goal congruence, there was no significant difference in scores for the strong ($n = 123$, $M = 3.74$, $SD = 0.96$) and weak ($n = 122$, $M = 3.58$, $SD = 1.08$) conditions, $t(243) = -1.23$, $p = .221$ (two-tailed, equal variances assumed). For the message manipulation of future expectation, there was no significant difference in scores for the strong ($n = 124$, $M = 3.63$, $SD = 1.01$) and weak ($n = 121$, $M = 3.70$, $SD = 1.04$) conditions, $t(243) = 0.53$, $p = .597$ (two-tailed, equal variances). For the message manipulation of possibility, there was no significant difference in scores for the strong ($n = 127$, $M = 3.67$, $SD = 1.03$) and weak ($n = 118$, $M = 3.66$, $SD = 1.02$) conditions, $t(251) = -0.11$, $p = .914$ (two-tailed). Given the unintended significant difference in perceived message clarity for the importance component manipulation, I used perceived message clarity as a covariate for all the analyses that assess effects of the importance component.

In addition to analyzing the quantitative perceived message clarity data, I examined the open-ended questions about perceived message clarity to identify components of the messages that were unclear. Approximately 20% of the respondents wanted more “statistics,” “evidence,” or “proof” included in the messages. About half of these respondents specified that they wanted this evidence because the message contradicted their views (e.g., the message said that protecting

the climate was not important when they believed that it was). About 19% of respondents commented on the contradictory nature of the message or recommended that the message should present only one side. These participants were all in conditions that had mixed strong and weak message manipulations. About 6% of participants wanted more information, more examples, or information about specific behaviors that they could perform. Another 6% wanted the message to be more optimistic, wanted the message to do more to convince naysayers, or believed that the message did not reflect current scientific opinion (the people in the latter group all read message 16, which contained all the weak components).

Message Manipulation Checks

To determine if the message manipulations were successful, I performed a series of chi-square analyses on the dichotomous (no/yes) message manipulation checks. In the analyses, the manipulations of the message components (strong or weak) were the independent variables and the manipulation check items were the dependent variables. I used a Bonferroni correction (.05/18) to set the significance level to $p = .003$. In all cases, the strong and weak conditions were significantly different ($p < .001$). Overall, the percentages of correct responses were good. Table 4.13 shows the chi-square with continuity correction, significance level, effect size phi (Φ), as well as the percentage of participants in each condition that correctly marked the item.

Table 4.13: Study 1 Chi-square with Continuity Correction, Significance, Effect Size Phi, and Percent Correct by Message Manipulation Check

Message Manipulation			% Correct	
Check #	χ^2	Φ	Strong	Weak
Importance				
1	133.09***	.75	94.07	80.16
2	135.49***	-.76	94.92	80.00
3	47.53***	.45	78.81	65.87
4	68.58***	-.53	88.14	63.49
5	88.71***	.61	88.98	71.43
6	94.96***	-.63	95.73	65.08
Goal Congruence				
7	124.34***	.72	88.62	83.47
8	118.89***	-.71	88.62	81.82
9	103.36***	.66	81.15	85.00
10	100.21***	-.65	86.18	78.51
Future Expectation				
11	70.83***	.55	80.33	74.38
12	72.38***	-.55	83.74	71.07
13	62.41***	.52	73.98	77.50
14	69.64***	-.54	81.30	72.73

Possibility				
15	42.37***	.43	73.23	69.23
16	63.51***	-.52	88.19	61.74
17	61.88***	.51	71.65	79.49
18	87.27***	-.61	80.34	80.31

Note. Manipulations were coded as 0 = weak and 1 = strong. *** = manipulation checks were statistically significant at $p < .001$.

Order Effects

Due to the length of the survey, three versions of the survey controlled for order effects. I tested order effects using analyses of variance with all the pre-message and post-message items as the outcome variables and the three survey orders as the predictor. Because of the large number of tests involved in this analysis, I used a Bonferroni correction (.05/100) to achieve an acceptable error rate of $p < .0005$. Survey order was not significantly associated with differences in the means of any of the items.

In addition to examining the effects of order on individual items, I also used a one-way analysis of variance to examine the effects of order on the scales formed from the items. Survey order was not significantly associated with differences in the means of any of the scales.

Evaluation of Random Assignment

To evaluate possible significant and salient group differences between the participants randomly assigned to the 16 different message conditions, I conducted a one-way analysis of variance with the message component manipulations as the predictor and the pre-message scales, environmental identity scale, and demographic items as the outcomes. Because I had 16 dependent variables, I used a Bonferroni correction (.05/16) to achieve an acceptable error rate of

$p = .003$. The analysis indicated that there were no significant differences between participants assigned to the message component manipulations.

Tests of Hypotheses and Research Questions

Hypothesis 1

The first hypothesis states that subjective feelings of hope are positively related to appraisals of importance, goal congruence, possibility, and future expectation. I used Pearson's correlations to test the associations between subjective feelings of hope and the appraisals. I assessed these relationships on the pre-message measures as well as the post-message measures. Pre-message subjective feelings of hope were not significantly correlated with pre-message appraisals of importance, goal congruence, future expectation, or possibility. Post-message subjective feelings of hope were significantly correlated with post-message appraisals of goal congruence ($p = .036$) and future expectation ($p = .001$). Table 4.14 presents the correlations between pre-message subjective feelings of hope and the pre-message appraisals as well as the correlations between post-message subjective feelings of hope and the post-message appraisals. In summary, the post-message data provided partial support for hypothesis one, whereas the pre-message data did not.

Table 4.14: Study 1 Correlations between Subjective Feelings of Hope and Each of the Appraisals on the Pre-Message and Post-Message Scales

	Subjective Feelings of Hope	
	Pre-Message	Post-Message
Appraisals of Importance	-.06	.06
Appraisals of Goal Congruence	.09	.13*
Appraisals of Future Expectation	.11	.21**
Appraisals of Possibility	.02	.03

Note. Pre-message subjective feelings of hope were correlated with pre-message appraisals, whereas post-message subjective feelings of hope were correlated with post-message appraisals. *
 $= p < .05$, ** $= p < .01$

Hypothesis 2

The second hypothesis states that appraisals of importance, goal congruence, positive future expectation, and possibility predict subjective feelings of hope. I conducted two multiple regression analyses to test this hypothesis. The first regression used pre-message scales, whereas the second regression used post-message scales. For the first regression, pre-message subjective feelings of hope was the dependent variable and pre-message appraisals of importance, goal congruence, future expectation, and possibility were the independent variables. For the second regression, post-message subjective feelings of hope was the dependent variable and pre-message subjective feelings of hope as well as post-message appraisals of importance, goal congruence, future expectation, and possibility were the independent variables. Results of the evaluation of assumptions indicated that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity.

Pre-message. For the pre-message regression, the R for regression ($R = .23$) was significantly different from zero, $F(4, 238) = 3.24$, $p = .013$, with an R^2 value of .05. The R^2 value indicates that about 5% of the variability in pre-message subjective feelings of hope was

predicted by pre-message appraisals of importance, goal congruence, future expectation, and possibility. The regression coefficients for the appraisals of importance ($t = -2.98, p = .003$) and future expectation ($t = 2.44, p = .016$) significantly differed from zero, whereas the regression coefficient for the appraisals of goal congruence ($t = 1.93, p = .055$) and possibility ($t = 0.51, p = .608$) did not. The size and direction of the relationships suggest that subjective feelings of hope are greater among people with lower appraisals of importance and more positive appraisals of future expectation. Thus, the pre-message data provided partial support for hypothesis two. Table 4.15 presents the correlations among the pre-message appraisals and pre-message subjective feelings of hope. Table 4.16 presents the B and β weights from the regression.

Table 4.15: Study 1 Correlations among Pre-Message Subjective Feelings of Hope and the Four Pre-Message Appraisals

	Hope	Importance	Goal Congruence	Future Expectation
Appraisals of Importance	-.06			
Appraisals of Goal Congruence	.09	.57**		
Appraisals of Future Expectation	.11*	.59**	.44**	
Appraisals of Possibility	.02	.55**	.38**	.42**

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

Table 4.16: Study 1 Multiple Regression of Pre-Message Appraisals on Pre-Message Subjective Feelings of Hope

	B	β
Appraisals of Importance	-.35**	-.28**
Appraisals of Goal Congruence	.13	.15
Appraisals of Future Expectation	.22*	.20*
Appraisals of Possibility	.05	.04

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

Post-message. For the post-message regression, the R for regression ($R = .26$) was significantly different from zero, $F(4, 239) = 4.14$, $p = .003$, with an R^2 value of .07. The R^2 value indicates that approximately 7% of the variability in post-message subjective feelings of hope was predicted by post-message appraisals of importance, goal congruence, future expectation, and possibility. The regression coefficients for the appraisal of future expectation ($t = 3.41$, $p = .001$) significantly differed from zero, whereas the regression coefficient for appraisals of importance ($t = -1.77$, $p = .079$), goal congruence ($t = 1.72$, $p = .088$), and possibility ($t = -0.59$, $p = .557$) did not. The size and direction of the relationship suggests that post-message subjective feelings of hope were greater among people with more positive appraisals of future expectation. Thus, the post-message data provided partial support for hypothesis two. Table 4.17 presents the correlations among the post-message variables. Table 4.18 presents the B and β weights from the regression.

Table 4.17: Study 1 Correlations among Post-Message Subjective Feelings of Hope and the Four Post-Message Appraisals

	Hope	Importance	Goal Congruence	Future Expectation
Appraisals of Importance	.06			
Appraisals of Goal Congruence	.13 [*]	.62 ^{**}		
Appraisals of Future Expectation	.21 ^{**}	.65 ^{**}	.44 ^{**}	
Appraisals of Possibility	.03	.56 ^{**}	.42 ^{**}	.40 ^{**}

Note. ^{*} = $p < .05$, ^{**} = $p < .01$

Table 4.18: Study 1 Multiple Regression of Post-Message Appraisals on Post-Message Subjective Feelings of Hope

	B	β
Appraisals of Importance	-.26	-.18
Appraisals of Goal Congruence	.15	.14
Appraisals of Future Expectation	.35 ^{**}	.28 ^{**}
Appraisals of Possibility	-.06	-.05

Note. ^{*} = $p < .05$, ^{**} = $p < .01$

In summary, the data provided partial support for hypothesis two. Specifically, the pre-message data supported appraisals of importance as a predictor of subjective feelings of hope, whereas the post-message data did not. The size and direction of the relationship suggests that subjective feelings of hope are greater among people with lower appraisals of importance. Both the pre-message and post-message data supported future expectation as a predictor of subjective feelings of hope. The size and direction of the relationships suggest that subjective feelings of

hope were greater among people with more positive appraisals of future expectation. Neither the pre-message nor the post-message data supported appraisals of goal congruence or appraisals of possibility as predictors of subjective feelings of hope.

Hypothesis 3

The third hypothesis predicts that subjective feelings of hope felt in response to a hope appeal are positively related to attention to that message. To test this hypothesis, I examined the partial correlation between post-message subjective feelings of hope and message attention while controlling for pre-message subjective feelings of hope. In addition, I examined the effect of the total amount of subjective hope (i.e., not controlling for pre-message subjective feelings of hope) on message attention via a bivariate Pearson's correlation. There was no significant partial relationship between post-message subjective feelings of hope and message attention while controlling for pre-message subjective feelings of hope: $r(239) = .06$, $p = .354$. Thus, the data did not provide support for a relationship between message attention and the change in subjective feelings of hope after exposure to a hope appeal. Similarly, there was no significant bivariate relationship: $r(243) = -.02$, $p = .757$. In summary, the data did not provide support for a relationship between the total amount of subjective feelings of hope and message attention.

Hypothesis 4

The fourth hypothesis predicts that subjective feelings of hope felt in response to a hope appeal are positively related to interest in the topic of the message. To test this hypothesis, I examined the partial correlation between post-message subjective feelings of hope and interest while controlling for pre-message subjective feelings of hope. In addition, I examined the effect of the total amount of subjective hope (i.e., not controlling for pre-message subjective feelings of hope) on interest in the message topic via a bivariate Pearson's correlation. There was a significant partial relationship between post-message subjective feelings of hope and interest

while controlling for pre-message subjective feelings of hope: $r(239) = .14$ $p = .037$. Thus, the data provided support for a relationship between interest in learning about climate protection behaviors and the change in subjective feelings of hope after exposure to a hope appeal. However, there was not a significant bivariate relationship: $r(243) = .12$, $p = .058$. In summary, the data did not provide support for a relationship between the total amount of subjective feelings of hope and interest in learning about ways to protect the climate.

Hypothesis 5

The fifth hypothesis predicts that subjective feelings of hope felt in response to a hope appeal are positively related to behavioral intentions. To test this hypothesis, I examined the partial correlation between post-message subjective feelings of hope and behavioral intentions while controlling for pre-message subjective feelings of hope. In addition, I examined the effect of the total amount of subjective hope (i.e., not controlling for pre-message subjective feelings of hope) on behavioral intentions via a bivariate Pearson's correlation. There was no significant partial relationship between post-message subjective feelings of hope and behavioral intentions while controlling for pre-message subjective feelings of hope: $r(239) = .01$ $p = .913$. Similarly, there was no significant bivariate relationship: $r(243) = -.01$, $p = .917$. In summary, the data did not provide support for relationships between behavioral intentions and total subjective feelings of hope or between behavioral intentions and changes in subjective feelings of hope after exposure to a message.

Hypothesis 7 and Research Question 1

The seventh¹⁹ hypothesis predicts that the strong level of each of the four manipulated components (importance, goal congruence, positive future expectation, and possibility) leads to higher post-message subjective feelings of hope than does the weak level of each of the message manipulations when controlling for pre-message subjective feelings of hope and perceived message clarity. The first research question asks about the relative contribution of each of the manipulated message components in predicting post-message subjective feelings of hope. I conducted 2 x 2 x 2 x 2 factorial between-groups analyses of covariance to assess the effects of the manipulated components (importance, goal congruence, future expectation, and possibility) on subjective feelings of hope. The independent variables were the four strong/weak manipulated components and all interactions between the components. The dependent variable was the scores on the subjective feelings of hope scale administered after participants read the message. The covariates were participants' scores on the pre-message subjective feelings of hope and perceived message clarity scales. I conducted preliminary checks to ensure that there were no violations of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, or reliable measurement of the covariate.

After adjusting for pre-message subjective feelings of hope and perceived message clarity, the message manipulations of goal congruence: $F(1, 224) = 8.28, p = .004$, partial $\eta^2 = .04$ and possibility: $F(1, 224) = 15.45, p < .0005$, partial $\eta^2 = .07$ had significant main effects on post-message subjective feelings of hope. The adjusted means indicate that people in the strong goal congruence condition ($M = 2.16, SE = .08$) experienced greater subjective feelings of hope than did people in the weak goal congruence condition ($M = 1.84, SE = .08$). The adjusted means also

¹⁹ The numbering skips from the fifth hypothesis to the seventh hypothesis because the sixth hypothesis is tested exclusively in Study 2.

indicate that people in the strong possibility condition ($M = 2.21$, $SE = .08$) experienced greater subjective feelings of hope than did people in the weak possibility condition ($M = 1.79$, $SE = .08$). The message manipulations of importance: $F(1, 224) = 2.72$, $p = .101$, partial $\eta^2 = .01$ and future expectation: $F(1, 224) = 3.87$, $p = .051$, partial $\eta^2 = .02$ did not have a significant main effect on post-message subjective feelings of hope. The covariate pre-message subjective feelings of hope, also had a significant effect on post-message subjective feelings of hope: $F(1, 224) = 60.07$, $p < .0005$, partial $\eta^2 = .21$. The covariate perceived message clarity did not have a significant effect on post-message subjective feelings of hope: $F(1, 224) = 2.97$, $p = .086$, partial $\eta^2 = .01$. No interaction effects were significant. Thus, the data provided partial support for hypothesis seven. Table 4.19 includes the means and standard deviations for pre- and post-message subjective feelings of hope and assessment of message clarity by message manipulation.

Table 4.19: Study 1 Means and Standard Deviations for Pre-Message and Post-Message Subjective Feelings of Hope by Message Condition

Message Manipulation			Subjective Feelings of Hope	
Condition	<i>N</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	117	3.87 (0.87)	1.62 (0.70)	2.13 (0.97)
Weak	125	3.46 (1.12)	1.67 (0.77)	1.91 (0.98)
Goal Congruence				
Strong	122	3.73 (0.96)	1.60 (0.76)	2.14 (1.03)**
Weak	120	3.58 (1.09)	1.70 (0.70)	1.88 (0.91)**

Future Expectation

Strong	123	3.63 (1.01)	1.61 (0.70)	2.11 (1.02)
Weak	119	3.68 (1.04)	1.68 (0.77)	1.91 (0.93)

Possibility

Strong	126	3.66 (1.03)	1.66 (0.75)	2.23 (1.00)**
Weak	116	3.65 (1.02)	1.63 (0.72)	1.78 (0.91)**

Note. Manipulations were coded as 0 = weak and 1 = strong. ** = strong versus weak message manipulation is significantly different at $p < .01$ when controlling for pre-message subjective feelings of hope and perceived message clarity.

In summary, the data provided partial support for hypothesis seven. Specifically, the data supported the manipulation of goal congruence and the manipulation of possibility as predictors of subjective feelings of hope. In both cases, the strong manipulation led to greater subjective feelings of hope.

Research Question 2

The second research question asks if the strong and weak manipulated conditions result in different subjective feelings, controlling for pre-message subjective feelings and perceived message clarity. For each subjective feeling (fear, guilt, sadness, happiness, and anger), I conducted a 2 x 2 x 2 x 2 factorial between-groups analyses of covariance to assess the effects of the strong and weak conditions for each of the four manipulated components (importance, goal congruence, future expectation, and possibility) on the post-test subjective feelings. The independent variables were the strong/weak message condition for each of the components and all interactions between the four components. The dependent variable was the post-message scores on each subjective feeling. The covariates were participants' scores on the pre-message subjective feeling and perceived message clarity scales. I used a Bonferroni correction (.05/5) to

set the significance level at $p < .01$. I conducted preliminary checks to ensure that there were no violations of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, or reliable measurement of the covariates. The results of my evaluation of assumptions were satisfactory.

Fear. After adjusting for pre-message subjective feelings of fear and assessments of message clarity, none of the message manipulations had a significant main effect on post-message fear. However, the covariate, pre-message subjective feelings of fear, had a significant effect on post-message subjective feelings fear: $F(1, 224) = 90.94, p < .0005$, partial $\eta^2 = .29$. However, the covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 224) = 0.06, p = .805$, partial $\eta^2 = .00$. No interaction effects were significant. Table 4.20 includes the means and standard deviations for pre- and post-message subjective feelings of fear and assessments of message clarity by message manipulation.

Table 4.20: Study 1 Means and Standard Deviations for Perceived Message Clarity and Subjective Feelings of Fear by Message Condition

Message Manipulation			Subjective Feelings of Fear	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	118	3.87 (0.87)	2.39 (0.85)	2.03 (0.92)
Weak	125	3.47 (1.12)	2.38 (0.93)	1.92 (0.90)
Goal Congruence				
Strong	122	3.74 (0.96)	2.37 (0.93)	1.97 (0.94)
Weak	121	3.58 (1.08)	2.40 (0.86)	1.97 (0.88)

Future Expectation

Strong	123	3.63 (1.01)	2.46 (0.89)	1.98 (0.86)
Weak	119	3.70 (1.04)	2.31 (0.89)	1.96 (0.96)

Possibility

Strong	126	3.67 (1.03)	2.40 (0.85)	1.86 (0.85)
Weak	117	3.66 (1.03)	2.37 (0.93)	2.09 (0.97)

Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .01$.

Guilt. After adjusting for pre-message subjective feelings of guilt and assessments of message clarity, there were no significant main effects or interaction effects of the message manipulations on post-message subjective feelings of guilt. The covariate, pre-message subjective feelings of guilt, had a significant effect on post-message subjective feelings of guilt: $F(1, 224) = 117.60, p < .0005$, partial $\eta^2 = .34$. The covariate perceived message clarity did not provide a statistically significant adjustment. Table 4.21 includes the means and standard deviations for assessments of message clarity and pre- and post-message subjective feelings of guilt by message condition.

Table 4.21: Study 1 Means and Standard Deviations for Pre- and Post-Message Guilt by Message Condition

Message Manipulation			Subjective Feelings of Guilt	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	118	3.87 (0.87)	2.18 (0.90)	1.92 (0.90)
Weak	125	3.47 (1.12)	2.08 (0.93)	1.78 (0.91)
Goal Congruence				
Strong	122	3.74 (0.96)	2.15 (0.96)	1.88 (0.89)
Weak	121	3.58 (1.08)	2.10 (0.88)	1.81 (0.93)
Future Expectation				
Strong	123	3.63 (1.01)	2.23 (0.95)	1.82 (0.86)
Weak	119	3.70 (1.04)	2.02 (0.88)	1.88 (0.96)
Possibility				
Strong	126	3.67 (1.03)	2.17 (0.91)	1.80 (0.89)
Weak	117	3.66 (1.03)	2.08 (0.93)	1.90 (0.92)

Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .01$.

Sadness. After adjusting for pre-message subjective feelings of sadness and perceived message clarity, none of the strong and weak message manipulations had significant main or interaction effects on post-message subjective feelings of sadness. The covariate, pre-message subjective feelings of sadness, had a significant effect on post-message subjective feelings of sadness: $F(1, 224) = 121.34, p < .0005$, partial $\eta^2 = .35$. The covariate perceived message clarity

did not have a significant effect on post-message subjective feelings of sadness. Table 4.22 includes the means and standard deviations for perceived message clarity and pre- and post-message subjective feelings of sadness by message condition.

Table 4.22: Study 1 Means and Standard Deviations for Pre- and Post-Message Subjective Feelings of Sadness by Message Condition

Message Manipulation			Subjective Feelings of Sadness	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	118	3.87 (0.87)	2.12 (0.89)	1.87 (0.91)
Weak	125	3.47 (1.12)	2.11 (0.93)	1.80 (0.88)
Goal Congruence				
Strong	122	3.74 (0.96)	2.06 (0.93)	1.83 (0.89)
Weak	121	3.58 (1.08)	2.17 (0.89)	1.84 (0.89)
Future Expectation				
Strong	123	3.63 (1.01)	2.17 (0.90)	1.81 (0.81)
Weak	119	3.70 (1.04)	2.05 (0.92)	1.86 (0.97)
Possibility				
Strong	126	3.67 (1.03)	2.14 (0.89)	1.75 (0.83)
Weak	117	3.66 (1.03)	2.09 (0.94)	1.93 (0.95)

Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .01$.

Happiness. After adjusting for pre-message subjective feelings of happiness and perceived message clarity, the message manipulations did not have significant main effects on post-message happiness. The covariate, pre-message subjective feelings of happiness, also had a significant effect on post-message subjective feelings of happiness: $F(1, 224) = 38.21, p < .0005$, partial $\eta^2 = .15$. No interaction effects were significant. The covariate message clarity did not have a significant effect. Table 4.23 includes the means and standard deviations for pre- and post-message subjective feelings of happiness by message condition.

Table 4.23: Study 1 Means and Standard Deviations for Pre- and Post-Message Subjective Feelings of Happiness by Message Condition

Message Manipulation			Subjective Feelings of Happiness	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	118	3.87 (0.87)	1.32 (0.59)	1.75 (0.94)
Weak	125	3.47 (1.12)	1.36 (0.64)	1.68 (0.91)
Goal Congruence				
Strong	122	3.74 (0.96)	1.33 (0.64)	1.83 (0.94)
Weak	121	3.58 (1.08)	1.35 (0.59)	1.59 (0.89)
Future Expectation				
Strong	123	3.63 (1.01)	1.34 (0.60)	1.76 (0.93)
Weak	119	3.70 (1.04)	1.34 (0.64)	1.67 (0.91)

Possibility				
Strong	126	3.67 (1.03)	1.32 (0.58)	1.82 (0.93)
Weak	117	3.66 (1.03)	1.36 (0.65)	1.60 (0.91)

Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .01$.

Anger. After adjusting for pre-message subjective feelings of anger and perceived message clarity, the message manipulation of possibility: $F(1, 224) = 9.07, p = .003$, partial $\eta^2 = .04$ had a significant main effect on post-message subjective feelings of anger, whereas the other message manipulations did not. The adjusted means indicated that participants in the weak possibility condition experienced more anger ($M = 2.33, SE = .08$) than did participants in the strong possibility condition ($M = 2.01, SE = .08$). There were no significant interaction effects. The covariate, pre-message subjective feelings of anger, had a significant effect on post-message subjective feelings of anger: $F(1, 224) = 110.74, p < .0005$, partial $\eta^2 = .33$. The covariate message clarity did not have a significant effect. Table 4.24 includes the means and standard deviations for perceived message clarity and pre- and post-message subjective feelings of anger by message condition.

Table 4.24: Study 1 Means and Standard Deviations for Pre- and Post-Message Subjective Feelings of Anger by Message Condition

Message Manipulation			Subjective Feelings of Anger	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	118	3.87 (0.87)	2.30 (0.98)	2.04 (0.99)
Weak	125	3.47 (1.12)	2.19 (0.97)	2.29 (1.09)
Goal Congruence				
Strong	122	3.74 (0.96)	2.23 (1.00)	2.13 (1.01)
Weak	121	3.58 (1.08)	2.26 (0.95)	2.20 (1.09)
Future Expectation				
Strong	123	3.63 (1.01)	2.26 (0.99)	2.12 (1.01)
Weak	119	3.70 (1.04)	2.22 (0.96)	2.21 (1.09)
Possibility				
Strong	126	3.67 (1.03)	2.26 (0.96)	2.02 (0.97) ^{**}
Weak	117	3.66 (1.03)	2.22 (1.00)	2.33 (1.11) ^{**}

Note. Manipulations were coded as 0 = weak and 1 = strong. ^{**} = the strong and weak message conditions are significantly different at $p < .01$.

In summary, the analyses show that participants in the weak possibility condition experienced more anger than did participants in the strong possibility condition. Otherwise, participants in the strong and weak conditions did not significantly differ in terms of the subjective feelings they experienced after reading the messages.

Hypothesis 8

The eighth hypothesis predicts that the strong level of each of the manipulated components (importance, goal congruence, positive future expectation, and possibility) leads to higher post-message appraisals of importance, goal congruence, positive future expectation, and possibility, respectively than does the weak level when controlling for pre-message appraisals and perceived message clarity. To account for interactions between the manipulated components, I conducted four $2 \times 2 \times 2 \times 2$ factorial between-groups analyses of covariance to assess the effect of the message manipulations on each of the post-test appraisal. I used a Bonferroni correction ($.05/4$) to set the significance level at $p < .013$. For each analysis, the independent variables were the message manipulations and all interactions between the four components. The dependent variable was the post-message scores on one of the appraisals. The covariates were participants' scores on the pre-message appraisal and perceived message clarity scales. I conducted a preliminary evaluation to ensure that there were no violations of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, or reliable measurement of the covariate. The results of this evaluation were satisfactory.

Importance. After adjusting for pre-message appraisals of importance and perceived message clarity, none of the strong/weak manipulations had a significant main effect on post-message appraisals of importance. The message manipulation of strong and weak goal congruence did approach significance: $F(1, 227) = 5.69, p = .018$, partial $\eta^2 = .02$. Table 4.25 includes the means and standard deviations for perceived message clarity and pre- and post-message appraisals of importance by message manipulation. The covariate pre-message appraisals of importance had a significant effect on post-message appraisals of importance: $F(1, 227) = 334.66, p < .0005$, partial $\eta^2 = .60$. The covariate perceived message clarity also had a significant effect on post-message appraisals of importance: $F(1, 227) = 7.15, p = .008$, partial $\eta^2 = .03$. No interaction effects were significant.

Table 4.25: Study 1 Means and Standard Deviations for Perceived Message Clarity and Pre- and Post-Message Appraisals of Importance by Message Condition

Message Manipulation			Appraisals of Importance	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	119	3.87 (0.87)	4.14 (0.58)	4.02 (0.65)
Weak	126	3.46 (1.12)	4.14 (0.62)	3.99 (0.69)
Goal Congruence				
Strong	123	3.73 (0.96)	4.12 (0.60)	3.92 (0.68)
Weak	122	3.58 (1.09)	4.17 (0.60)	4.08 (0.65)
Future Expectation				
Strong	124	3.63 (1.01)	4.13 (0.61)	3.99 (0.67)
Weak	121	3.68 (1.04)	4.15 (0.59)	4.01 (0.67)
Possibility				
Strong	127	3.66 (1.03)	4.15 (0.57)	4.01 (0.65)
Weak	118	3.65 (1.02)	4.14 (0.62)	3.99 (0.70)

Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .013$.

Goal congruence. After adjusting for pre-message appraisals of goal congruence and perceived message clarity, the strong and weak message manipulations did not have significant main effects on post-message appraisals of goal congruence. The covariate pre-message appraisals of goal congruence had a significant effect on post-message appraisals of goal congruence: $F(1, 227) = 745.84, p < .0005$, partial $\eta^2 = .77$. The covariate perceived message

clarity also had a significant effect on post-message appraisals of goal congruence: $F(1, 227) = 11.67, p = .001$, partial $\eta^2 = .05$. Table 4.26 includes the means and standard deviations for pre- and post-message appraisals of goal congruence by message manipulation.

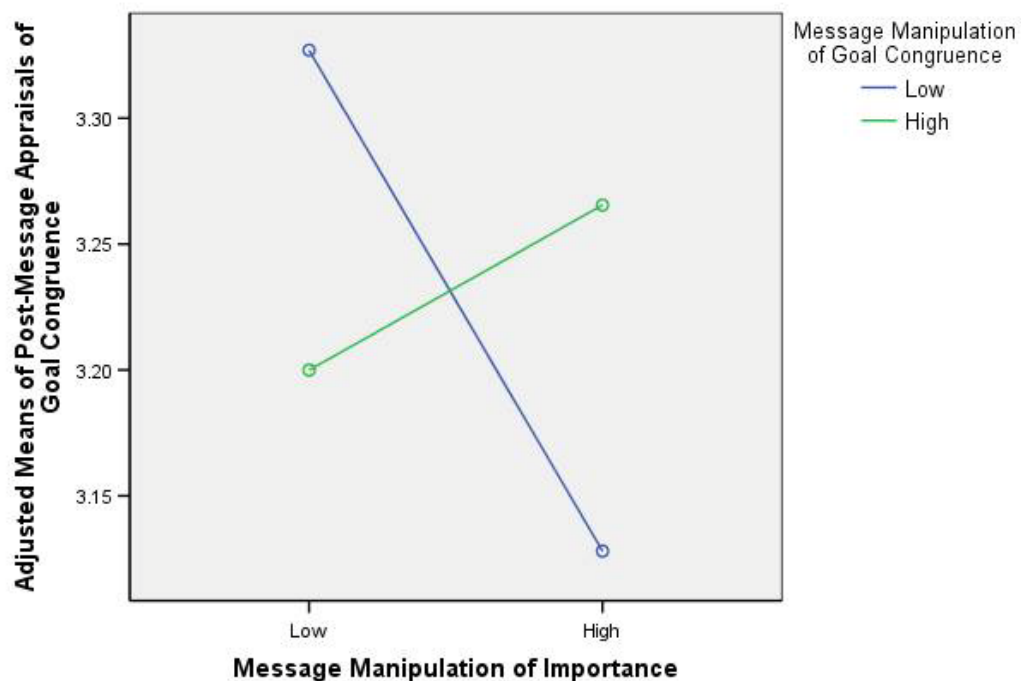
Table 4.26: Study 1 Means and Standard Deviations for Pre- and Post-Message Appraisals of Goal Congruence by Message Condition

Message Manipulation			Appraisals of Goal Congruence	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	119	3.87 (0.87)	3.29 (0.82)	3.22 (0.88)
Weak	126	3.46 (1.12)	3.28 (0.87)	3.24 (0.87)
Goal Congruence				
Strong	123	3.73 (0.96)	3.19 (0.88)	3.16 (0.86)
Weak	122	3.58 (1.09)	3.38 (0.80)	3.31 (0.89)
Future Expectation				
Strong	124	3.63 (1.01)	3.27 (0.91)	3.23 (0.90)
Weak	121	3.68 (1.04)	3.30 (0.77)	3.24 (0.85)
Possibility				
Strong	127	3.66 (1.03)	3.35 (0.81)	3.30 (0.82)
Weak	118	3.65 (1.02)	3.22 (0.88)	3.16 (0.93)

Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .013$.

Although there were no main effects, there was a nearly significant interaction between the strong and weak message manipulations of importance and goal congruence: $F(1, 227) = 5.75, p = .017$, partial $\eta^2 = .03$. Figure 4.1 displays this interaction, which indicates that the weak goal congruence condition led to greater post-message appraisals of goal congruence when the message also included the weak importance condition. The strong goal congruence condition led to higher post-message appraisals of goal congruence when the message also included the strong importance condition. No other interaction effects were significant.

Figure 4.1: Study 1 Interaction Effects between Manipulations of Importance and Goal Congruence on Post-Message Appraisals of Goal Congruence



Future expectation. After adjusting for pre-message appraisals of future expectation and message clarity, there were no significant main or interaction effects of the strong and weak message manipulations. The covariate pre-message appraisals of future expectation, had a significant effect on post-message appraisals of future expectation: $F(1, 227) = 166.92, p < .0005$,

partial $\eta^2 = .42$. The covariate message clarity did not have an effect on post-message appraisals of future expectation. Table 4.27 includes the means and standard deviations for perceived message clarity and pre- and post-message appraisals of future expectation by message condition.

Table 4.27: Study 1 Means and Standard Deviations for Pre- and Post-Message Appraisals of Future Expectation by Message Condition

Message Manipulation			Appraisals of Future Expectation	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	119	3.87 (0.87)	3.75 (0.66)	3.42 (0.82)
Weak	126	3.46 (1.12)	3.78 (0.67)	3.47 (0.78)
Goal Congruence				
Strong	123	3.73 (0.96)	3.76 (0.70)	3.38 (0.78)
Weak	122	3.58 (1.09)	3.76 (0.64)	3.51 (0.81)
Future Expectation				
Strong	124	3.63 (1.01)	3.79 (0.66)	3.52 (0.73)
Weak	121	3.68 (1.04)	3.73 (0.67)	3.36 (0.86)
Possibility				
Strong	127	3.66 (1.03)	3.80 (0.65)	3.48 (0.78)
Weak	118	3.65 (1.02)	3.72 (0.68)	3.41 (0.81)

Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .013$.

Possibility. After adjusting for pre-message appraisals of possibility, the strong and weak message manipulation of possibility: $F(1, 227) = 17.43, p < .0005$, partial $\eta^2 = .072$ had a significant main effect on post-message appraisals of possibility, whereas the strong and weak message manipulations of importance, goal congruence, and future expectation did not. The adjusted means indicate that people in the strong possibility condition ($M = 3.78, SE = .04$) experienced higher appraisals of possibility than did people in the weak possibility condition ($M = 3.54, SE = .04$). There were no significant interaction effects at $p < .013$. The covariate pre-message appraisals of possibility had a significant effect on post-message appraisals of possibility: $F(1, 227) = 324.42, p < .0005$, partial $\eta^2 = .59$. The covariate message clarity did not have a significant effect on appraisals of possibility. Table 4.28 includes the means and standard deviations for message clarity and pre- and post-message appraisals of possibility by message condition.

Table 4.28: Study 1 Means and Standard Deviations for Pre- and Post-Message Appraisals of Possibility by Message Condition

Message Manipulation			Appraisals of Possibility	
Condition	<i>n</i>	Message Clarity	Pre-Message	Post-Message
Importance				
Strong	119	3.87 (0.87)	3.71 (0.65)	3.64 (0.71)
Weak	126	3.46 (1.12)	3.76 (0.64)	3.69 (0.69)
Goal Congruence				
Strong	123	3.73 (0.96)	3.68 (0.65)	3.56 (0.67)
Weak	122	3.58 (1.09)	3.79 (0.64)	3.77 (0.72)

Future Expectation

Strong	124	3.63 (1.01)	3.70 (0.65)	3.63 (0.66)
Weak	121	3.68 (1.04)	3.77 (0.64)	3.70 (0.74)

Possibility

Strong	127	3.66 (1.03)	3.73 (0.62)	3.77 (0.65)*
Weak	118	3.65 (1.02)	3.74 (0.67)	3.55 (0.73)*

Note. Manipulations were coded as 0 = weak and 1 = strong. * = strong versus weak message

manipulation is significantly different when controlling for pre-message appraisals and perceived message clarity at $p < .013$.

In summary, the data provided limited support for hypothesis eight. Using $p < .013$ as the critical value for significance, none of the strong/weak manipulations had a significant main effect on post-message appraisals of importance, goal congruence, or future expectations. However, the data did support a significant main effect of the possibility manipulation on appraisals of possibility. The data indicated that the strong manipulation led to higher appraisals of possibility.

Hypothesis 11 and Research Question 3

The eleventh²⁰ hypothesis predicts that the strong level of each of the message manipulations (importance, goal congruence, positive future expectation, and possibility) leads to greater behavioral intention (measured post-message) than does the weak level of each of the message manipulations when controlling for current behavior (measured pre-message) and

²⁰ The numbering skips from the eighth hypothesis to the eleventh hypothesis because the ninth and tenth hypotheses are tested exclusively in Study 2.

perceived message clarity. Research question three asks what the relative contribution of each of the components is to behavioral intention. To test this hypothesis and answer the research question, I conducted 2 x 2 x 2 x 2 factorial between-groups analyses of covariance to assess the effect of the message manipulations on behavioral intention. The independent variables were the four message manipulations and all interactions between the manipulations. The dependent variable was the scores on the behavioral intention index administered after participants read the message. The covariates were participants' scores on the pre-message behavior index and the perceived message clarity scale.

I conducted preliminary checks to ensure that there were no violations of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, or reliable measurement of the covariate. The analysis for homogeneity of regression slopes revealed an interaction between future vision and the covariate behavior. I examined the results of the ANOVA if I dropped the covariate from the model. There were no differences in the results without behavior as a covariate than there were with behavior in the model. Therefore, given the strong correlation between behavior and behavioral intention and the robustness of the ANCOVA model to violations of homogeneity of regression slopes (Tabachnick & Fidell, 2007), I kept the covariate behavior in the model.

After adjusting for pre-intervention behavior and perceptions of message clarity, none of the message manipulations had a significant main effect on behavioral intention. The covariate pre-message behavior had a significant effect on post-message behavioral intentions: $F(1, 227) = 231.27, p < .0005$, partial $\eta^2 = .51$. The covariate message clarity did not have a significant effect on behavioral intentions. Table 4.29 includes the means and standard deviations for perceived message clarity, pre-message behavior, and post-message behavioral intentions by message condition.

Table 4.29: Study 1 Means and Standard Deviations for Perceived Message Clarity, Pre-Message Behavior, and Post-Message Behavioral Intention by Message Condition

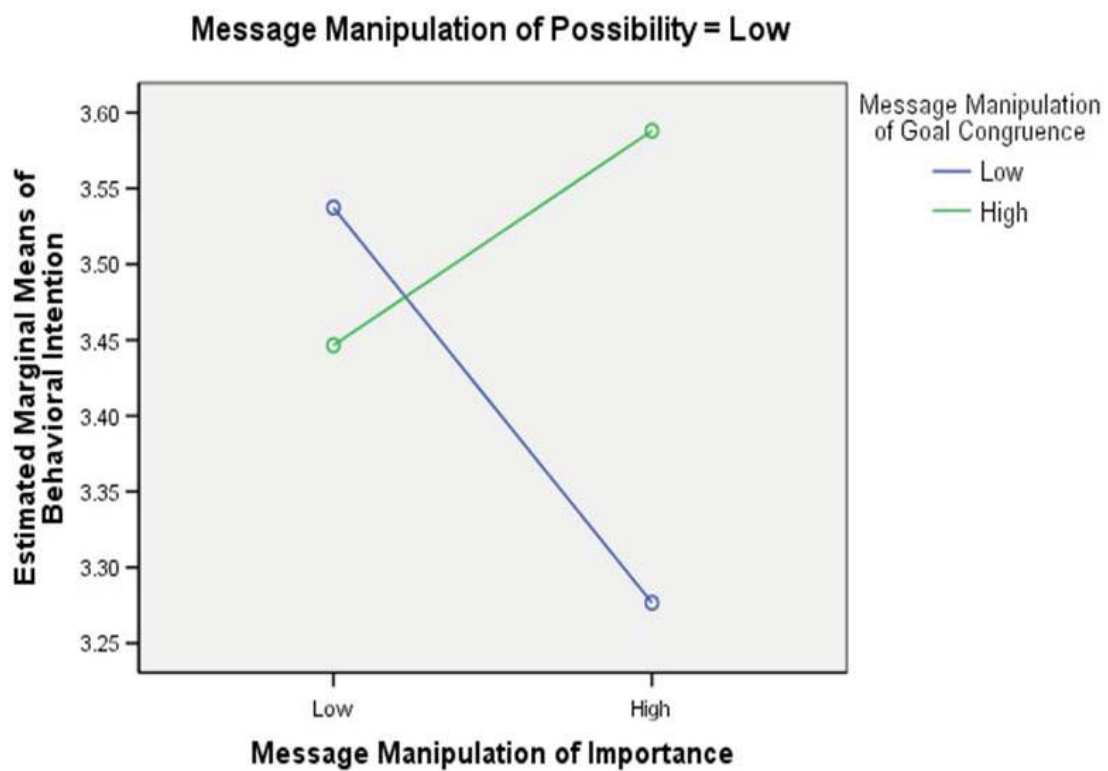
Manipulation		Behavioral		
Condition	<i>N</i>	Message Clarity	Behavior	Intention
Importance				
Strong	119	3.87 (0.87)	2.78 (0.71)	3.45 (0.76)
Weak	126	3.47 (1.12)	2.80 (0.81)	3.43 (0.81)
Goal Congruence				
Strong	123	3.74 (0.96)	2.69 (0.71)	3.40 (0.79)
Weak	122	3.58 (1.08)	2.89 (0.80)	3.48 (0.78)
Future Expectation				
Strong	124	3.63 (1.01)	2.77 (0.71)	3.43 (0.78)
Weak	121	3.70 (1.04)	2.81 (0.81)	3.45 (0.79)
Possibility				
Strong	127	3.67 (1.03)	2.89 (0.75)	3.48 (0.72)
Weak	118	3.66 (1.03)	2.69 (0.76)	3.39 (0.85)

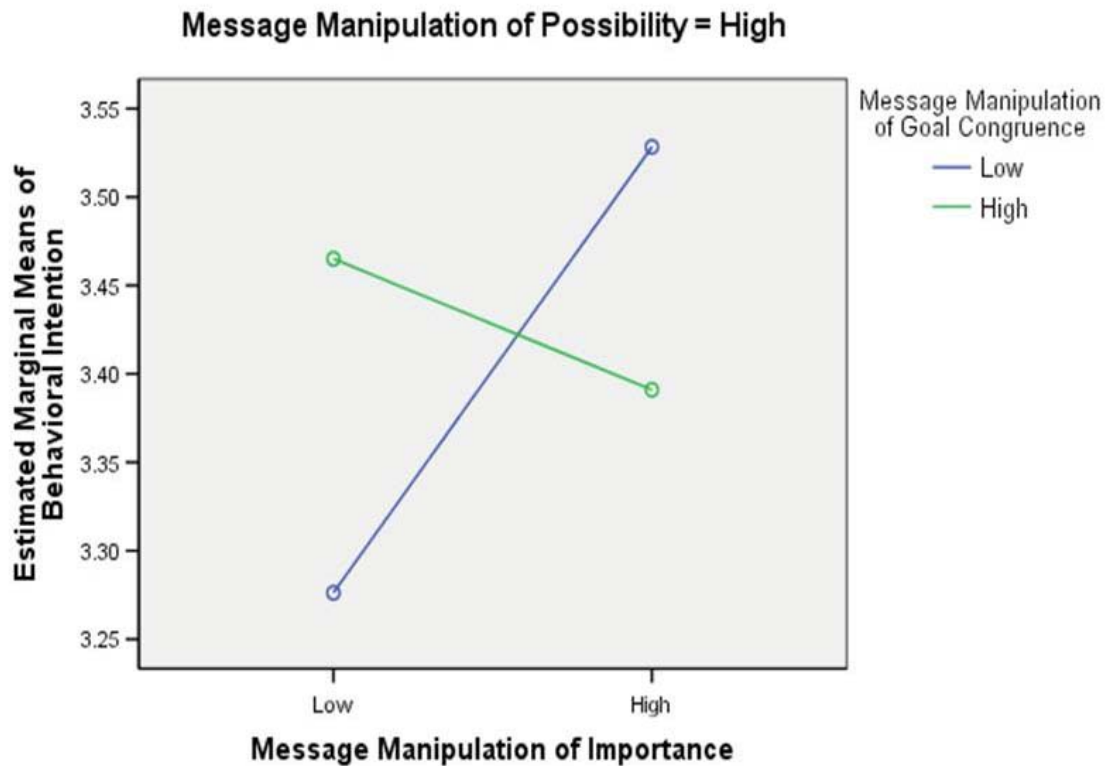
Note. Manipulations were coded as 0 = weak and 1 = strong. There were no significant differences at $p < .05$.

Although there were no significant main effects, there was a significant interaction between the message manipulations of importance, goal congruence, and possibility: $F(1, 227) = 5.06, p = .025$, partial $\eta^2 = .02$. Figure 4.2 displays this interaction, which indicates that in the weak possibility condition, the strong goal congruence condition led to greater behavioral intention when the message also included the strong importance condition. Also in the weak

possibility condition, the weak goal congruence condition led to less behavioral intention when the message also included the strong importance condition. However, for the strong possibility condition, the strong goal congruence condition led to less behavioral intention when the message also included the strong importance condition. Also in the strong possibility condition, the weak goal congruence condition led to greater behavioral intention when the message also included the strong importance condition. No other interaction effects were significant.

Figure 4.2: Study 1 Interaction Effects of Message Manipulations of Importance, Goal Congruence, and Possibility on Post-Message Behavioral Intention





In summary, the data provided partial support for hypothesis 11. Although the data did not support main effects of the message manipulations on behavioral intentions, they did support an interaction between the message manipulations of importance, goal congruence, and possibility. This result indicates that the components individually may not be sufficient to create changes in behavior intention, but may be sufficient in combination.

Research Question 4

The fourth research question asks if post-message subjective feelings of hope along with the manipulated components of hope appeals (importance, goal congruence, future expectation, and possibility), current behavior, perceived barriers, perceptions of severity and susceptibility, and environmental identity predict behavioral intention. I conducted a multiple regression analysis to answer this research question. For the regression, behavioral intention (measured post-message) was the dependent variable. Post-message subjective feelings of hope, the four manipulated components of hope appeals, environmental identity, perceived barriers, current

behavior, perceived severity, and perceived susceptibility were the independent variables. Results of the evaluation of assumptions indicated that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity.

The R for regression ($R = .79$) was significantly different from zero, $F(10, 230) = 38.95$, $p < .0005$, with an R^2 value of .61. The R^2 indicates that about 60% of the variability in behavioral intentions was predicted by post-message subjective feelings of hope along with the manipulated components of a hope appeal, current behavior, perceived barriers, perceptions of severity and susceptibility, and environmental identity. The regression coefficients for current behavior, perceptions of severity, and environmental identity all significantly differed from zero, whereas the regression coefficients for post-message subjective feelings of hope, the message manipulations, perceived barriers, and perceptions of susceptibility did not. The size and direction of the relationships suggest that behavior intentions are greater among people with a greater index of current behaviors, higher perceptions of the severity of climate change, and a more environmental identity. Table 4.30 presents the correlations among the independent and dependent variables. Table 4.31 presents the B and β weights, t statistics, and significant levels from the regression.

In summary, the data supported current behavior, perceptions of severity, and environmental identity as predictors of behavioral intentions. The size and direction of the relationships suggest that behavior intentions are greater among people with a greater index of current behaviors, higher perceptions of the severity of climate change, and a more environmental identity.

Table 4.30: Study 1 Correlations among Post-Message Behavioral Intentions and Regression Independent Variables

		Goal	Future		Subject					
	Behav	Import	Cong	Expect	Possibil	Feelings	Perceiv		Perceiv	Perceiv
	Intent	Manipul	Manipul	Manipul	Manip	of Hope	Barriers	Behav	Suscep	Sever
Importance Manipulation	.01									
Goal Congruence Manipulation	-.05	.02								
Future Expectations Manipulation	-.02	.01	.00							
Possibility Manipulation	.06	.01	-.05	.03						
Subjective Feelings of Hope	.00	.11*	.13*	.09	.22**					
Perceived Barriers	-.51**	.03	.18**	-.01	-.10	.01				
Behavior	.70**	-.01	-.13*	-.03	.13*	-.01	-.44**			
Perceived Susceptibility	.35**	.01	-.10	.13*	.05	.04	-.34**	.31**		
Perceived Severity	.53**	.02	-.08	.00	.02	-.02	-.51**	.38**	.57**	
Environmental Identity	.65**	.04	-.19**	-.01	.04	-.03	-.55**	.57**	.43**	.52**

Note. Manipulations were coded as 0 = weak and 1 = strong, * = $p < .05$, ** = $p < .01$

Table 4.31: Study 1 Multiple Regression on Post-Message Behavior Intentions

	B	β	<i>t</i>	<i>p</i>
Importance Manipulation	.00	.00	-0.02	.986
Goal Congruence Manipulation	.13	.08	1.93	.055
Future Expectations Manipulation	.00	.00	0.05	.962
Possibility Manipulation	-.04	-.02	-0.57	.572
Subjective Feelings of Hope	.01	.01	0.28	.782
Perceived Barriers	-.08	-.08	-1.57	.117
Behavior	.48**	.46**	9.11	.000
Perceived Susceptibility	-.04	-.04	-0.82	.411
Perceived Severity	.21**	.21**	3.76	.000
Environmental Identity	.27**	.27**	4.73	.000

Note. Manipulations were coded as 0 = weak and 1 = strong, ** = $p < .01$

Research Question 5

The fifth research question asks how subjective feelings of hope felt in response to a hope appeal and appraisals evoked by a hope appeal are related to perceived susceptibility, perceived severity, and environmental identity. I used Pearson's correlations to test the associations between the post-message subjective feelings of hope scale and the four post-message appraisals and perceived susceptibility, perceived severity, and environmental identity. There were no significant relationships between post-message subjective feelings of hope and perceived susceptibility, $r(241) = .04$, $p = .496$, perceived severity, $r(244) = -.02$, $p = .746$, or environmental identity, $r(244) = -.03$, $p = .681$.

There were significant positive relationships between post-message appraisals of importance and perceived susceptibility, $r(242) = .44$, $p < .0005$; perceived severity, $r(245) = .72$,

$p < .0005$; and environmental identity, $r(245) = .65, p < .0005$. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of importance. There were significant positive relationships between post-message appraisals of goal congruence and perceived susceptibility, $r(242) = .46, p < .0005$; perceived severity, $r(245) = .52, p < .0005$; and environmental identity, $r(245) = .74, p < .0005$. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of goal congruence. There were significant positive relationships between post-message appraisals of future expectation and perceived susceptibility, $r(242) = .44, p < .0005$; perceived severity, $r(245) = .61, p < .0005$; and environmental identity, $r(245) = .43, p < .0005$. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with more positive appraisals of future expectation. There were significant positive relationships between post-message appraisals of possibility and perceived susceptibility, $r(242) = .25, p < .0005$; perceived severity, $r(245) = .48, p < .0005$; and environmental identity, $r(245) = .38, p < .0005$. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of possibility.

In summary, the data supported positive relationships between all four post-message appraisals (importance, goal congruence, future expectation, and possibility) and perceived susceptibility, perceived severity, and environmental identity. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of importance, higher appraisals of goal congruence, more positive future expectations, and higher appraisals of possibility. The data did not support relationships between post-message subjective feelings of hope and perceived susceptibility, perceived severity, or environmental identity.

Research Question 6

The sixth research question asks how much of the variance in post-message subjective feelings of hope can be explained by the manipulated message conditions, environmental identity, perceived susceptibility, perceived severity as well as appraisals of importance, goal congruence, future expectation, and possibility. I conducted a multiple regression analyses to test this hypothesis using post-message subjective feelings of hope as the dependent variable. The message manipulations of importance (strong/weak), goal congruence (strong/weak), future expectation (strong/weak), and possibility (strong/weak) along with environmental identity, perceived susceptibility, perceived severity, and appraisals of importance, goal congruence, future expectation, and possibility were the independent variables. Results of the evaluation of assumptions indicated that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity.

The R for regression ($R = .45$) was significantly different from zero, $F(11, 229) = 5.21, p < .0005$, with an R^2 value of .20. The R^2 value indicates that 20% of the variability in post-message subjective feelings of hope was predicted by the independent variables. The regression coefficients for the message manipulation of importance and possibility along with environmental identity, perceived severity, and appraisals of goal congruence and future expectation were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message subjective feelings of hope were greater among people in the strong importance and strong possibility message conditions and people with a lower environmental identity, lower perceptions of severity, and higher appraisals of goal congruence and positive future expectations. Table 4.32 presents the correlations among the independent variables and post-message subjective feelings of hope. Table 4.32 presents the B and β weights, from the regression.

Table 4.32: Study 1 Correlations among Post-Message Subjective Feelings of Hope and Regression Independent Variables

	Subj		Goal	Future						Goal	Future
	Feel of	Impt	Cong	Expect	Possib				Import	Cong	Expect
	Hope	Manip	Manip	Manip	Manip	Ident	Suscep	Sever	Appr	Appr	Appr
Importance Manipulation	.11 [*]										
Goal Congruence Manipulation	.12 [*]	.03									
Future Expectation Manipulation	.09	.01	.00								
Possibility Manipulation	.22 ^{**}	.01	-.06	.02							
Environmental Identity	-.03	.06	-.19 ^{**}	-.01	.05						
Perceived Susceptibility	.04	.01	-.10	.13 [*]	.05	.43 ^{**}					
Perceived Severity	-.02	.04	-.08	.02	.03	.51 ^{**}	.57 ^{**}				
Appraisal of Importance	.07	.04	-.13 [*]	.00	.01	.65 ^{**}	.44 ^{**}	.72 ^{**}			
Appraisal of Goal Congruence	.13 [*]	.01	-.10	.01	.09	.74 ^{**}	.46 ^{**}	.51 ^{**}	.62 ^{**}		
Appraisal of Future Expectation	.22 ^{**}	-.02	-.08	.11 [*]	.05	.42 ^{**}	.44 ^{**}	.61 ^{**}	.65 ^{**}	.45 ^{**}	
Appraisal of Possibility	.03	-.02	-.15 [*]	-.05	.17 ^{**}	.37 ^{**}	.25 ^{**}	.48 ^{**}	.56 ^{**}	.42 ^{**}	.39 ^{**}

Note. Manipulations were coded as 0 = weak and 1 = strong, ^{*} = $p < .05$, ^{**} = $p < .01$

Table 4.33: Study 1 Multiple Regression on Post-Message Subjective Feelings of Hope

	B	β	<i>t</i>	<i>p</i>
Importance Manipulation	.26	.13	2.22	.027
Goal Congruence Manipulation	.23	.12	1.88	.061
Future Expectation Manipulation	.09	.04	0.72	.475
Possibility Manipulation	.42**	.21**	3.49	.001
Environmental Identity	-.32**	-.25**	-2.62	.009
Perceived Susceptibility	.01	.01	0.10	.919
Perceived Severity	-.32**	-.26**	-2.67	.008
Appraisal of Importance	.10	.07	0.63	.531
Appraisal of Goal Congruence	.30**	.26**	2.79	.006
Appraisal of Future Expectation	.41**	.33**	4.02	.000
Appraisal of Possibility	-.06	-.04	-0.57	.568

Note. Manipulations were coded as 0 = weak and 1 = strong, * = $p < .05$, ** = $p < .01$

In summary, the data supported the manipulation of importance, the manipulation of possibility, environmental identity, perceived severity, appraisals of goal congruence, and appraisals of future expectation as predictors of post-message subjective feelings of hope. The size and direction of the relationships suggest that post-message subjective feelings of hope were greater among people in the strong importance and strong possibility message conditions and people with a lower environmental identity, lower perceptions of severity, and higher appraisals of goal congruence and positive future expectations.

Research Question 7

Research question seven asks if individual characteristics affect the appraisals and if the appraisals affect each other. To answer this question, I conducted four multiple regression analyses to test this research question, with each of the appraisals as the dependent variable for one of the regressions. Manipulations of importance (strong/weak), goal congruence (strong/weak), future expectation (strong/weak), and possibility (strong/weak) along with perceived severity, perceived susceptibility, environmental identity and post-message appraisals of importance, goal congruence, future expectation, and possibility were the independent variables. Results of the evaluation of assumptions indicated that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity.

Importance appraisal. The R for regression ($R = .84$) was significantly different from zero, $F(10, 231) = 56.66, p < .0005$, with an R^2 value of .71. The R^2 value indicates that about 70% of the variability in post-message appraisals of importance was predicted by the independent variables. The regression coefficients for perceived severity, environmental identity, and appraisals of future expectation and possibility were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of importance are higher among people with higher perceived severity, more positive appraisals of future expectation, higher appraisals of possibility, and a more environmental identity. Table 4.32 above in research question six contains the correlations among the independent variables and post-message appraisals of importance. Table 4.34 below presents the B and β weights, from the regression.

Table 4.34: Study 1 Multiple Regression on Post-Message Appraisals of Importance

	B	β	<i>t</i>	<i>p</i>
Importance Manipulation	.03	.02	0.59	.557
Goal Congruence Manipulation	.00	.00	0.04	.971
Future Expectation Manipulation	-.02	-.02	-0.44	.660
Possibility Manipulation	-.07	-.05	-1.47	.143
Perceived Susceptibility	-.05	-.06	-1.42	.156
Perceived Severity	.28**	.34	6.33**	< .0005
Appraisal of Goal Congruence	.08	.10	1.80	.074
Appraisal of Future Expectation	.20**	.24	5.23**	< .0005
Appraisal of Possibility	.18**	.19	4.41**	< .0005
Environmental Identity	.22**	.26	4.70**	< .0005

Note. Manipulations were coded as 1 = strong, 0 = weak, * = $p < .05$, ** = $p < .01$

Goal congruence appraisal. The R for regression ($R = .77$) was significantly different from zero, $F(10, 231) = 34.39$, $p < .0005$, with an R^2 value of .60. The R^2 value indicates that 60% of the variability in post-message appraisals of goal congruence was predicted by the independent variables. The regression coefficients for perceived susceptibility and environmental identity were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of goal congruence are higher among people with higher perceived susceptibility to climate change impacts and a more environmental identity. Table 4.32 above in research question six contains the correlations among the independent variables and post-message appraisals of goal congruence. Table 4.35 below presents the B and β weights, from the regression.

Table 4.35: Study 1 Multiple Regression on Post-Message Appraisals of Goal Congruence

	B	β	<i>t</i>	<i>p</i>
Importance Manipulation	-.06	-.04	-0.84	.399
Goal Congruence Manipulation	.12	.07	1.54	.124
Future Expectation Manipulation	-.02	-.01	-0.24	.812
Possibility Manipulation	.06	.03	0.77	.441
Perceived Susceptibility	.13*	.12*	2.34	.020
Perceived Severity	.01	.01	0.10	.921
Appraisal of Importance	.18	.14	1.80	.074
Appraisal of Future Expectation	.03	.03	0.49	.623
Appraisal of Possibility	.10	.08	1.54	.125
Environmental Identity	.62**	.56**	9.74	< .0005

Note. Manipulations were coded as 1 = strong, 0 = weak, * = $p < .05$, ** = $p < .01$

Future expectation appraisal. For the climate change data, the R for regression ($R = .69$) was significantly different from zero, $F(10, 231) = 21.41$, $p < .0005$, with an R^2 value of .48. The R^2 value indicates that almost half of the variability in post-message appraisals of future expectation was predicted by the independent variables. The regression coefficients for perceived severity and appraisals of importance were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of future expectation are more positive among people with higher perceived severity of climate change and higher appraisals of importance. Table 4.32 above in research question six contains the correlations among the independent

variables and post-message appraisals of future expectation. Table 4.36 below presents the B and β weights, from the regression.

Table 4.36: Study 1 Multiple Regression on Post-Message Appraisals of Future Expectation

	B	β	<i>t</i>	<i>p</i>
Importance Manipulation	-.07	-.04	-0.89	.374
Goal Congruence Manipulation	-.01	.00	-0.08	.937
Future Expectation Manipulation	.15	.09	1.94	.054
Possibility Manipulation	.04	.03	0.55	.586
Perceived Susceptibility	.11	.12	1.91	.057
Perceived Severity	.23**	.22**	2.96	.003
Appraisal of Importance	.52**	.44**	5.23	< .0005
Appraisal of Goal Congruence	.03	.04	0.49	.623
Appraisal of Possibility	.03	.02	0.37	.708
Environmental Identity	-.06	-.06	-0.76	.449

Note. Manipulations were coded as 1 = strong, 0 = weak, * = $p < .05$, ** = $p < .01$

Possibility appraisal. For the climate change data, the *R* for regression ($R = .47$) was significantly different from zero, $F(8, 182) = 6.36$, $p < .0005$, with an R^2 value of .22. The R^2 value indicates that almost 22% of the variability in post-message appraisals of possibility was predicted by the independent variables. The regression coefficients for the manipulation of possibility and appraisals of importance were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of possibility are higher among people exposed

to the strong possibility condition and who have higher appraisals of importance. Table 4.32 above in research question six contains the correlations among the independent variables and post-message appraisals of possibility. Table 4.37 below presents the B and β weights, from the regression.

Table 4.37: Study 1 Multiple Regression on Post-Message Appraisals of Possibility

	B	β	<i>t</i>	<i>p</i>
Importance Manipulation	-.06	-.04	-0.76	.447
Goal Congruence Manipulation	-.12	-.08	-1.56	.121
Future Expectation Manipulation	-.06	-.04	-0.81	.421
Possibility Manipulation	.21**	.15**	2.84	.005
Perceived Susceptibility	-.06	-.07	-1.05	.295
Perceived Severity	.15	.17	1.96	.051
Appraisal of Importance	.43**	.41**	4.41	< .0005
Appraisal of Goal Congruence	.10	.13	1.54	.125
Appraisal of Future Expectation	.02	.03	0.37	.708
Environmental Identity	-.06	-.07	-0.77	.442

Note. Manipulations were coded as 1 = strong, 0 = weak, * = $p < .05$, ** = $p < .01$

In summary, the data indicated that the individual characteristics affect appraisals and the appraisals affect each other. Specifically, perceived severity, environmental identity, appraisals of future expectation, and appraisals of possibility significantly predict appraisals of importance. The size and direction of the relationships suggest that post-message appraisals of importance are higher among people with higher perceived severity, more positive appraisals of future

expectation, higher appraisals of possibility, and a more environmental identity. Perceived susceptibility and environmental identity predict appraisals of goal congruence. The size and direction of the relationships suggest that post-message appraisals of goal congruence are higher among people with higher perceived susceptibility to climate change impacts and a more environmental identity. Perceived severity and appraisals of importance predict appraisals of future expectation. The size and direction of the relationships suggest that post-message appraisals of future expectation are more positive among people with higher perceived severity of climate change and higher appraisals of importance. Finally, the manipulation of possibility and appraisals of importance significantly predict appraisals of possibility. The size and direction of the relationships suggest that post-message appraisals of possibility are higher among people exposed to the strong possibility condition and who have higher appraisals of importance.

Summary

The goals of Study 1 were to (a) test the PHT's proposed relationships between the subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility, (b) examine the relationships between subjective feelings of hope and behavioral antecedents, (c) assess separately the effects of the different components of hope appeals, and (d) identify individual characteristics that affect the above relationships and effects. Overall, the results of Study 1 provided partial support for the hypothesized relationships and effects.

Relationships between subjective feelings of hope and appraisals. The data provided partial support for the hypothesized relationships between subjective feelings of hope and appraisals. The pre-message data did not provide support for positive relationships between subjective feelings of hope and the appraisals. The post-message data provided support for a

positive relationship between subjective feelings of hope and appraisals of goal congruence and future expectation.

The data also provided partial support for the appraisals as predictors of subjective feelings of hope. Specifically, the pre-message data supported appraisals of importance as a predictor of subjective feelings of hope, whereas the post-message data did not. The size and direction of the relationship suggests that subjective feelings of hope are greater among people with lower appraisals of importance. Both the pre-message and post-message data supported future expectation as a predictor of subjective feelings of hope. The size and direction of the relationships suggest that subjective feelings of hope were greater among people with more positive appraisals of future expectation. Neither the pre-message nor the post-message data supported appraisals of goal congruence or appraisals of possibility as predictors of subjective feelings of hope.

Relationships between subjective feelings of hope and behavioral antecedents. I examined the relationships between various behavioral antecedents and *total* subjective feelings of hope (i.e., not controlling for pre-message feelings) as well as the relationships the antecedents and *changes* in subjective feelings of hope after exposure to a hope appeal. The data did not provide support for relationships between message attention and total subjective feelings of hope or between message attention and changes in subjective feelings of hope after exposure to a message. The data did support a relationship between interest in learning about climate protection behaviors and the change in subjective feelings of hope after exposure to a hope appeal. However, the data did not provide support for a relationship between the total amount of subjective feelings of hope and interest in learning about ways to protect the climate. The data did not provide support for relationships between behavioral intentions and total subjective feelings of hope or between behavioral intentions and changes in subjective feelings of hope after exposure to a message.

Effects of hope appeals. I analyzed the effects of message manipulations (strong and weak for each component) on subjective feelings of hope. The data supported the manipulation of goal congruence and the manipulation of possibility as predictors of subjective feelings of hope. In both cases, the strong manipulation led to greater subjective feelings of hope. However, the data did not support the manipulation of importance or the manipulation of future expectation as predictors of subjective feelings of hope.

I also analyzed the effects of message condition on other emotions. The analyses show that participants in the weak possibility condition experienced more anger than did participants in the strong possibility condition. Otherwise, participants in the strong and weak conditions did not significantly differ in terms of the subjective feelings they experienced after reading the messages.

I also examined the effects of the manipulated components on appraisals of importance, goal congruence, future expectation, and possibility. None of the strong/weak manipulations had a significant main effect on post-message appraisals of importance, goal congruence, or future expectations. However, the data did support a significant main effect of the possibility manipulation on appraisals of possibility. The data indicated that the strong manipulation led to higher appraisals of possibility.

In addition, I tested the effects of the manipulated components on behavioral intention. Although the data did not support main effects of the message manipulations on behavioral intentions, they did support an interaction between the message manipulations of importance, goal congruence, and possibility. This interaction indicates that in the weak possibility condition, the strong goal congruence condition led to greater behavioral intention when the message also included the strong importance condition. Also in the weak possibility condition, the weak goal congruence condition led to less behavioral intention when the message also included the strong importance condition. However, for the strong possibility condition, the strong goal congruence

condition led to less behavioral intention when the message also included the strong importance condition. Also in the strong possibility condition, the weak goal congruence condition led to greater behavioral intention when the message also included the strong importance condition. This result indicates that the components individually may not be sufficient to create changes in behavior intention, but may be sufficient in combination.

I also examined whether the manipulated components along with other independent variables predicted behavioral intentions. The data supported current behavior, perceptions of severity, and environmental identity as predictors of behavioral intentions. The size and direction of the relationships suggest that behavior intentions are greater among people with a greater index of current behaviors, higher perceptions of the severity of climate change, and a more environmental identity.

Individual characteristics that may affect the relationship between hope appeals and subjective feelings of hope. I examined individual characteristics that may affect the relationship between hope appeals and subjective feelings of hope for their relationship with subjective feelings of hope. The data did not support relationships between post-message subjective feelings of hope and perceived susceptibility, perceived severity, or environmental identity.

I also examined several independent variables as predictors for post-message subjective feelings of hope. The data supported the manipulation of importance, the manipulation of possibility, environmental identity, perceived severity, appraisals of goal congruence, and appraisals of future expectation as predictors of post-message subjective feelings of hope. The size and direction of the relationships suggest that post-message subjective feelings of hope were greater among people in the strong importance and strong possibility message conditions and people with a lower environmental identity, lower perceptions of severity, and higher appraisals of goal congruence and positive future expectations.

Individual characteristics that may affect the relationships between hope appeals and the four appraisals. I examined individual characteristics that may affect the relationship between hope appeals and the appraisals for their relationship with the appraisals. In summary, the data supported positive relationships between all four post-message appraisals (importance, goal congruence, future expectation, and possibility) and perceived susceptibility, perceived severity, and environmental identity. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of importance, higher appraisals of goal congruence, more positive future expectations, and higher appraisals of possibility.

Relationships among the appraisals and between the appraisals and individual characteristics. The data indicated that the individual characteristics affect appraisals and the appraisals affect each other. Specifically, perceived severity, environmental identity, appraisals of future expectation, and appraisals of possibility significantly predict appraisals of importance. The size and direction of the relationships suggest that post-message appraisals of importance are higher among people with higher perceived severity, more positive appraisals of future expectation, higher appraisals of possibility, and a more environmental identity.

Perceived susceptibility and environmental identity predict appraisals of goal congruence. The size and direction of the relationships suggest that post-message appraisals of goal congruence are higher among people with higher perceived susceptibility to climate change impacts and a more environmental identity.

Perceived severity and appraisals of importance predict appraisals of future expectation. The size and direction of the relationships suggest that post-message appraisals of future expectation are more positive among people with higher perceived severity of climate change and higher appraisals of importance.

Finally, the manipulation of possibility and appraisals of importance significantly predict appraisals of possibility. The size and direction of the relationships suggest that post-message appraisals of possibility are higher among people exposed to the strong possibility condition and who have higher appraisals of importance.

Conclusion

The greatest strength of Study 1 is that it allowed for the examination of the effects of each of the proposed components of a hope appeal. However, its greatest weakness was that because most of the messages included combinations of strong and weak components, the effects of the individual components versus the whole message are unclear. Study 2 addresses this weakness by using messages that are internally consistent (e.g., include components designed only to evoke strong appraisals rather than mixed components). A full discussion of the results of Study 1 is in chapter 6.

CHAPTER FIVE:

STUDY 2

Overview

The goals of Study 2 were (a) to test persuasive hope theory's proposed relationships between subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility; (b) to examine the relationships between subjective feelings of hope and behavioral antecedents; (c) to assess the effects of hope appeals developed in accordance with PHT; and (d) to identify individual characteristics that may affect the above relationships and effects. To achieve these goals, I created messages intended to evoke high levels of all four of the appraisals proposed to constitute hope (strong hope appeal). I also created messages intended to evoke low levels of all four appraisals (weak hope appeal). In addition, I created an attention control message that was about job interviewing. I describe these messages and their development in detail below. Once I developed these messages, I used them to conduct Study 2. In the study, participants responded online to questions about either climate protection or seasonal influenza prevention. They responded to these questions both before and after reading one of the messages. One week later, participants responded to additional questions. Below, I first explain how I designed the messages for the study. Then, I describe the methods for the study. Finally, I present the study results and a brief discussion.

Message Design

In this dissertation, I advance a framework for persuasive hope appeals that focuses on two components, (a) the inducement of hope through the presentation of an opportunity and (b) recommended actions to take advantage of the opportunity and achieve a desired outcome. For

Study 2, I systematically varied the inducement of hope component while holding constant the recommended action component. I designed two variations of the inducement of hope component. The first variation (strong hope inducement) was designed to present a compelling opportunity to readers and was intended to evoke high levels of all four of the appraisals proposed to constitute hope. The second variation (weak hope inducement) was designed to present a non-compelling opportunity and thereby evoke low levels of all four appraisals. I combined the strong and weak hope inducement components with the same recommended action component to create strong and weak hope appeal messages. In addition, I created an attention control message. Below, I first describe the hope appeal messages. Within my description of the hope appeal messages, I explain the topics of the hope appeal messages, the hope inducement component, and the recommended behaviors component. Then, I describe other message design variables that I held constant across the hope appeal messages, including organizational pattern, source credibility, clarity, readability, and typeset. After describing the hope appeal messages, I then describe the attention control message. Appendix U contains the complete messages.

Hope Appeal Messages

Topics

To broaden the potential generalizability of Study 2 to messages about non-climate protection topics, I added seasonal influenza prevention as a topic for the messages. I chose seasonal influenza prevention as a topic because of its potentially relevant similarities to and differences from climate protection. The primary similarity between seasonal influenza prevention and climate protection is that personal behavior (e.g., covering your cough or being vaccinated) creates a group benefit (e.g., herd immunity). However, unlike climate protection messages, messages about seasonal influenza prevention usually emphasize the personal benefits

rather than the group benefits (e.g., protect yourself so that you do not get the flu). Also, the time between the cause (being around someone who has the flu) and the effect (getting the flu) is much shorter for seasonal influenza prevention than for climate protection, which may affect responses to persuasive hope appeals. In addition, seasonal influenza may differ from climate protection in terms of pre-existing appraisals of importance, goal congruence, future expectation, and possibility. Thus, adding seasonal influenza as a message topic helped refine and generalize the results from Study 2.

Hope Inducement

As I mentioned previously, I designed two variations of the inducement of hope component. The first variation (strong hope inducement) was designed to present a compelling opportunity to readers and was intended to evoke high levels of all four of the appraisals proposed to constitute hope. I created the strong hope inducement variation using all four of the paragraphs designed to create high appraisals from Study 1 (strong importance, strong goal congruence, strong positive future expectation, and strong possibility). By using all four of the strong paragraphs from Study 1, I intended to create a compelling opportunity, evoke high levels of all four appraisals, and evoke strong subjective feelings of hope. Thus, the strong hope appeal attempts to make the future outcome (climate protection or seasonal influenza prevention) seem very important, very possible, and very goal-congruent and attempts to create a very positive expectation for the future if the outcome is achieved.

The second hope inducement variation (weak hope inducement) was designed to present a non-compelling opportunity and was intended to evoke low levels of all four appraisals. I created the weak hope inducement variation using all four of the weak paragraphs designed to create low appraisals from Study 1. By using all four of the weak paragraphs from Study 1, I intended to create a non-compelling opportunity, evoke low levels of all four appraisals, and

evoke weak subjective feelings of hope. Thus, the weak hope appeal attempts to make the future outcome seem only slightly important, slightly possible, and slightly goal congruent and to attempts make the future seem only slightly better if the outcome is achieved.

Recommended Behaviors

The second component of a hope appeal is the presentation of recommended behaviors. The behaviors should help the receiver take advantage of the opportunity presented in the inducement and achieve the desired outcome. I applied three criteria in choosing the recommended behaviors: students' ability to perform the behavior, the cost of the behavior, and the availability of the behavior. For the climate protection message, I chose the recommended behaviors based on the criteria above, as well as the results of the formative survey (see Table 3.3 in chapter 3). The four recommended climate protection behaviors were turning off computers when they are not in use, unplugging cell phone chargers when they are not in use, using a reusable water bottle rather than plastic bottles, and bringing reusable bags to the grocery store. For the seasonal influenza prevention message, I applied the three criteria, as well as examined seasonal influenza prevention materials from the Centers for Disease Control and Prevention and The Pennsylvania State University health centers to identify potential behaviors. The materials I reviewed all recommended four behaviors that students are able to perform, are free or inexpensive, and are available to students. The seasonal influenza prevention behaviors were frequent hand washing, use of hand sanitizers, covering any coughs or sneezes with the upper arm, and obtaining the seasonal influenza vaccine.

My framework for hope appeals requires that the recommended behaviors component include information designed to (a) increase the receivers' perceived ability to perform the recommended behavior (self-efficacy) and (b) demonstrate the ability of the recommended action to achieve the desired outcome (response efficacy). Thus, the messages included statements that

were intended to increase perceptions of self-efficacy and response efficacy for each of the recommended behaviors. The first sentence for each of the recommended behaviors identified the recommended behavior (e.g., “Use a reusable water bottle.”). The next part of the paragraph for each behavior described how the behavior is effective at solving the problem. I intended this information to increase perceptions of response efficacy. The last part of the paragraph included information designed to raise the reader’s belief that he or she can perform the behavior. I intended this section to increase perceptions of self-efficacy. For example, for using a reusable water bottle, the paragraph identified where students can purchase the bottles and how much they cost.

For example, the complete recommended action paragraph for using a reusable water bottle stated,

Use a reusable water bottle. Making and shipping the disposable plastic water bottles burns fossil fuels and emits carbon dioxide. The plastic water bottles used in one year in the U.S. use more than 17 million barrels of oil. Making these bottles emits more than 2.5 million tons of carbon dioxide. Trucking the bottles to stores emits even more. By using a reusable water bottle, you can stop these greenhouse gases from going into the air. You can buy a reusable water bottle at a grocery or sporting store for five to ten dollars.

Design Variables

To control for variation in the messages beyond the manipulations of topic and hope inducement, I designed the messages similarly along the following variables: (a) organizational pattern, (b) source credibility, (c) message clarity, (d) readability, (e) length, and (f) typeset.

Organizational pattern. Each message followed a consistent organizational pattern. I designed the first four paragraphs to evoke the appraisals of importance, goal congruence, future expectation, and possibility, respectively. The next four paragraphs were about one of the recommended behaviors and contained self-efficacy and response efficacy statements related to those behaviors. At the end of the messages was the source information.

Source credibility. All of the messages on the same topic contained the same source information. Specifically, at the bottom of each climate protection message the following sources were referenced, “Center for Disease Control and Prevention, National Center for Environmental Health, Climatecrisis.net, Intergovernmental Panel on Climate Change, United Nations Environmental Programme, U.S. Department of Energy, and U.S. Environmental Protection Agency.” At the bottom of the seasonal influenza prevention message, I referenced the following source, “Center for Disease Control and Prevention.”

Clarity. I wrote the messages in a straightforward, easy to understand manner. The messages used short paragraphs with an average paragraph length of 4.1 sentences. The messages’ paragraph length ranged from 3.9 to 4.2 sentences per paragraph. The messages also used simple sentence structure. The average sentence length was 11.6 words with a range of 10.9 to 12.3 across messages. I also used simple words in the messages. All messages had an average word length of 4.5 characters per word with a range of 4.5 to 4.6. Calculations excluded the source information. Clarity characteristics by message are in Table 5.1.

Readability. I also kept the readability of the messages as close to constant as possible. I calculated the readability of each message in Microsoft Word using the Flesch reading ease and Flesch-Kincaid reading level statistics. The average reading ease across all manipulated messages was 71.2 and the average reading level was 6.2. With reading ease, the higher the number is the more clear the message is. These calculations excluded the source information. Readability statistics by message are in Table 5.1.

Length. Message length was relatively constant across the messages. The messages had an average length of 616.8 words with a range of 601 to 632 words. All messages were well within 5% of the mean message length. The word counts did not include the source citations. Table 5.1 contains message length by message.

Typeset. The fonts and font usage were constant across all messages. All messages were in Arial, 12-point font. The first sentence of each paragraph was in bold font. The remainder of each paragraph was in regular font and I used underlining to accent the differences between the strong and weak hope appeal messages. The source information was in Arial, 10-point font.

Table 5.1: Study 2 Message Length, Clarity, and Readability Characteristics by Survey Topic and Type of Hope Appeal

Survey			Sentences/	Words/	Characters/	Reading	Reading
Appeal	Words	Characters	Paragraph	Sentence	Word	Ease	Level
Climate Protection							
Strong	601	2786	4.2	10.9	4.5	71.5	5.9
Weak	620	2866	4.0	11.6	4.5	71.6	6.1
Seasonal Influenza Prevention							
Strong	614	2923	4.1	11.5	4.6	70.6	6.2
Weak	632	2932	3.9	12.3	4.5	71.1	6.4

Attention Control Message

In addition to creating the strong and weak hope appeals, I created an attention control message about job interviewing. An attention control message gives participants something to read that is approximately equal in length and ideally equally as interesting as the experimental messages. The purpose of an attention control group is to control for the effects on the dependent variables of participant expectancy and the attention given to the experimental group (Bootzin, 1985; Gross, 2005). The attention control message allows the control group to follow the same procedures that the experimental groups follow. I adapted the content of the attention control message from the *2009-2010 Penn State Grad Student Career Guide* (PSU, 2009). To maintain

consistency with the hope appeals, the attention control message was similar in length, clarity, and readability and used the same typeface as the hope appeals.

Methods

The goals of Study 2 were (a) to test PHT's proposed relationships between subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility; (b) to examine the relationships between subjective feelings of hope and behavioral antecedents; (c) to assess the effects of hope appeals developed in accordance with PHT; and (d) to identify individual characteristics that may affect the relationships between hope appeals, subjective feelings of hope, and the appraisals. The study was a three (message type: strong hope appeal, weak hope appeal, or attention control) by two (survey topic: climate protection or seasonal influenza prevention) between subjects pre-test, post-test with follow-up design. I conducted the study in two phases. In the first phase, participants completed the pre-message measures, read one of the messages, and completed the post-message measures. In the second phase, participants completed the follow-up measures. The second phase commenced seven days after each participant completed the first phase.

The study had five message conditions: (a) a strong hope appeal about climate protection, (b) a weak hope appeal about climate protection, (c) a strong hope appeal about seasonal influenza prevention, (d) a weak hope appeal about seasonal influenza prevention, or (e) an attention control message about job interviewing. Before and after reading these messages, participants answered questions about either climate protection or seasonal influenza prevention. The follow-up survey was on the same topic as the participants' original survey. Table 5.2 below illustrates the message conditions.

Table 5.2: Study 2 Message Conditions Illustrated by Message Type, Message Topic, and Survey Topic

Cond	Message Type	Message Topic	Survey Topic
1	Strong hope appeal	Climate protection	Climate protection
2	Weak hope appeal	Climate protection	Climate protection
3	Attention control	Job interviewing	Climate protection
4	Strong hope appeal	Seasonal influenza prevention	Seasonal influenza prevention
5	Weak hope appeal	Seasonal influenza prevention	Seasonal influenza prevention
6	Attention control	Job interviewing	Seasonal influenza prevention

Note. Cond = Message Condition

The pre-message measures assessed current behavior; perceptions of severity, susceptibility, and subjective knowledge; and subjective feelings of hope and fear. The post-message measures were manipulation checks and measures of perceived message clarity, subjective feelings (hope, fear, guilt, sadness, happiness, and anger), message attention, environmental identity, interest, perceived self-efficacy, perceived response efficacy, attitudes toward the behaviors, perceived barriers, and behavioral intention as well as appraisals of importance, goal congruence, future expectation, and possibility. At the end of the survey, participants completed demographic measures. The measures on the follow up survey were current behavior, subjective feelings of hope and fear, interest, perceived self-efficacy, perceived response efficacy, attitudes toward the behaviors, perceived barriers, and behavioral intention as well as appraisals of importance, goal congruence, future expectation, and possibility.

To assess order effects, I created three orders of the survey. I randomized blocks of the pre-message measures, post-message message reaction measures, post-message attitude and

belief measures, and follow-up measures to produce the three different orders. Then, I combined the randomized blocks to produce three orders for the complete survey. For all orders, the demographic questions were the last items.

Sample Size

I used G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) to calculate the sample size for a one-way, fixed effect, omnibus ANOVA (the least-powerful test I anticipated using). Based on the Study 1 results, I expected a single message to have a small effect on the outcome variables. Therefore, I entered an effect size of .15, an alpha of .05, and a power of .80 for an ANOVA with six groups. This calculation indicated that I need 576 participants to detect a .15 effect size. To allow for attrition of 10% between the main data collection and follow-up, I needed an initial sample size of 640.

Recruitment

Students taking the University-required public speaking course earn 2% of their grade for participation in a research study, creating a subject pool. I drew participants from this subject pool during the fall semester in 2009. The administrator of the pool assigned 642 participants to my study. When I received the subject list, I e-mailed the students to let them know that they were assigned to my study and to tell them when the study would begin. I assigned the students to one of the 18 study conditions (3 message types x 2 survey topics x 3 orders) using a random list generator. Once phase one of the study was open, participants received an e-mail from the online survey program with the link to their assigned survey Web site. The link to the survey site was unique for each participant for authentication purposes. During the fielding of the survey, I sent reminder e-mails via the online survey program to all participants who had not yet accessed the survey and to those who had begun, but not completed, the survey. I sent up to five reminder

e-mails (every three days during the two and a half week study period). I also sent one final reminder on the day that the study closed. Approximately one week after a participant completed the survey, I sent him or her an e-mail containing the link to the follow-up phase two study. As with the phase one survey, I sent reminders to participants who had not yet accessed the follow-up survey and to those who had begun, but not completed, the follow-up survey.

Participants

Of the 642 students assigned to the study, 606 (94.39%) participated. Of the 606, 598 (98.68%; 299 climate protection, 299 seasonal influenza prevention) completed both parts of the study and one participant completed the alternative assignment. The final sample contained 577 students (290 climate protection, 287 seasonal influenza prevention). The final sample excluded 21 participants (3.51%) who had more than 10% missing responses.

Although participants ranged in age from 18 to 32 years old, 96.25% of respondents fell between the ages of 18 and 22 ($M = 19.99$, $SD = 1.64$, $MD = 20$). Two participants (0.35%) did not indicate their age. About half of the participants indicated that they were female ($n = 285$, 49.39%) and about half indicated that they were male ($n = 289$, 50.09%). Three participants (0.52%) did not indicate their gender. Most participants identified as Caucasian-American or White ($n = 488$, 84.58%); 5.03% ($n = 29$) identified as Asian-American, Asian, or Pacific Islander; 3.11% ($n = 18$) identified as African-American or Black; 3.11% ($n = 18$) identified as Hispanic or Latino/a; 1.21% ($n = 7$) identified as multi-racial or multi-ethnic; and 2.08% ($n = 12$) identified as “other.” Five participants (0.87%) did not indicate their race or ethnicity. Eighteen percent ($n = 104$) of the participants were freshmen, 23.05% ($n = 133$) were sophomores, 41.25% ($n = 238$) were juniors, 14.56% ($n = 84$) were seniors, 2.60% ($n = 15$) were “super seniors,” and 0.17% ($n = 1$) were “other.” Two participants (0.35%) did not indicate their year in school. The majority of the participants indicated that they primarily grew up in suburban locations ($n = 350$,

60.66%), 18.20% ($n = 105$) indicated that they grew up in small towns, 10.75% ($n = 62$) indicated that they grew up in urban locations, and 9.88% ($n = 57$) indicated that they grew up in rural locations. More than half of the participants ($n = 330$, 57.19%) considered themselves to be pro-environment, whereas 12.13% ($n = 70$) did not and 29.98% ($n = 173$) were unsure. However, only 19.41% ($n = 112$) considered themselves to be environmentalists, whereas 41.59% ($n = 240$) did not and 38.47% ($n = 222$) were unsure. Finally, the participants were split fairly evenly between those who considered themselves to be “green” ($n = 188$, 32.58%), those who did not ($n = 161$, 27.90%), and those who were unsure ($n = 225$, 38.99%).

Procedures

Before beginning the survey, students read an online IRB-approved informed consent form and checked a box indicating their consent. Once participants gave consent, they gained access to the online survey. When they accessed the survey, participants first read an introductory screen. This screen told participants that the survey was about climate change or seasonal influenza and would take them approximately 45 minutes to complete. The formative research indicated that participants were more familiar with global warming than they were with climate change and few had any understanding of climate change. Thus, participants were told that for the purposes of the survey, climate change and global warming mean the same thing.²¹ Similarly, for the seasonal influenza condition, participants were told that for the purposes of the survey, seasonal influenza and the flu mean the same thing. The introductory screen also told participants

²¹ Climate change and global warming are not the same. Global warming is both an example of a climate change and a cause of other changes in the climate. However, students did not have the scientific literacy to make this distinction.

that they would be reading a brief introductory message and another message later in the survey. Because a few participants in the pilot study indicated that they did not know how important the messages were to the study, the introductory screen also stated, “Please read both these messages carefully as they are the basis for the rest of the survey.” Finally, because participants in the pilot study commented on the repetitive nature of the questions, the introductory screen stated, “Some of the questions you read may seem repetitive. This is intentional. Please just answer each one honestly.”

After reading the introductory screen, participants read a short introductory message that defined the topic about which they were reading. This introduction gave participants a common stimulus for the pre-message subjective feeling questions. For the climate protection condition, the message read:

Climate is the average weather of a particular location over many decades or longer. Thus, the climate is made up of the air, living beings, earth, water, and frozen components.

Climate change is changes in the average weather and the air, living beings, earth, water, and frozen components beyond natural variation.

These climate changes include increases in global temperature (global warming), modified patterns of atmospheric and ocean circulation, rise in sea level, changes in precipitation patterns, and changes in the human and ecological systems that depend on the climate.

Participants in the seasonal influenza prevention condition read a similar introductory message. For this condition, the message read:

Seasonal influenza (the flu) is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness, and at times can lead to death.

Seasonal influenza is different from H1N1.

Flu spreads person to person. Flu viruses are thought to spread mainly from person to person through coughing or sneezing by people with influenza. Sometimes people may become infected by touching something with flu virus on it and then touching their mouth or nose.

After reading the introductory message, participants completed the pre-message measures (current behavior; perceptions of severity, susceptibility, and subjective knowledge; and subjective feelings of hope and fear). The online survey program presented each measure on a separate screen and the program's randomizer presented the items in random order within measures. After completing the pre-message measures, participants read the first part of the message to which I had randomly assigned them. I split the messages into two parts so that participants would not need to scroll to read the messages. For participants in the four hope appeal conditions, the first part of the message was the hope induction component. For participants in the attention control condition, it was simply the first half of the message. Instructions at the top of the page read, "Please read this message carefully! The rest of the questions on this survey are about this message! Once you have carefully read the message, please click 'Next' to continue reading the message." Once participants pressed the "Next" button, they saw the second half of the message. For participants in the hope appeal conditions, this part of the message was the recommended behavior component of the hope appeal. After reading the second part of the message, participants began the post-message measures.

The post-message measures consisted of manipulation checks and questions about message reactions and attitudes and beliefs. Message reaction questions included measures of perceived message clarity, subjective feelings (hope, fear, guilt, sadness, happiness, and anger), and message attention. The attitude and belief measures asked about environmental identity, interest, perceived self-efficacy, perceived response efficacy, attitudes toward the behaviors, perceived barriers, and behavioral intention as well as appraisals of importance, goal congruence, future expectation, and possibility. At the end of the survey, participants completed demographic measures.

Approximately one week after they completed the initial survey, I contacted participants again via e-mail and asked them to complete the follow-up study. When participants accessed

their unique link to the survey, they immediately began the follow-up measures. The measures on the follow up survey were current behavior, subjective feelings of hope and fear, interest, perceived self-efficacy, perceived response efficacy, attitudes toward the behaviors, perceived barriers, and behavioral intention as well as appraisals of importance, goal congruence, future expectation, and possibility.

Survey Instrument

The survey consists of pre-message, post-message, and follow-up measures as described above. Many of the measures for Study 2 were the same as for Study 1. Therefore, I only fully describe below those measures that are unique to Study 2 (the remainder I fully describe in Chapter 4). To be succinct, I also describe below the results of my analysis of each scales' measurement qualities.

To create the scales, I first analyzed items for normal distribution. With my large sample size, the *t*-statistics for skew and kurtosis (the skew or kurtosis statistic divided by its standard error) are too sensitive to identify meaningful deviations from normality (Tabachnick & Fidell, 2007). Therefore, I examined the skew and kurtosis statistics (rather than their *t* statistics) and flagged any absolute values greater than two deviations from normal distribution. Skew and kurtosis values less than the absolute value of two should not affect statistical estimates (Curran, West, & Finch, 1996; Muthén & Kaplan, 1985; Tabachnick & Fidell, 2007). After I examined normality, I checked the internal consistency of the scale items by comparing their means, standard deviations, and intercorrelations. Then, I performed exploratory factor analyses (EFA) using principal axis as the method of extraction and direct oblmin as the factor rotation to check for unidimensionality of the measures. Because I developed or modified many of the scales specifically for this research, I used exploratory rather than confirmatory methods to assess dimensionality. Before performing the EFAs, I calculated the Kaiser, Meyer, Olkin (KMO)

measure of sampling adequacy to assess the merit of factor analyzing the items. As mentioned previously, large values (greater than .50) of the KMO index indicate that factor analysis of the variables is appropriate (Kaiser, 1974). Finally, I calculated the reliability of the scales using Cronbach's alpha.

Current behavior. Participants reported their current climate protection or seasonal influenza prevention behaviors by responding to four items measured on a five-point scale (*never, rarely, sometimes, usually, and always*). Participants reported their behavior in the past 30 days for the four recommended behaviors for the survey topic condition to which I assigned them (e.g., for climate prevention: turning off computers, unplugging cell phone chargers, using reusable grocery bags, and using a reusable water bottle). This scale is different from the Study 1 scale in that I only report participants' behavior on the four recommended behaviors included in their messages. See Appendix E for the complete measure. I did not intend these items to form a unidimensional scale, but rather to be an index of climate protection and seasonal influenza prevention behaviors. To create the index, I averaged the responses to the items (pre-message climate protection behaviors: $M = 2.55$, $SD = 0.90$, follow-up climate protection behaviors: $M = 2.71$, $SD = 0.89$, pre-message seasonal influenza prevention behaviors: $M = 3.52$, $SD = 0.82$, follow-up seasonal influenza prevention behaviors: $M = 3.54$, $SD = 0.80$).

Perceived severity. Participants indicated their perceptions of the severity of climate change or seasonal influenza by responding to six five-point Likert scale items. This scale was unchanged from Study 1 except that I created a version of the scale with seasonal influenza as the topic. See Appendix F for the complete measure. For the climate change data, after reversing negatively worded items, the exploratory factor analysis ($KMO = .86$) indicated that the items formed a unidimensional scale that accounted for 69.74% of the variance in the items. For the seasonal influenza data, the exploratory factor analysis ($KMO = .73$) indicated that the items formed a unidimensional scale that accounted for 72.88% of the variance in the items. To create

the scale, I averaged the responses to the items (climate change: $\alpha = .91$, $M = 3.44$, $SD = 0.84$, seasonal influenza: $\alpha = .79$, $M = 3.01$, $SD = 0.62$).

Perceived susceptibility. Participants indicated their perceptions of their personal risk of experiencing effects of climate change or seasonal influenza by responding to five five-point Likert scale items. This scale was unchanged from Study 1 except that I created a version of the scale with seasonal influenza as the topic. See Appendix G for the complete measure. For the climate change data, after reversing the negatively worded item, the exploratory factor analysis ($KMO = .87$) indicated that the items formed a unidimensional scale that accounted for 72.24% of the variance in the items. For the seasonal influenza data, the exploratory factor analysis ($KMO = .85$) indicated that the items formed a unidimensional scale that accounted for 71.95% of the variance in the items. To create the scale, I averaged the responses to the items (climate change: $\alpha = .90$, $M = 3.15$, $SD = 0.84$, seasonal influenza: $\alpha = .90$, $M = 2.87$, $SD = 0.85$).

Subjective knowledge. Participants indicated how knowledgeable they believed themselves to be about climate change or seasonal influenza by answering five five-point Likert scale items. The items began with the stem, “I am very knowledgeable about” followed by (a) the causes of climate change, (b) climate change, (c) the effects of climate change, (d) how to prevent climate change, and (e) the symptoms of climate change. For the seasonal influenza prevention condition, I replaced the words “climate change” in the previous examples with the words “seasonal influenza.” See Appendix V for the complete measure. For the climate change data, the exploratory factor analysis ($KMO = .88$) indicated that the items formed a unidimensional scale that accounted for 78.30% of the variance in the items. For the seasonal influenza data, the exploratory factor analysis ($KMO = .87$) indicated that the items formed a unidimensional scale that accounted for 74.23% of the variance in the items. To create the scale, I averaged the responses to the items (climate change: $\alpha = .93$, $M = 3.24$, $SD = 0.84$, seasonal influenza: $\alpha = .91$, $M = 3.63$, $SD = 0.77$).

Manipulation checks. The manipulation checks for climate protection remain unchanged from Study 1. However, because I added the topic of seasonal influenza prevention, I created a second set of dichotomous manipulation checks addressing the seasonal influenza prevention messages. The manipulation checks for the seasonal influenza prevention topic differ from the climate protection manipulation checks only by their reference to seasonal influenza. See Appendix M for the complete measure.

Perceived message clarity. Participants indicated their perceptions of message clarity by responding to five five-point semantic differential scale items. This scale was unchanged from Study 1. See Appendix N for the complete measure. For the climate change data, the exploratory factor analysis ($KMO = .75$) indicated that the items formed a unidimensional scale that accounted for 60.65% of the variance in the items. For the seasonal influenza data, the exploratory factor analysis ($KMO = .82$) indicated that the items formed a unidimensional scale that accounted for 65.82% of the variance in the items. To create the scale, I averaged the responses to the items (climate change: $\alpha = .84$, $M = 4.11$, $SD = 0.78$, seasonal influenza: $\alpha = .87$, $M = 4.32$, $SD = 0.76$).

Message attention. Participants indicated how much attention they paid to the message by responding to five five-point Likert scale items. This scale was unchanged from Study 1. See Appendix O for the complete measure. For the climate change data, the exploratory factor analysis ($KMO = .89$) indicated that the items formed a unidimensional scale that accounted for 83.60% of the variance in the items. For the seasonal influenza data, the exploratory factor analysis ($KMO = .87$) indicated that the items formed a unidimensional scale that accounted for 79.25% of the variance in the items. To create the scale, I averaged the responses to the items (climate change: $\alpha = .95$, $M = 3.54$, $SD = 0.88$, seasonal influenza: $\alpha = .93$, $M = 3.56$, $SD = 0.85$).

Appraisal of importance. Participants indicated their appraisals of importance by responding to seven five-point semantic differential items. This scale was unchanged from Study

1 except that I created a version of the scale with seasonal influenza as the topic. See Appendix I for the complete measure. For the post-message climate change data, the exploratory factor analysis ($KMO = .90$) indicated that the items formed a unidimensional scale that accounted for 62.70% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .94$) indicated that the items formed a unidimensional scale that accounted for 73.12% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .93$) indicated that the items formed a unidimensional scale that accounted for 69.32% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .93$) indicated that the items formed a unidimensional scale that accounted for 69.88% of the variance in the items. To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .90$, $M = 3.92$, $SD = 0.62$, follow-up climate change: $\alpha = .94$, $M = 3.91$, $SD = 0.68$, post-message seasonal influenza: $\alpha = .93$, $M = 3.63$, $SD = 0.77$, follow-up seasonal influenza: $\alpha = .93$, $M = 3.56$, $SD = 0.74$).

Appraisal of goal congruence. Participants indicated their appraisals of goal congruence by responding to seven five-point Likert scale items. This scale was unchanged from Study 1 except that I created a version of the scale with seasonal influenza as the topic. See Appendix J for the complete measure. For the post-message climate change data, the exploratory factor analysis ($KMO = .90$) indicated that the items formed a unidimensional scale that accounted for 71.69% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .89$) indicated that the items formed a unidimensional scale that accounted for 72.61% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .91$) indicated that the items formed a unidimensional scale that accounted for 73.24% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .92$) indicated that the items formed a unidimensional scale that accounted for 77.35% of the variance in the items. To create the scale, I averaged the

responses to the items (post-message climate change: $\alpha = .93$, $M = 2.98$, $SD = 0.83$, follow-up climate change: $\alpha = .94$, $M = 3.09$, $SD = 0.81$, post-message seasonal influenza: $\alpha = .94$, $M = 2.89$, $SD = 0.93$, follow-up seasonal influenza: $\alpha = .95$, $M = 3.11$, $SD = 0.92$).

Appraisal of future expectation. Participants indicated their appraisals of future expectation by responding to six five-point Likert scale items. This scale was unchanged from Study 1 except that I created a version of the scale with seasonal influenza as the topic. See Appendix K for the complete measure. For the post-message climate change data, the exploratory factor analysis ($KMO = .83$) indicated that the items formed a unidimensional scale that accounted for 58.07% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .86$) indicated that the items formed a unidimensional scale that accounted for 66.75% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .85$) indicated that the items formed a unidimensional scale that accounted for 63.43% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .88$) indicated that the items formed a unidimensional scale that accounted for 69.89% of the variance in the items. To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .86$, $M = 3.36$, $SD = 0.71$, follow-up climate change: $\alpha = .90$, $M = 3.41$, $SD = 0.73$, post-message seasonal influenza: $\alpha = .88$, $M = 2.72$, $SD = 0.81$, follow-up seasonal influenza: $\alpha = .91$, $M = 2.89$, $SD = 0.82$).

Appraisal of possibility. Participants indicated their appraisals of possibility by responding to six five-point semantic differential items. This scale was unchanged from Study 1 except that I created a version of the scale with seasonal influenza as the topic. See Appendix L for the complete measure. For the post-message climate change data, the exploratory factor analysis ($KMO = .80$) indicated that the items formed a unidimensional scale that accounted for 57.33% of the variance in the items. For the follow-up climate change data, the exploratory factor

analysis ($KMO = .77$) indicated that the items formed a unidimensional scale that accounted for 59.97% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .90$) indicated that the items formed a unidimensional scale that accounted for 71.19% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .88$) indicated that the items formed a unidimensional scale that accounted for 74.14% of the variance in the items. To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .84$, $M = 3.70$, $SD = 0.59$, follow-up climate change: $\alpha = .86$, $M = 3.69$, $SD = 0.57$, post-message seasonal influenza: $\alpha = .92$, $M = 3.47$, $SD = 0.86$, follow-up seasonal influenza: $\alpha = .93$, $M = 3.46$, $SD = 0.81$).

Appraisals. To verify that the four appraisals are separate, I conducted an exploratory factor analysis using all the items making up the four appraisal scales (importance, goal congruence, future expectation, and possibility). For both the climate change and seasonal influenza data, I performed a principle axis factor extraction with oblique (direct oblimin) rotation on the 26 items. Prior to performing the EFA, I assessed the suitability of the data for factor analysis.

For the climate change post-message data, inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The KMO value was .89 and the Bartlett's Test of Sphericity was statistically significant, supporting the factorability of the correlation matrix. The factor analysis revealed the presence of four factors that explained 37.11%, 12.86%, 8.93%, and 7.53% of the variance, respectively. The four-factor solution explained 66.43% of the variance. The four factors fall along the four appraisals, indicating that they are indeed separate appraisals. Table 5.3 below provides the pattern matrix for the post-message items with the primary loadings in bold font.

Table 5.3: Study 2 Climate Change Data Pattern Matrix from an Exploratory Factor Analysis of the Post-Message Appraisal Items Using Principal Axis Factoring and Oblique Rotation

Appraisal	Factors			
Item	1	2	3	4
Future Expectation				
Protecting the climate will make the future wonderful.	.15	.29	.13	.59
Not protecting the climate will make the future awful.	.13	-.07	.00	.61
Failing to protect the climate will create a bleak future.	.02	-.08	-.12	.74
Protecting the climate will create a bright future.	.04	.24	-.05	.54
A better climate equals a much better future.	.10	.09	-.09	.54
A worse climate equals a much worse future.	-.03	-.05	-.08	.70
Importance				
Does not matter at all to me/Matters very much to me	.15	.05	-.76	-.02
Is very important/Is very unimportant R	.00	-.09	-.68	.13
Is very nonessential/Is very essential	-.03	.02	-.77	.04
Is very significant/Is very insignificant R	.13	-.02	-.73	.01
Is of no concern/Is of very much concern	.20	.04	-.68	.00
Is very relevant/Is very irrelevant R	-.08	.09	-.64	.02
Is not needed at all/Is needed very much	-.09	.03	-.77	.09
Possibility				
Very Impossible/very possible	-.09	.55	-.12	.17
Very Likely/very unlikely R	.11	.72	.06	-.16
Very Improbable/very probable	.04	.77	.09	-.05
Very Achievable/very unachievable R	-.12	.74	-.16	.11

Not at all feasible/Very feasible	-.06	.72	-.05	.14
Very Attainable/Very unattainable R	.04	.85	-.07	.02
<hr/> Goal Congruence				
Is one of my goals.	.81	.02	-.11	-.01
Relates to my personal goals.	.86	-.08	-.06	.07
Would help me achieve other important goals.	.74	.06	.03	.16
Helps me meet my personal goals.	.91	.00	.07	.12
Fits with my personal values.	.55	.08	-.41	-.14
Is consistent with my ideals.	.46	.04	-.39	-.08
Is important to meeting my personal goals.	.91	.00	.05	.12

Note. Primary loadings are in bold font for ease of reading. R = item reverse coded

For the climate change follow-up data, inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The KMO value was .92 and the Bartlett's Test of Sphericity was statistically significant, supporting the factorability of the correlation matrix. The factor analysis revealed the presence of four factors with eigenvalues exceeding 1, explaining 47.74%, 11.47%, 7.36%, and 5.41% of the variance, respectively. The four-factor solution explained 71.98% of the variance. The four factors fall precisely along the four appraisals, indicating that they are indeed separate appraisals. Table 5.4 below provides the pattern matrix for the follow-up items with the primary loadings in bold font.

Table 5.4: Study 2 Climate Change Data Pattern Matrix from an Exploratory Factor Analysis of the Follow-up Appraisal Items Using Principal Axis Factoring and Oblique Rotation

Appraisal	Factors			
Item	1	2	3	4
Future Expectation				
Protecting the climate will make the future wonderful.	-.16	.21	.73	.07
Not protecting the climate will make the future awful.	.12	-.10	.80	-.01
Failing to protect the climate will create a bleak future.	.17	.02	.69	.05
Protecting the climate will create a bright future.	-.03	.16	.75	-.03
A better climate equals a much better future.	.01	.08	.75	.08
A worse climate equals a much worse future.	.14	-.11	.64	.12
Importance				
Does not matter at all to me/Matters very much to me	.64	.03	.05	.24
Is very important/Is very unimportant R	.62	.24	-.02	.07
Is very nonessential/Is very essential	.73	-.05	.25	-.02
Is very significant/Is very insignificant R	.70	.13	.16	.01
Is of no concern/Is of very much concern	.64	.08	.11	.19
Is very relevant/Is very irrelevant R	.75	.14	.10	-.04
Is not needed at all/Is needed very much	.79	.05	.06	.04
Possibility				
Very Impossible/very possible	.27	.45	.04	-.12
Very Likely/very unlikely R	-.09	.64	.05	.05
Very Improbable/very probable	-.05	.69	.07	.00
Very Achievable/very unachievable R	.05	.76	.00	.05

Not at all feasible/Very feasible	.10	.75	.02	.05
Very Attainable/Very unattainable R	.15	.79	-.02	.02
<hr/> Goal Congruence				
Is one of my goals.	.19	-.07	.17	.70
Relates to my personal goals.	.04	.01	.02	.86
Would help me achieve other important goals.	-.09	.10	.02	.86
Helps me meet my personal goals.	-.06	-.02	.13	.87
Fits with my personal values.	.43	-.02	-.06	.57
Is consistent with my ideals.	.39	-.03	-.05	.56
Is important to meeting my personal goals.	-.08	.08	.07	.87

Note. Primary loadings are in bold font for ease of reading. R = item reverse coded

For the seasonal influenza post-message data, inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The KMO value was .94 and the Bartlett's Test of Sphericity was statistically significant, supporting the factorability of the correlation matrix. The factor analysis revealed the presence of four factors with eigenvalues greater than one that explained 46.81%, 12.38%, 7.34%, and 5.25% of the variance, respectively. The four-factor solution explained 71.78% of the variance. The four factors fall along the four appraisals, indicating that they are indeed separate appraisals. Table 5.5 below provides the pattern matrix for the post-message items with the primary loadings in bold font.

Table 5.5: Study 2 Seasonal Influenza Data Pattern Matrix from an Exploratory Factor Analysis of the Post-Message Appraisal Items Using Principal Axis Factoring and Oblique Rotation

Appraisal	Factors			
Item	1	2	3	4
Future Expectation				
Protecting the climate will make the future wonderful.	.00	.01	.77	-.03
Not protecting the climate will make the future awful.	.10	.04	.79	.11
Failing to protect the climate will create a bleak future.	-.02	-.05	.79	-.07
Protecting the climate will create a bright future.	.06	.08	.70	-.02
A better climate equals a much better future.	.04	.05	.65	-.08
A worse climate equals a much worse future.	-.05	-.02	.67	-.05
Importance				
Does not matter at all to me/Matters very much to me	.22	-.03	-.06	-.75
Is very important/Is very unimportant R	.02	.04	.02	-.79
Is very nonessential/Is very essential	-.03	.01	.17	-.70
Is very significant/Is very insignificant R	-.06	.08	.00	-.73
Is of no concern/Is of very much concern	.08	.00	.13	-.68
Is very relevant/Is very irrelevant R	-.03	.09	-.04	-.72
Is not needed at all/Is needed very much	.03	.00	.04	-.83
Possibility				
Very Impossible/very possible	-.03	.71	-.01	-.08
Very Likely/very unlikely R	-.01	.78	.11	.08
Very Improbable/very probable	.02	.78	-.07	-.11
Very Achievable/very unachievable R	.01	.88	-.04	-.04

Not at all feasible/Very feasible	.09	.78	.04	-.04
Very Attainable/Very unattainable R	-.01	.93	.00	.01
<hr/> Goal Congruence				
Is one of my goals.	.71	.13	.11	.06
Relates to my personal goals.	.89	.00	.01	.02
Would help me achieve other important goals.	.85	.05	-.03	.02
Helps me meet my personal goals.	.94	.04	-.04	.01
Fits with my personal values.	.72	-.02	.02	-.11
Is consistent with my ideals.	.76	-.11	.04	-.09
Is important to meeting my personal goals.	.82	.00	.04	-.04

Note. Primary loadings are in bold font for ease of reading. R = item reverse coded

For the seasonal influenza follow-up data, inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The KMO value was .94 and the Bartlett's Test of Sphericity was statistically significant, supporting the factorability of the correlation matrix. The factor analysis revealed the presence of four factors with eigenvalues exceeding 1, explaining 51.12%, 11.93%, 8.54%, and 4.86% of the variance, respectively. The four-factor solution explained 76.45% of the variance. The four factors fall precisely along the four appraisals, indicating that they are indeed separate appraisals. Table 5.6 below provides the pattern matrix for the follow-up items with the primary loadings in bold font.

Table 5.6: Study 2 Seasonal Influenza Data Pattern Matrix from an Exploratory Factor Analysis of the Follow-up Appraisal Items Using Principal Axis Factoring and Oblique Rotation

Appraisal	Factors			
Item	1	2	3	4
Future Expectation				
Protecting the climate will make the future wonderful.	.06	.00	.80	-.01
Not protecting the climate will make the future awful.	-.04	-.09	.84	-.08
Failing to protect the climate will create a bleak future.	-.08	-.07	.74	.14
Protecting the climate will create a bright future.	.12	-.05	.78	-.09
A better climate equals a much better future.	.06	.04	.77	.07
A worse climate equals a much worse future.	-.02	.07	.83	.04
Importance				
Does not matter at all to me/Matters very much to me	.77	-.16	-.04	-.02
Is very important/Is very unimportant R	.69	.00	.04	.08
Is very nonessential/Is very essential	.68	-.07	.08	.14
Is very significant/Is very insignificant R	.86	.06	.02	.05
Is of no concern/Is of very much concern	.72	-.14	-.02	.04
Is very relevant/Is very irrelevant R	.87	.07	.03	.02
Is not needed at all/Is needed very much	.83	-.02	.05	-.03
Possibility				
Very Impossible/very possible	.03	-.03	.06	.73
Very Likely/very unlikely R	.08	.01	-.03	.80
Very Improbable/very probable	.13	.03	.00	.75
Very Achievable/very unachievable R	-.06	-.01	-.01	.94

Not at all feasible/Very feasible	.09	.01	.10	.74
Very Attainable/Very unattainable R	-.06	-.05	-.03	.90
<hr/> Goal Congruence				
Is one of my goals.	.14	-.73	.04	-.01
Relates to my personal goals.	-.05	-.94	.04	-.01
Would help me achieve other important goals.	.00	-.85	.01	.02
Helps me meet my personal goals.	-.07	-.93	.00	.05
Fits with my personal values.	.13	-.75	.06	-.03
Is consistent with my ideals.	.13	-.78	-.06	.00
Is important to meeting my personal goals.	-.06	-.94	.02	.04

Note. Primary loadings are in bold font for ease of reading. R = item reverse coded

Subjective feelings. Participants indicated their subjective feelings of hope, fear, guilt, sadness, happiness, and anger by responding to five-point Likert scale items (1 = *none of this emotion*, 5 = *a great deal of this emotion*). These scales were unchanged from Study 1. See Appendix H for the complete measures. The exploratory factor analyses indicated that for each of the subjective feelings, the items formed a unidimensional scale. To create the scales, I averaged the responses to the items for each feeling. Table 5.7 contains the KMO index, percentage of variance explained, mean, standard deviation, and reliability of each of the subjective feeling scales.

Table 5.7: Study 2 Factorability, Percentage of Variance Explained, Means, Standard Deviations, and Reliability for Subjective Feeling Measures by Survey Topic

Survey Topic	% Variance				
Subjective Feeling	KMO	Explained	Mean	SD	α
Climate Change					
Hope					
Pre-Message	.89	68.75	2.00	0.88	.91
Post-Message	.93	75.96	2.14	1.04	.94
Follow-Up	.90	76.34	2.23	1.00	.94
Fear					
Pre-Message	.90	74.82	2.40	0.98	.93
Post-Message	.92	73.40	1.97	0.94	.93
Follow-Up	.92	81.87	2.30	1.05	.96
Guilt	.83	73.87	1.89	0.93	.88
Sadness	.87	75.22	1.78	0.88	.92
Happiness	.89	77.56	1.74	0.87	.93
Anger	.84	75.94	2.20	1.05	.92
Seasonal Influenza					
Hope					
Pre-Message	.84	58.85	1.51	0.68	.85
Post-Message	.89	67.87	1.86	0.91	.90
Follow-Up	.88	74.47	1.56	1.56	.93

Fear					
Pre-Message	.90	73.25	1.98	0.89	.93
Post-Message	.91	73.80	1.72	0.87	.93
Follow-Up	.89	75.84	1.87	0.87	.94
Guilt	.79	67.62	1.37	0.61	.84
Sadness	.85	74.64	1.45	0.70	.91
Happiness	.88	69.64	1.55	0.73	.89
Anger	.83	68.72	1.89	0.92	.88

Environmental identity. Participants indicated their environmental identity by responding to five five-point Likert-type items. This scale was unchanged from Study 1. See Appendix S for the complete measure. For the climate change data, the exploratory factor analysis ($KMO = .79$) indicated that the items formed a unidimensional scale that accounted for 60.88% of the variance in the items. For the seasonal influenza data, the exploratory factor analysis ($KMO = .82$) indicated that the items formed a unidimensional scale that accounted for 64.27% of the variance in the items. To create the scale, I averaged the responses to the items (climate change: $\alpha = .84$, $M = 3.31$, $SD = 0.66$, seasonal influenza: $\alpha = .86$, $M = 3.37$, $SD = 0.73$).

Interest in the message topic. Participants indicated their interest in learning about ways to protect the climate or prevent seasonal influenza by responding to five five-point semantic differential items. This scale was unchanged from Study 1 except that I created a version of the scale with seasonal influenza as the topic. See Appendix P for the complete measure. For the post-message climate change data, the exploratory factor analysis ($KMO = .88$) indicated that the items formed a unidimensional scale that accounted for 69.48% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .87$) indicated that the items formed a unidimensional scale that accounted for 71.31% of the variance in the items. For

the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .87$) indicated that the items formed a unidimensional scale that accounted for 67.20% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .86$) indicated that the items formed a unidimensional scale that accounted for 67.96% of the variance in the items. To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .89$, $M = 3.21$, $SD = 0.72$, follow-up climate change: $\alpha = .90$, $M = 3.19$, $SD = 0.75$, post-message seasonal influenza: $\alpha = .87$, $M = 2.64$, $SD = 0.72$, follow-up seasonal influenza: $\alpha = .88$, $M = 2.69$, $SD = 0.73$).

Perceived self-efficacy. Participants indicated their confidence in their ability to perform each of the recommended behaviors. They responded to four five-point Likert scale items for each of the behaviors. The items began with the stems (a) it is very hard for me to, (b) I can very easily, (c) I am very confident in my ability to, and (d) it is very difficult for me to. The stems were followed by the recommended behavior (e.g., it is very hard for me to use reusable grocery bags). See Appendix W for the complete measure. The perceived self-efficacy scale is a second-order scale. To create the scale, I first examined perceptions by the individual behaviors that the items referenced and created unidimensional scales for each behavior. Then, I combined the scales for each behavior into a second-order measure of perceived self-efficacy for climate protection and seasonal influenza prevention behaviors. To be succinct, I present only the results from the second-order analysis. For the post-message climate change data, the exploratory factor analysis ($KMO = .69$) indicated that the items formed a unidimensional scale that accounted for 51.96% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .70$) indicated that the items formed a unidimensional scale that accounted for 54.56% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .75$) indicated that the items formed a unidimensional scale that accounted for 58.88% of the variance in the items. For the follow-up seasonal influenza data,

the exploratory factor analysis ($KMO = .73$) indicated that the items formed a unidimensional scale that accounted for 58.54% of the variance in the items. To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .69$, $M = 3.71$, $SD = 0.66$, follow-up climate change: $\alpha = .72$, $M = 3.69$, $SD = 0.65$, post-message seasonal influenza: $\alpha = .75$, $M = 4.07$, $SD = 0.58$, follow-up seasonal influenza: $\alpha = .74$, $M = 4.02$, $SD = 0.58$).

Perceived response efficacy. Participants indicated how effective they thought each of the recommended behaviors were in either protecting the climate or preventing seasonal influenza. They responded to three five-point Likert scale items for each of the behaviors. The items began with the behavior as the stem (e.g., Unplugging my cell phone charger when I am not using it is...). The stem was followed by the items (a) a very effective way to protect the climate [or prevent seasonal influenza], (b) very helpful in protecting the climate, and (c) an excellent way to help protect the climate. See Appendix X for the complete measure. The perceived response efficacy scale is a second-order scale. To create the scale, I first examined perceptions by the individual behaviors that the items referenced and created unidimensional scales for each behavior. Then, I combined the scales for each behavior into a second-order measure of perceived response efficacy for climate protection and seasonal influenza prevention behaviors. To be succinct, I present only the results from the second-order analysis. For the post-message climate change data, the exploratory factor analysis ($KMO = .71$) indicated that the items formed a unidimensional scale that accounted for 78.09% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .77$) indicated that the items formed a unidimensional scale that accounted for 81.47% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .76$) indicated that the items formed a unidimensional scale that accounted for 64.81% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .77$) indicated that the items formed a unidimensional scale that accounted for 65.70% of the variance in the items.

To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .91$, $M = 3.70$, $SD = 0.79$, follow-up climate change: $\alpha = .92$, $M = 3.61$, $SD = 0.79$, post-message seasonal influenza: $\alpha = .78$, $M = 4.04$, $SD = 0.66$, follow-up seasonal influenza: $\alpha = .80$, $M = 3.95$, $SD = 0.61$).

Attitudes toward the behaviors. Participants indicated their attitudes toward the recommended behaviors by responding to five five-point Likert scale items for each of the recommended behaviors. The items began with a stem that referenced the behavior (e.g., Using a reusable water bottle instead of plastic bottles is...). The stem was followed by the items of (a) very good, (b) very bad, (c) very beneficial, (d) very undesirable, and (e) very desirable. See Appendix Y for the complete measure. The attitudes toward the behaviors scale is a second-order scale. To create the scale, I first examined the attitudes by the individual behaviors that the items referenced and created unidimensional scales for each behavior. Then, I combined the scales for each behavior into a second-order measure of attitudes toward the behaviors for climate protection and seasonal influenza prevention behaviors. Again, I present only the results from the second-order analysis. For the post-message climate change data, the exploratory factor analysis ($KMO = .75$) indicated that the items formed a unidimensional scale that accounted for 65.98% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .78$) indicated that the items formed a unidimensional scale that accounted for 73.69% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .74$) indicated that the items formed a unidimensional scale that accounted for 57.08% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .78$) indicated that the items formed a unidimensional scale that accounted for 65.13% of the variance in the items. To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .83$, $M = 3.86$, $SD = 0.62$, follow-up climate change:

$\alpha = .88$, $M = 3.73$, $SD = 0.65$, post-message seasonal influenza: $\alpha = .74$, $M = 4.10$, $SD = 0.54$, follow-up seasonal influenza: $\alpha = .80$, $M = 3.97$, $SD = 0.58$).

Perceived barriers. For each of the recommended behaviors, five items measured perceived barriers to performing the behavior. Participants responded to five five-point Likert scale items that began with a stem that identified the recommended behavior (e.g., “Turning off my computer when I am not using it...”). The stem was followed by the items (a) takes too much time, (b) costs too much, (c) will decrease my quality of life, (d) is inconvenient, and (e) takes too much effort. See Appendix Q for the complete measure. The perceived barriers scale is a second-order scale. To create the scale, I first examined the barriers by the individual behaviors that the items referenced and created unidimensional scales for each behavior. Then, I combined the scales for each behavior into a second-order measure of perceived barriers for climate protection and seasonal influenza prevention behaviors. I present only the results from the second-order analysis. For the post-message climate change data, the exploratory factor analysis ($KMO = .77$) indicated that the items formed a unidimensional scale that accounted for 67.52% of the variance in the items. For the follow-up climate change data, the exploratory factor analysis ($KMO = .79$) indicated that the items formed a unidimensional scale that accounted for 72.08% of the variance in the items. For the post-message seasonal influenza data, the exploratory factor analysis ($KMO = .76$) indicated that the items formed a unidimensional scale that accounted for 62.50% of the variance in the items. For the follow-up seasonal influenza data, the exploratory factor analysis ($KMO = .77$) indicated that the items formed a unidimensional scale that accounted for 64.42% of the variance in the items. To create the scale, I averaged the responses to the items (post-message climate change: $\alpha = .84$, $M = 2.15$, $SD = 0.70$, follow-up climate change: $\alpha = .84$, $M = 2.26$, $SD = 0.72$, post-message seasonal influenza: $\alpha = .78$, $M = 1.88$, $SD = 0.58$, follow-up seasonal influenza: $\alpha = .79$, $M = 2.00$, $SD = 0.59$).

Behavioral intention. As with current behavior, participants reported their behavioral intentions for the four recommended behaviors for the survey topic condition to which I assigned them. See Appendix R for the complete measure. I did not intend these items to form a unidimensional scale, but rather to be an index of climate protection and seasonal influenza prevention behavioral intentions. To create the index, I averaged the responses to the items (post-message climate change: $M = 3.43$, $SD = 0.86$, follow-up climate change: $M = 3.43$, $SD = 0.86$, post-message seasonal influenza: $M = 3.66$, $SD = 0.71$, follow-up seasonal influenza: $M = 3.49$, $SD = 0.72$).

Demographics. The demographic questions remain unchanged from Study 1. They ask students to report their age, gender, race/ethnicity, year in school, type of area they grew up in, and whether they are able to meet their financial needs and wants. See Appendix T for the complete measure.

Data Analysis

Ability to collapse conditions. To examine whether I could collapse the climate protection and seasonal influenza conditions, I performed a series of independent-samples *t*-tests. The message topic (climate protection or seasonal influenza prevention) was the independent variable. Pre-message perceptions of severity, susceptibility, and subjective knowledge; subjective feelings of hope and fear; as well as the post-message perceptions of importance, goal congruence, future expectation, and possibility were the dependent variables.

Perceived message clarity. In analyzing perceived message clarity, I first examined the means for each message on the perceived message clarity scale to determine if the messages were clear. Next, I conducted two one-way analyses of variance to compare the perceived message clarity scores for the strong hope appeal, weak hope appeal, and attention control conditions for both the climate protection and seasonal influenza prevention messages. The independent variable

was the message manipulation (strong/weak/control). The dependent variable was post-message perceptions of message clarity.

Manipulation checks. To determine if the strong/weak manipulations were successful, I performed a series of chi-square analyses on the dichotomous (no/yes) manipulation check variables. In the analyses, the message conditions (i.e., strong hope appeal, weak hope appeal, and attention control) were the independent variables and the manipulation check items were the dependent variables. I also examined the percent of participants in each message condition who answered the questions correctly.

Order effects. Due to the length of the survey, three versions of the survey controlled for order effects. I tested order effects using a series of analyses of variance with all the pre-message, post-message, and follow-up items as the outcome variables and the three survey orders as the predictor. In addition to examining the effects of order on individual items, I also used a one-way analysis of variance to examine the effects of order on the scales formed from the items.

Evaluation of random assignment. To evaluate possible significant and salient group differences between the participants randomly assigned to the three different message conditions (strong/weak/control), I conducted a one-way analysis of variance with the message conditions as the predictor and the pre-message scales, post-message environmental identity scale, and demographic items as the outcomes for both the climate change and seasonal influenza data.

Hypotheses and research questions. I tested hypotheses 1, 3, 4, 5, 6, and 12 as well as research question 5 using bivariate or partial correlation coefficients. I tested hypotheses 2 and research questions 4 and 6 using multiple regression analyses. I used analyses of covariance to test hypothesis 7 and research question 2. I tested hypotheses 8, 9, 10, and 11 using multivariate analyses of covariance. I describe the details of the analyses in the results section.

Results

The goals of Study 2 were (a) to test PHT's proposed relationships between subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility; (b) to examine the relationships between subjective feelings of hope and behavioral antecedents; (c) to assess the effects of hope appeals developed in accordance with PHT; and (d) to identify individual characteristics that may affect the relationship between hope appeals and subjective feelings of hope. The study was a three (message type: strong hope appeal, weak hope appeal, or attention control) by two (survey topic: climate protection or seasonal influenza prevention) between subjects pre-test, post-test with follow-up design. Below, I describe the results of my preliminary analyses followed by tests of my hypotheses and research questions.

Preliminary Analyses

Ability to Collapse Conditions

To examine whether I could collapse the climate protection and seasonal influenza conditions, I performed a series of independent-samples *t*-tests. The message topic (climate protection or seasonal influenza prevention) was the independent variable. Pre-message perceptions of severity, susceptibility, and subjective knowledge; subjective feelings of hope and fear; as well as the post-message perceptions of importance, goal congruence, future expectation, and possibility were the dependent variables. With a Bonferroni correction to the significance level (correction: $.05/9 = p < .006$), all the variables except perceptions of goal congruence were significantly different between the two message topics. Given the significant differences between the two message topics, I concluded that I could not collapse the message conditions. Thus, I conducted all analyses separately for the climate change and seasonal influenza data. Table 5.8

presents the means and standard deviations for each comparison variable by message topic as well as the t statistic, significance level p , and effect size η^2 .

Table 5.8: Study 2 Means and Standard Deviations for Comparison Variables by Message Topic with Test Statistics, Significance Levels, and Effect Sizes

	Climate		Seasonal		<i>t</i>	<i>p</i>	η^2
	Change		Influenza				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Susceptibility	3.15	0.84	2.87	0.85	4.09	<.0005	.03
Severity	3.44	0.81	3.01	0.62	7.15	<.0005	.08
Subjective Knowledge	3.24	0.84	3.67	0.68	-6.74	<.0005	.07
Pre-Message Hope	2.00	0.88	1.51	0.68	7.45	<.0005	.09
Pre-Message Fear	2.40	0.98	1.98	0.89	5.39	<.0005	.05
Importance	3.92	0.62	3.63	0.77	5.05	<.0005	.04
Goal Congruence	2.98	0.83	2.89	0.93	1.14	.256	.00
Future Expectation	3.36	0.71	2.72	0.81	10.06	<.0005	.15
Possibility	3.70	0.59	3.47	0.86	3.73	<.0005	.02

Perceived Message Clarity

To examine perceptions of message clarity, I conducted two one-way analyses of variance to compare the perceived message clarity scores for the strong hope appeal, weak hope appeal, and attention control conditions for both the climate protection and seasonal influenza prevention messages. The independent variable was the message condition (strong/weak/control).

The dependent variable was post-message perceptions of message clarity. Given the significant differences described below in perceived message clarity between the manipulations, I used perceived message clarity as a covariate for all the analyses that assessed message effects.

Climate protection. There was an unintended statistically significant difference in perceived message clarity for the three message manipulations: $F(2, 286) = 9.08, p < .0005$. Post-hoc analyses using Tukey's HSD test indicated that the perceived message clarity means for the strong hope appeal ($M = 4.27, SD = 0.64, p < .0005$) and attention control ($M = 4.22, SD = 0.82, p = .002$) conditions were significantly higher than for the weak hope appeal ($M = 3.84, SD = 0.81$).

Seasonal influenza. The data violated the assumption of homogeneity of variances; therefore, I used Welch's robust test of equality of means to assess differences in perceived message clarity. There was an unintended statistically significant difference in perceived message clarity for the three message manipulations: $F(2, 178.1) = 11.80, p < .0005$. Post-hoc analyses using Tukey's HSD test indicated that the perceived message clarity mean for the strong hope appeal ($M = 4.57, SD = 0.49$) was significantly higher than that for either the weak hope appeal ($M = 4.11, SD = 0.87, p < .0005$) or attention control ($M = 4.30, SD = 0.80, p = .036$) conditions.

Message Manipulation Checks

To determine if the message manipulations were successful, I performed a series of chi-square analyses on the dichotomous (no/yes) message manipulation checks. For each of the message topics, the message manipulations (strong hope appeal, weak hope appeal, or attention control) were the independent variables and the manipulation check items were the dependent variables. I used a Bonferroni correction (.05/18) to set the significance level to $p = .003$. For both the climate change and seasonal influenza manipulation checks, the message conditions were significantly different ($p < .0005$) and had a large effect size ($\Phi > .5$). Overall, the percentages of correct responses were excellent, with at least two-thirds of respondents correctly marking the

manipulation check (except for the climate change manipulation check number four). Tables 5.9 and 5.10 show the chi-square, effect size phi (Φ), and the percentage of participants in each condition that marked the item correctly for the climate protection and seasonal influenza prevention messages, respectively.

Table 5.9: Study 2 Climate Protection Message Chi-Square, Effect Size Phi, and Percent Correct by Message Manipulation Check

Message Manipulation			% Correct		
Check #	χ^2	Φ	Strong	Weak	Control
Importance					
1	165.59	.76	97.89	82.29	81.82
2	192.86	.82	98.95	83.16	93.88
3	131.90	.67	93.68	67.71	84.85
4	92.33	.57	97.89	52.08	93.88
5	174.39	.78	97.89	83.33	84.85
6	175.34	.78	97.89	77.08	95.92
Goal Congruence					
7	184.20	.80	94.74	86.46	89.80
8	187.41	.81	95.79	86.46	91.84
9	185.88	.80	89.47	91.67	91.92
10	158.45	.74	91.58	85.42	87.76

Future Expectation					
11	174.65	.78	98.95	82.29	83.84
12	194.65	.82	100.00	79.17	96.94
13	138.00	.69	77.66	92.71	88.89
14	182.46	.80	94.74	81.25	96.94
Possibility					
15	132.10	.68	87.10	82.29	84.85
16	160.96	.75	96.84	73.96	95.92
17	144.85	.71	70.53	91.67	98.99
18	120.56	.65	81.05	81.05	88.78

Note. All manipulation checks were statistically significant at $p < .0005$.

Table 5.10: Study 2 Seasonal Influenza Prevention Message Chi-Square, Effect Size Phi, and Percent Correct by Message Manipulation Check

Message Manipulation			% Correct		
Check #	χ^2	Φ	Strong	Weak	Control
Importance					
1	193.88	.82	95.70	90.82	88.42
2	186.04	.81	93.62	90.82	88.42
3	166.05	.76	90.43	88.78	87.37
4	187.02	.81	94.68	87.76	91.58
5	117.33	.64	96.81	67.35	74.74
6	116.02	.64	97.85	60.20	94.74

Goal Congruence					
7	154.02	.73	86.17	90.82	86.32
8	201.40	.84	96.81	88.78	92.63
9	121.57	.65	84.04	81.63	85.26
10	116.34	.64	85.11	75.51	90.53
Future Expectation					
11	159.69	.75	91.49	88.78	83.16
12	196.44	.83	98.92	84.69	93.68
13	128.97	.67	75.53	91.75	89.47
14	182.05	.80	94.68	83.67	94.74
Possibility					
15	109.92	.62	84.04	79.59	81.91
16	143.43	.71	91.49	75.51	94.68
17	123.59	.66	78.72	86.73	88.42
18	130.84	.68	85.11	79.38	91.58

Note. All manipulation checks were statistically significant at $p < .0005$.

Order Effects

Due to the length of the survey, three versions of the survey controlled for order effects. For each message topic, I tested order effects using analyses of variance with all the pre-message and post-message items and scales as the outcome variables and the three survey orders as the predictor. Because of the large number of tests involved in this analysis, I used a Bonferroni correction (.05/100) to achieve an acceptable error rate of $p = .0005$. For the climate protection

data, survey order was not significantly associated with differences in the means of any of the items or scales.

For the seasonal influenza data, survey order was associated with significant differences in the means of five (1.26%) of the 397 variables and one of the scales, without controlling for any other variable. Survey order significantly affected the pre-message perceived severity item “very overblown,” $F(2, 282) = 7.96, p < .0005$. Examination of the Tukey HSD post-hoc test indicated that this item had a lower mean for order one ($M = 2.46, SD = 0.84$) than for orders two ($M = 2.87, SD = 0.90, p = .005$) or three ($M = 2.95, SD = 0.96, p = .001$). In survey order one, participants answered questions about their susceptibility to seasonal influenza before answering questions about the severity of seasonal influenza, whereas the other orders answered severity questions prior to susceptibility questions.

Survey order significantly affected the follow-up appraisal of importance item “does not matter at all/matters very much,” $F(2, 279) = 7.96, p < .0005$. Examination of the Tukey HSD post-hoc test indicated that this item had a higher mean for order three ($M = 3.98, SD = 0.94$) than for orders one ($M = 3.49, SD = 0.97, p = .002$) or two ($M = 3.52, SD = 0.90, p = .002$). Survey order also significantly affected the follow-up appraisal of importance item “is very nonessential/is very essential,” $F(2, 280) = 13.83, p < .0005$. Examination of the Tukey HSD post-hoc test indicated that this item had a higher mean for order three ($M = 3.76, SD = 0.88$) than for orders one ($M = 3.12, SD = 0.84, p < .0005$) or two ($M = 3.33, SD = 0.80, p = .001$). Survey order significantly affected the follow-up appraisal of importance item “is of no concern/is of very much concern,” $F(2, 281) = 12.87, p < .0005$. Examination of the Tukey HSD post-hoc test indicated that this item had a higher mean for order three ($M = 3.72, SD = 0.96$) than for orders one ($M = 3.12, SD = 0.89, p < .0005$) or two ($M = 3.16, SD = 0.87, p < .0005$). Survey order significantly affected the follow-up appraisal of importance item “is not needed at all/is needed very much,” $F(2, 283) = 7.96, p < .005$. Examination of the Tukey HSD post-hoc test indicated

that this item had a higher mean for order three ($M = 3.97$, $SD = 0.81$) than for orders one ($M = 3.48$, $SD = 0.87$, $p < .0005$) or two ($M = 3.61$, $SD = 0.78$, $p = .007$). The only consistent difference between these orders is that participants assigned to orders one and two answered questions about the importance of seasonal influenza after answering questions about their future expectations, whereas participants in order three answered questions about importance prior to answering questions about future expectations.

In addition to examining the effects of order on individual items, I also used a one-way analysis of variance to examine the effects of order on the scales formed from the items. Although order affected one perceived severity item, survey order did not significantly affect the perceived severity scale using this item; therefore, this order effect was not of concern for the substantive analyses. However, survey order significantly affected the follow-up appraisals of importance scale, $F(2, 283) = 10.94$, $p < .005$. Therefore, whenever I analyzed follow-up appraisals of importance for the seasonal influenza data, I included order as a covariate.

Evaluation of Random Assignment

To evaluate possible significant and salient group differences between the participants randomly assigned to the three different message conditions, I conducted a one-way analysis of variance with the message conditions as the predictor and the pre-message scales, environmental identity scale, and demographic items as the outcomes for both the climate change and seasonal influenza data. Because I had 16 dependent variables, I used a Bonferroni correction ($.05/16$) to achieve acceptable error rate of $p = .003$. The analysis indicated that there were no significant differences between participants assigned to the three message conditions for either the climate protection or seasonal influenza prevention data.

Tests of Hypotheses and Research Questions

Hypothesis 1

The first hypothesis states that subjective feelings of hope are positively related to appraisals of importance, goal congruence, possibility, and future expectation. I used Pearson's correlations to test the associations between subjective feelings of hope and the appraisals. I assessed these relationships on the post-message measures using only participants exposed to the strong and weak hope appeals.²² Then I assessed the relationships between follow-up subjective feelings of hope and the follow-up appraisals using all participants.

Climate change. Post-message subjective feelings of hope were significantly correlated with post-message appraisals of importance ($p = .001$), goal congruence ($p = .001$), future expectation ($p < .0005$), and possibility ($p < .0005$). Follow-up subjective feelings of hope were significantly correlated with post-message appraisals of importance ($p < .0005$), goal congruence ($p < .0005$), future expectation ($p < .0005$), and possibility ($p < .0005$). Thus, the climate change data provided full support for hypothesis one. Table 5.11 presents the correlations between post-message subjective feelings of hope and the post-message appraisals as well as the correlations between follow-up subjective feelings of hope and the follow-up appraisals.

²² After reading the message manipulation to which they were assigned, participants answered how much of each subjective feeling they experienced as a result of the message that they read. Because control participants read a message about job interviewing, the results from these scales (post-message subjective feelings of hope, fear, guilt, sadness, happiness, and anger) are not comparable with the strong and weak hope appeal groups. However, for pre-message and follow-up subjective feelings, the referent for the feelings is either climate change or seasonal influenza, based on the manipulation to which I assigned participants, allowing comparison among all groups.

Table 5.11: Study 2 Climate Change Data Correlations between Subjective Feelings of Hope and Each of the Appraisals on the Post-Message and Follow-Up Scales

	Subjective Feelings of Hope	
	Post-Message	Follow-Up
Appraisals	(N = 190)	(N = 290)
Importance	.23**	.33**
Goal Congruence	.23**	.46**
Future Expectation	.32**	.40**
Possibility	.29**	.29**

Note. Post-message subjective feelings of hope were correlated with post-message appraisals, whereas follow-up subjective feelings of hope were correlated with the follow-up appraisals. ** = $p < .01$

Seasonal influenza. Post-message subjective feelings of hope were significantly correlated with post-message appraisals of future expectation ($p = .012$). Follow-up subjective feelings of hope were significantly correlated with post-message appraisals of goal congruence ($p = .004$) and future expectation ($p < .0005$). Thus, the seasonal influenza data provided partial support for hypothesis one. Table 5.12 presents the correlations between post-message subjective feelings of hope and the post-message appraisals as well as the correlations between follow-up subjective feelings of hope and the follow-up appraisals.

Table 5.12: Study 2 Seasonal Influenza Data Correlations between Subjective Feelings of Hope and Each of the Appraisals on the Post-Message and Follow-Up Scales

	Subjective Feelings of Hope	
	Post-Message	Follow-Up
Appraisals	(N = 192)	(N = 286)
Importance	.09	.07
Goal Congruence	.13	.17**
Future Expectation	.18*	.21**
Possibility	.08	.04

Note. Post-message subjective feelings of hope were correlated with post-message appraisals, whereas follow-up subjective feelings of hope were correlated with the follow-up appraisals. * = $p < .05$, ** = $p < .01$

In summary, the climate change data provided full support for hypothesis one, whereas the seasonal influenza data provided only partial support. The climate change data provided support for the relationship between appraisals of importance and subjective feelings of hope, whereas the seasonal influenza data did not. The climate change data and the follow-up seasonal influenza data provided support for the relationship between appraisals of goal congruence and subjective feelings of hope, whereas the post-message seasonal influenza data did not. Both the climate change and seasonal influenza data provided support for the relationship between appraisals of future expectations and subjective feelings of hope. The climate change data provided support for the relationship between appraisals of possibility and subjective feelings of hope, whereas the seasonal influenza data did not.

Hypothesis 2

The second hypothesis states that appraisals of importance, goal congruence, positive future expectation, and possibility predict subjective feelings of hope. For each topic, I conducted two multiple regression analyses to test this hypothesis. The first regression used post-message scales, whereas the second regression used follow-up scores. For the first regression, post-message subjective feelings of hope was the dependent variable and post-message appraisals of importance, goal congruence, future expectation, and possibility were the independent variables. For the second regression, follow-up subjective feeling of hope was the dependent variable and follow-up appraisals of importance, goal congruence, future expectation, and possibility were the independent variables. Results of the evaluation of assumptions indicated that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity for any of the regressions.

Climate change post-message. For the post-message regression, the R for regression ($R = .37$) was significantly different from zero, $F(4, 185) = 7.47, p < .0005$, with an R^2 value of .14. The R^2 value indicates that approximately 14% of the variability in post-message subjective feelings of hope was predicted by post-message appraisals of importance, goal congruence, future expectation, and possibility. The regression coefficients for the appraisals of future expectation ($t = 2.31, p = .022$) and possibility ($t = 2.42, p = .017$) significantly differed from zero, whereas the regression coefficients for the appraisals of importance ($t = 0.42, p = .625$) and goal congruence ($t = 0.69, p = .423$) did not. The size and direction of the relationships suggest that subjective feelings of hope are greater among people with more positive appraisals of future expectation and higher appraisals of possibility. Thus, the post-message climate change data provided partial support for hypothesis two. Table 5.13 presents the correlations among the post-message appraisals and post-message subjective feelings of hope. Table 5.14 presents the B and β weights from the regression.

Table 5.13: Study 2 Climate Change Data Correlations among Post-Message Subjective Feelings of Hope and the Four Post-Message Appraisals

	Hope	Importance	Goal Congruence	Future Expectation
Appraisals of Importance	.23**			
Appraisals of Goal Congruence	.23**	.56**		
Appraisals of Future Expectation	.32**	.47**	.47**	
Appraisals of Possibility	.29**	.32**	.25**	.39**

Note. ** = $p < .01$

Table 5.14: Study 2 Climate Change Data Multiple Regression of Post-Message Appraisals on Post-Message Subjective Feelings of Hope

	B	β
Appraisals of Importance	.07	.04
Appraisals of Goal Congruence	.09	.07
Appraisals of Future Expectation	.29*	.19*
Appraisals of Possibility	.30*	.18*

Note. * = $p < .05$

Climate change follow-up. For the follow-up regression, the R for regression ($R = .50$) was significantly different from zero, $F(4, 284) = 24.01$, $p < .0005$, with an R^2 value of .25. The R^2 value indicates that approximately a quarter of the variability in follow-up subjective feelings of hope was predicted by follow-up appraisals of importance, goal congruence, future expectation, and possibility. The regression coefficients for the appraisals of goal congruence ($t =$

5.53, $p < .0005$) and future expectation ($t = 2.37$, $p = .019$) significantly differed from zero, whereas the regression coefficients for appraisals of importance ($t = -0.70$, $p = .484$) and possibility ($t = 1.65$, $p = .100$) did not. The size and direction of the relationships suggest that follow-up subjective feelings of hope were greater among people with higher appraisals of goal congruence and more positive appraisals of future expectation. Thus, the follow-up climate change data provided partial support for hypothesis two. Table 5.15 presents the correlations among the follow-up variables. Table 5.16 presents the B and β weights from the regression.

Table 5.15: Study 2 Climate Change Data Correlations among Follow-up Subjective Feelings of Hope and the Four Follow-up Appraisals

	Hope	Importance	Goal Congruence	Future Expectation
Appraisals of Importance	.33**			
Appraisals of Goal Congruence	.46**	.60**		
Appraisals of Future Expectation	.40**	.59**	.54**	
Appraisals of Possibility	.29**	.54**	.32**	.55**

Note. ** = $p < .01$

Table 5.16: Study 2 Climate Change Data Multiple Regression of Follow-up Appraisals on Follow-up Subjective Feelings of Hope

	B	β
Appraisals of Importance	-.08	-.05
Appraisals of Goal Congruence	.46**	.37**
Appraisals of Future Expectation	.23*	.17*
Appraisals of Possibility	.19	.11

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

Seasonal influenza post-message. For the post-message regression, the R for regression ($R = .19$) was not significantly different from zero, $F(4, 186) = 1.73$, $p = .146$, nor did any of the regression coefficients differ significantly from zero. Thus, the post-message seasonal influenza data did not support hypothesis two. Table 5.17 presents the correlations among the post-message appraisals and post-message subjective feelings of hope. Table 5.18 presents the B and β weights from the regression.

Table 5.17: Study 2 Seasonal Influenza Data Correlations among Post-Message Subjective Feelings of Hope and the Four Post-Message Appraisals

	Hope	Importance	Goal Congruence	Future Expectation
Appraisals of Importance	.09			
Appraisals of Goal Congruence	.13	.60**		
Appraisals of Future Expectation	.18*	.61**	.55**	
Appraisals of Possibility	.08	.64**	.37**	.43**

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

Table 5.18: Study 2 Seasonal Influenza Data Multiple Regression of Post-Message Appraisals on Post-Message Subjective Feelings of Hope

	B	β
Appraisals of Importance	-.07	-.08
Appraisals of Goal Congruence	.05	.06
Appraisals of Future Expectation	.16	.18
Appraisals of Possibility	.03	.03

Note. There were no significant results.

Seasonal influenza follow-up. For the follow-up regression, the R for regression ($R = .24$) was significantly different from zero, $F(4, 284) = 4.39$, $p = .002$, with an R^2 value of .06. The R^2 value indicates that about 6% of the variability in follow-up subjective feelings of hope was predicted by follow-up appraisals of importance, goal congruence, future expectation, and possibility. The regression coefficient for the appraisal of future expectation ($t = 2.93$, $p = .004$)

significantly differed from zero, whereas the regression coefficients for appraisals of importance ($t = -1.05, p = .295$), goal congruence ($t = 1.64, p = .102$), and possibility ($t = -.57, p = .567$) did not. The size and direction of the relationship suggests that follow-up subjective feelings of hope were greater among people with more positive appraisals of future expectation. Thus, the follow-up seasonal influenza data provided partial support for hypothesis two. Table 5.19 presents the correlations among the follow-up variables. Table 5.20 presents the B and β weights from the regression.

Table 5.19: Study 2 Seasonal Influenza Data Correlations among Follow-up Subjective Feelings of Hope and the Four Follow-up Appraisals

	Hope	Importance	Goal Congruence	Future Expectation
Appraisals of Importance	.07			
Appraisals of Goal Congruence	.17**	.61**		
Appraisals of Future Expectation	.21**	.55**	.54**	
Appraisals of Possibility	.04	.66**	.38**	.48**

Note. ** = $p < .01$

Table 5.20: Study 2 Seasonal Influenza Data Multiple Regression of the Follow-up Appraisals on Follow-up Subjective Feelings of Hope

	B	β
Appraisals of Importance	-.10	-.10
Appraisals of Goal Congruence	.11	.13
Appraisals of Future Expectation	.21**	.22**
Appraisals of Possibility	-.04	-.05

Note. ** = $p < .01$

In summary, the climate change and seasonal influenza data provided partial support for hypothesis two. Neither the climate change data nor the seasonal influenza data provided support for appraisals of importance as a predictor for subjective feelings of hope. Only the climate change follow-up data provided support for appraisals of goal congruence as a predictor of subjective feelings of hope. The climate change post-message and follow-up data as well as the seasonal influenza follow-up data provided support for appraisals of future expectations as a predictor of subjective feelings of hope. Only the climate change post-message data provided support for appraisals of possibility as a predictor of subjective feelings of hope.

Hypothesis 3

The third hypothesis predicts that subjective feelings of hope felt in response to a hope appeal are positively related to attention to the appeal. To test this hypothesis, I examined the partial correlation between post-message subjective feelings of hope and message attention while controlling for pre-message subjective feelings of hope using only participants exposed to the strong or weak hope appeals. In addition, I examined the effect of the total amount of subjective

hope (i.e., not controlling for pre-message subjective feelings of hope) on message attention via a bivariate Pearson's correlation using all participants.

For the climate change data, there was no significant partial relationship between post-message subjective feelings of hope and message attention while controlling for pre-message subjective feelings of hope: $r(187) = -.08, p = .283$. Similarly, there was no significant bivariate relationship using all participants: $r(289) = .02, p = .694$. The seasonal influenza data also showed no significant partial relationship between post-message subjective feelings of hope and message attention while controlling for pre-message subjective feelings of hope: $r(189) = .07, p = .364$. Similarly, there was no significant bivariate relationship using all participants for the seasonal influenza data: $r(287) = .10, p = .107$. Thus, neither the climate change nor the seasonal influenza data provided support for relationships between message attention and subjective feelings of hope or between message attention and changes in subjective feelings of hope after exposure to a message. The data did not support hypothesis three.

Hypothesis 4

The fourth hypothesis predicts that subjective feelings of hope felt in response to a hope appeal are positively related to interest in the topic of the message. To test this hypothesis, I examined the partial correlation between post-message subjective feelings of hope and interest while controlling for pre-message subjective feelings of hope using only participants exposed to the strong or weak hope appeals. In addition, I examined the effect of the total amount of

subjective hope (i.e., not controlling for pre-message subjective feelings of hope) on interest in the message topic via a bivariate Pearson's correlation.²³

For the climate change data, there was no significant partial relationship between post-message subjective feelings of hope and interest while controlling for pre-message subjective feelings of hope: $r(187) = .09$, $p = .231$. Thus, the climate change data did not provide support for a relationship between interest in learning about climate protection and the change in subjective feelings of hope after exposure to a hope appeal. However, there was a significant bivariate relationship: $r(190) = .16$, $p = .024$, indicating support for a relationship between the total amount of subjective feelings of hope and interest in learning about ways to protect the climate.

For the seasonal influenza data, there was a significant partial relationship between post-message subjective feelings of hope and interest while controlling for pre-message subjective feelings of hope: $r(189) = .23$, $p = .001$. The relationship indicates that changes in subjective feelings of hope after reading a message are associated with more interest in learning about ways to prevent seasonal influenza. In addition, there was a significant bivariate relationship between post-message subjective feelings of hope and interest in learning about seasonal influenza: $r(192) = .29$, $p < .0005$. As with the climate change data, this relationship indicates that the total amount of subjective feelings of hope is related to interest in the message topic.

²³ Unlike the analyses for hypothesis 3, the analyses for hypotheses 4-6 use only participants exposed to either the strong or weak hope appeal. This is because hypotheses 4-6 have dependent variables that are specific to the message topic. For example, it would not be reasonable to assume that subjective feelings of hope evoked from a message about *job interviewing* would affect interest in learning about *climate protection*. Whereas it is justifiable to test if subjective feelings of hope evoked in response to a message about job interviewing affect attention to that message (hypothesis 3).

Thus, both the climate change and the seasonal influenza data provided support for a relationship between the total amount of subjective feelings of hope and interest in learning about the message topic. However, only the seasonal influenza data provided support for a relationship between changes in subjective feelings of hope after exposure to a hope appeal and interest in learning about the message topic. The data partially supported hypothesis four.

Hypothesis 5

The fifth hypothesis predicts that subjective feelings of hope felt in response to a hope appeal are positively related to behavioral intentions. To test this hypothesis, I examined the partial correlation between post-message subjective feelings of hope and behavioral intentions while controlling for pre-message subjective feelings of hope using only participants exposed to the strong or weak hope appeals. In addition, I examined the effect of the total amount of subjective hope (i.e., not controlling for pre-message subjective feelings of hope) on behavioral intentions via a bivariate Pearson's correlation.

For the climate change data, there was no significant partial relationship between post-message subjective feelings of hope and behavioral intentions while controlling for pre-message subjective feelings of hope: $r(187) = .10, p = .189$. Similarly, there was no significant bivariate relationship: $r(190) = .10, p = .159$. Thus, the climate change data did not provide support for relationships between behavioral intentions and subjective feelings of hope or between behavioral intentions and changes in subjective feelings of hope after exposure to a message.

For the seasonal influenza data, there was a significant partial relationship between post-message subjective feelings of hope and behavioral intentions while controlling for pre-message subjective feelings of hope: $r(188) = .18, p = .015$. The relationship indicates that increases in subjective feelings of hope after reading a hope appeal are associated with greater intentions to perform seasonal influenza prevention behaviors. In addition, there was a significant bivariate

relationship between post-message subjective feelings of hope and behavioral intentions: $r(192) = .29, p < .0005$. This relationship indicates that the total amount of subjective feelings of hope is related to behavioral intentions. Thus, the seasonal influenza data provided support for relationships between behavioral intentions and subjective feelings of hope and between behavioral intentions and changes in subjective feelings of hope after exposure to a message.

Thus, the seasonal influenza data provided support for a relationship between changes in subjective feelings of hope after exposure to a hope appeal and behavior intentions. The climate change data did not provide support for this relationship. Similarly, the seasonal influenza data provided support for a relationship between the total amount of subjective feelings of hope and behavioral intentions. Again, the climate change data did not provide support for this relationship. Thus, the data partially supported hypothesis five.

Hypothesis 6

The sixth hypothesis predicts that subjective feelings of hope felt in response to a hope appeal are positively related to attitudes toward the behaviors. To test this hypothesis, I examined the partial correlation between post-message subjective feelings of hope and attitudes toward the behaviors while controlling for pre-message subjective feelings of hope using only participants exposed to the strong or weak hope appeals. In addition, I examined the effect of the total amount of subjective hope (i.e., not controlling for pre-message subjective feelings of hope) on attitudes toward the behaviors via a bivariate Pearson's correlation.

For the climate change data, there was no significant partial relationship between post-message subjective feelings of hope and attitudes toward the behaviors while controlling for pre-message subjective feelings of hope: $r(187) = -.003, p = .967$. Similarly, there was no significant bivariate relationship: $r(190) = .02, p = .812$. The seasonal influenza data showed no significant partial relationship between post-message subjective feelings of hope and attitudes toward the

behaviors while controlling for pre-message subjective feelings of hope: $r(189) = .09, p = .233$. Similarly, there was no significant bivariate relationship: $r(192) = .06, p = .427$. These results indicate that attitudes toward seasonal influenza prevention behaviors are unrelated to either changes in subjective feelings of hope after reading a hope appeal or the total amount of subjective feelings of hope. In summary, neither the climate change nor the seasonal influenza data provided support for relationships between attitudes toward the behaviors and subjective feelings of hope or between message attention and changes in subjective feelings of hope after exposure to a message. The data did not support hypothesis six.

Hypothesis 7

The seventh hypothesis predicts that the strong hope appeal leads to more post-message and follow-up subjective feelings of hope than does the weak hope appeal or attention control conditions when controlling for pre-message subjective feelings of hope and perceptions of message clarity. For each topic, I conducted two one-way between-groups analyses of covariance to assess the effects of the manipulated messages (strong hope appeal, weak hope appeal, and attention control) on subjective feelings of hope. The first ANCOVA assessed message effects on post-message subjective feelings of hope using only participants in the strong and weak hope appeal conditions, whereas the second ANCOVA assessed effects on follow-up subjective feelings of hope using all participants. For both ANCOVAs, the independent variable was the message manipulations and the covariates were participants' scores on the pre-message subjective feelings of hope and perceived message clarity scales. For the first ANCOVA, the dependent variable was the scores on the subjective feelings of hope scale administered after participants read the message. For the second ANCOVA, the dependent variable was the score on the subjective feelings of hope scale administered in the follow-up survey. I conducted preliminary checks to ensure that there were no violations of the assumptions of normality, linearity,

homogeneity of variances, homogeneity of regression slopes, or reliable measurement of the covariate. Except as noted, the results of this examination were satisfactory.

Climate change. For the post-message data, the covariate perceived message clarity violated the assumption of homogeneity of regression slopes; therefore, I removed the covariate from this analysis.²⁴ In addition, the data violated the homogeneity of variance assumption; therefore, I adjusted the significance level to $p < .025$ to create a more stringent test per the recommendation of Tabachnick and Fidell (2007). After adjusting for pre-message subjective feelings of hope, the message manipulation had a significant main effect on post-message subjective feelings of hope: $F(2, 285) = 16.96, p < .0005$, partial $\eta^2 = .11$. The adjusted means indicate that people in the strong hope appeal ($M = 2.38, SE = .09$) and attention control ($M = 2.31, SE = .09$) conditions experienced greater subjective feelings of hope in response to the message that they read than did people in the weak hope appeal condition ($M = 1.74, SE = .09$). The covariate pre-message subjective feelings of hope had a significant effect on post-message subjective feelings of hope after adjusting for message effects: $F(1, 285) = 75.33, p < .0005$, partial $\eta^2 = .21$. Table 5.21 includes the means and standard deviations for pre- and post-message subjective feelings of hope by message condition.

After adjusting for pre-message subjective feelings of hope and assessments of message clarity, the message manipulation did not have a significant main effect on follow-up subjective feelings of hope: $F(2, 284) = 1.72, p = .181$, partial $\eta^2 = .01$. The covariate pre-message subjective feelings of hope had a significant effect on follow-up subjective feelings of hope after adjusting for perceptions of message clarity and message effects: $F(1, 284) = 95.57, p < .0005$, partial $\eta^2 = .25$. However, the covariate perceived message clarity did not provide a statistically

²⁴ The results with the covariate in the model are no different from the results with the covariate removed.

significant unique adjustment: $F(1, 284) = 1.16, p = .282$, partial $\eta^2 = .004$. Thus, the post-message and follow-up climate change data provided partial support for hypothesis seven. Table 5.21 includes the means and standard deviations for pre- message and follow-up subjective feelings of hope and assessments of message clarity by message condition.

Table 5.21: Study 2 Climate Change Data Means and Standard Deviations for Perceived Message Clarity and Subjective Feelings of Hope by Message Condition

Condition	<i>n</i>	Message Clarity	Subjective Feelings of Hope		
			Pre-Message	Post-Message	Follow-Up
Strong	95	4.27 (0.64)	1.94 (0.84)	2.36 (1.01)**	2.26 (0.97)
Weak	95	3.84 (0.81)	2.05 (0.98)	1.73 (0.96)	2.10 (0.99)
Control	99	4.22 (0.82)	2.01 (0.84)	2.32 (1.02)	2.33 (1.04)

Note. ** = message conditions significantly differ at $p < .01$

Seasonal influenza. The post-message data violated the assumption of equality of error variances; therefore, I adjusted the significance level to $p < .025$ to create a more stringent test (Tabachnick & Fidell, 2007). After adjusting for pre-message subjective feelings of hope and assessments of message clarity, the message condition had a significant main effect on post-message subjective feelings of hope: $F(2, 282) = 11.02, p < .0005$, partial $\eta^2 = .07$. The adjusted means indicate that people in the attention control condition ($M = 2.17, SE = .08$) conditions experienced greater subjective feelings of hope in response to the message that they read than did people in the weak hope appeal ($M = 1.73, SE = .08$) or strong hope appeal ($M = 1.67, SE = .08$) conditions. The covariate pre-message subjective feelings of hope had a significant effect on post-message subjective feelings of hope after adjusting for perceptions of message clarity and

message effects: $F(1, 282) = 57.81, p < .0005$, partial $\eta^2 = .17$. The covariate perceived message clarity also provided a statistically significant unique adjustment: $F(1, 282) = 7.38, p = .007$, partial $\eta^2 = .03$. Table 5.22 includes the means and standard deviations for pre- and post-message subjective feelings of hope and assessments of message clarity by message condition.

After adjusting for pre-message subjective feelings of hope and assessments of message clarity, the message condition did not have a significant main effect on follow-up subjective feelings of hope: $F(2, 282) = 0.48, p = .62$, partial $\eta^2 = .003$. The covariate pre-message subjective feelings of hope had a significant effect on follow-up subjective feelings of hope after adjusting for perceptions of message clarity and message effects: $F(1, 282) = 95.90, p < .0005$, partial $\eta^2 = .25$. The covariate perceived message clarity also provided a statistically significant unique adjustment: $F(1, 282) = 4.28, p = .040$, partial $\eta^2 = .02$. Thus, the post-message and follow-up seasonal influenza data provided partial support for hypothesis seven. Table 5.22 includes the means and standard deviations for pre- message and follow-up subjective feelings of hope and assessments of message clarity by message condition.

Table 5.22: Study 2 Seasonal Influenza Data Means and Standard Deviations for Perceived Message Clarity and Subjective Feelings of Hope by Message Condition

Condition	<i>n</i>	Message Clarity	Subjective Feelings of Hope		
			Pre-Message	Post-Message	Follow-Up
Strong	94	4.57 (0.49)	1.51 (0.62)	1.72 (0.75)	1.56 (0.71)
Weak	98	4.11 (0.87)	1.47 (0.67)	1.67 (0.77)	1.50 (0.77)
Control	95	4.30 (0.80)	1.55 (0.76)	2.19 (1.08)**	1.61 (0.84)

Note. ** = message conditions significantly differ at $p < .01$

In summary, the post-message climate change data provided support for the hypothesis that the strong hope appeal leads to more post-message hope than does the weak hope appeal. However, the seasonal influenza data did not support this hypothesis. In addition, neither the climate change nor seasonal influenza data supported the hypothesis that the strong hope appeal leads to more post-message hope than does the attention control message. Similarly, neither the climate change nor the seasonal influenza data supported the hypothesis that the strong hope appeal leads to more follow-up hope than does the weak hope appeal or attention control. Thus, the data only provided partial support for hypothesis seven.

Research Question 2

The second²⁵ research question asks if the manipulated message conditions result in different subjective feelings. I planned to perform a multivariate analysis of covariance (MANCOVA) to assess the effects of the manipulated messages on the post-message subjective feelings of fear, guilt, sadness, happiness, and anger. However, preliminary analysis indicated that the data violated the assumption of homogeneity of variance-covariance matrices, which is an essential assumption for MANCOVA. Therefore, for each subjective feeling, I conducted a one-way between-groups analysis of covariance (ANCOVA) to assess the effects of the messages (strong hope appeal, weak hope appeal, and attention control) on the post-message subjective feeling. Perceived message clarity was the covariate in each analysis. I used a Bonferroni correction (.05/5) to set the significance level at $p < .01$. For each of the ANCOVAs, I conducted preliminary checks to ensure that there were no violations of the assumptions of normality,

²⁵ The numbering of research questions skips research question one because this question is addressed exclusively in Study 1.

linearity, homogeneity of variances, homogeneity of regression slopes, or reliable measurement of the covariate. The results of this examination were satisfactory, except as noted below.

Climate Change

Fear. After adjusting for pre-message subjective feelings of fear and assessments of message clarity, the message condition did not have a significant main effect on post-message subjective feelings of fear: $F(2, 284) = 0.50, p = .610$, partial $\eta^2 = .003$. The covariate pre-message subjective feelings of fear had a significant effect on post-message subjective feelings of fear after adjusting for perceptions of message clarity and message effects: $F(1, 284) = 158.13, p < .0005$, partial $\eta^2 = .36$. However, the covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 284) = 0.40, p = .529$, partial $\eta^2 = .001$. Table 5.23 includes the means and standard deviations for pre- and post-message subjective feelings of fear and assessments of message clarity by message condition.

After adjusting for pre-message subjective feelings of fear and assessments of message clarity, the message condition did not have a significant main effect on follow-up subjective feelings of fear: $F(2, 284) = 1.67, p = .190$, partial $\eta^2 = .01$. The covariate pre-message subjective feelings of fear had a significant effect on follow-up subjective feelings of fear after adjusting for perceptions of message clarity and message effects: $F(1, 284) = 187.67, p < .0005$, partial $\eta^2 = .40$. However, the covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 284) = 1.44, p = .231$, partial $\eta^2 = .005$. Table 5.23 includes the means and standard deviations for pre- message, post-message, and follow-up subjective feelings of fear and assessments of message clarity by message condition.

Table 5.23: Study 2 Climate Change Data Means and Standard Deviations for Perceived Message Clarity and Subjective Feelings of Fear by Message Condition

Condition	<i>n</i>	Message Clarity	Subjective Feelings of Fear		
			Pre-Message	Post-Message	Follow-Up
Strong	95	4.27 (0.64)	2.27 (0.95)	1.91 (0.90)	2.30 (1.04)
Weak	95	3.84 (0.81)	2.35 (0.96)	2.00 (0.94)	2.29 (1.07)
Control	99	4.22 (0.82)	2.55 (1.01)	1.99 (0.98)	2.29 (1.03)

Note. No significant differences

Guilt. After adjusting for assessments of message clarity, the message condition had a significant main effect on post-message subjective feelings of guilt: $F(2, 285) = 8.23, p < .0005$, partial $\eta^2 = .06$. The adjusted means indicate that people in the strong hope appeal condition ($M = 2.17, SE = .09$) experienced greater subjective feelings of guilt in response to the message that they read than did people in the weak hope appeal condition ($M = 1.87, SE = .10$). The marginal means also indicated that participants in both the strong hope appeal and weak hope appeal conditions experienced more guilt than those in the attention control condition ($M = 1.64, SE = .09$). The covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 285) = 3.28, p = .071$, partial $\eta^2 = .01$. Table 5.24 includes the means and standard deviations for post-message subjective feelings of guilt and perceptions of message clarity by message condition.

Sadness. After adjusting for assessments of message clarity, the message condition had a significant main effect on post-message subjective feelings of sadness: $F(2, 285) = 4.74, p = .009$, partial $\eta^2 = .03$. The adjusted means indicated that people in the weak hope appeal ($M = 1.94, SE = .09$) experienced somewhat greater subjective feelings of sadness in response to the message than did people in the strong hope appeal condition ($M = 1.84, SE = .09$). The marginal means

also indicated that participants in both the strong and weak hope appeal conditions experienced more sadness than those in the attention control condition ($M = 1.57, SE = .09$). The covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 285) = 2.28, p = .132$, partial $\eta^2 = .01$. Table 5.24 includes the means and standard deviations for post-message subjective feelings of sadness and perceptions of message clarity by message condition.

Happiness. After adjusting for assessments of message clarity, with the more stringent significance level, the message condition did not have a significant main effect on post-message subjective feelings of happiness: $F(2, 285) = 4.25, p = .015$, partial $\eta^2 = .03$. Although this finding was not significant, the adjusted means indicate that people in the attention control condition ($M = 1.90, SE = .09$) experienced somewhat greater subjective feelings of happiness in response to the message that they read than did people in the strong hope appeal condition ($M = 1.78, SE = .09$). The marginal means also indicated that participants in both the attention control and strong hope appeal conditions experienced more happiness than those in the weak hope appeal condition ($M = 1.54, SE = .09$). The covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 285) = 0.11, p = .746$, partial $\eta^2 < .0005$. Table 5.24 includes the means and standard deviations for post-message subjective feelings of happiness and perceptions of message clarity by message condition.

Anger. After adjusting for assessments of message clarity, the message condition had a significant main effect on post-message subjective feelings of anger: $F(2, 285) = 7.40, p = .001$, partial $\eta^2 = .05$. The adjusted means indicate that people in the weak hope appeal condition ($M = 2.51, SE = .11$) experienced greater subjective feelings of anger in response to the message than did people in the strong hope appeal condition ($M = 2.16, SE = .10$). The marginal means also indicated that participants in both the weak and strong hope appeal conditions experienced more anger than those in the attention control condition ($M = 1.95, SE = .10$). The covariate perceived message clarity provided a statistically significant unique adjustment: $F(1, 285) = 9.40, p = .002$,

partial $\eta^2 = .032$. Table 5.24 includes the means and standard deviations for post-message subjective feelings of anger and perceptions of message clarity by message condition.

Table 5.24: Study 2 Climate Change Data Means and Standard Deviations for Perceived Message Clarity and Post-Message Subjective Feelings by Message Condition

Cond	<i>n</i>	Message				
		Clarity	Guilt	Sadness	Happiness	Anger
Strong	95	4.27 (0.64)	2.14 (0.94) ^{**}	1.83 (0.88)	1.78 (0.83)	2.12 (0.95)
Weak	95	3.84 (0.81)	1.91 (0.89)	1.97 (0.97) ^{**}	1.53 (0.86)	2.58 (1.15) ^{**}
Control	99	4.22 (0.82)	1.62 (0.90)	1.56 (0.75)	1.91 (0.87)	1.92 (0.95)

Note. Cond = Message condition, ^{**} = message conditions significantly differ at $p < .01$

Seasonal Influenza

Fear. After adjusting for pre-message subjective feelings of fear and assessments of message clarity, the message condition did not have a significant main effect on post-message subjective feelings of fear: $F(2, 282) = 2.11, p = .123$, partial $\eta^2 = .02$. The covariate pre-message subjective feelings of fear had a significant effect on post-message subjective feelings of fear after adjusting for perceptions of message clarity and message effects: $F(1, 282) = 120.22, p < .0005$, partial $\eta^2 = .30$. Using the Bonferroni corrected significance level of $p < .01$, the covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 282) = 4.28, p = .039$, partial $\eta^2 = .02$. Table 5.25 includes the means and standard deviations for pre- and post-message subjective feelings of fear and assessments of message clarity by message condition.

After adjusting for pre-message subjective feelings of fear and assessments of message clarity, with the more stringent significance level, the message condition did not have a significant main effect on follow-up subjective feelings of fear: $F(2, 282) = 4.51, p = .012$, partial $\eta^2 = .03$. The adjusted means indicate that participants in the weak hope appeal condition felt less fear in response to the message that they read ($M = 1.70, SE = .07$) than did participants in the strong hope appeal ($M = 1.95, SE = .07$) and attention control ($M = 1.97, SE = .07$) conditions. The covariate pre-message subjective feelings of fear had a significant effect on follow-up subjective feelings of fear after adjusting for perceptions of message clarity and message effects: $F(1, 282) = 79.72, p < .0005$, partial $\eta^2 = .38$. The covariate perceived message clarity also provided a statistically significant unique adjustment: $F(1, 282) = 6.74, p = .010$, partial $\eta^2 = .02$. Table 5.25 includes the means and standard deviations for pre- message, post-message, and follow-up subjective feelings of fear and assessments of message clarity by message condition.

Table 5.25: Study 2 Seasonal Influenza Data Means and Standard Deviations for Perceived Message Clarity and Subjective Feelings of Fear by Message Condition

Condition	<i>n</i>	Message Clarity	Subjective Feelings of Fear		
			Pre-Message	Post-Message	Follow-Up
Strong	94	4.57 (0.49)	2.02 (0.83)	1.77 (0.86)	1.94 (0.80)
Weak	98	4.11 (0.87)	2.01 (0.93)	1.64 (0.88)	1.75 (0.86)
Control	95	4.30 (0.80)	1.91 (0.91)	1.77 (0.88)	1.93 (0.95)

Guilt. After adjusting for assessments of message clarity, the message condition did not have a significant main effect on post-message subjective feelings of guilt: $F(2, 283) = 0.96, p = .385$, partial $\eta^2 = .007$. The covariate perceived message clarity provided a statistically significant

unique adjustment: $F(1, 283) = 11.12, p = .001$, partial $\eta^2 = .04$. Table 5.26 includes the means and standard deviations for post-message subjective feelings of guilt and perceptions of message clarity by message condition.

Sadness. After adjusting for assessments of message clarity, the message condition did not have a significant main effect on post-message subjective feelings of sadness: $F(2, 283) = 0.46, p = .630$, partial $\eta^2 = .003$. The covariate perceived message clarity provided a statistically significant unique adjustment: $F(1, 283) = 10.83, p = .001$, partial $\eta^2 = .04$. Table 5.26 includes the means and standard deviations for post-message subjective feelings of sadness and perceptions of message clarity by message condition.

Happiness. After adjusting for assessments of message clarity, the message condition had a significant main effect on post-message subjective feelings of happiness: $F(2, 283) = 7.04, p = .001$, partial $\eta^2 = .05$. The adjusted means indicate that people in the attention control condition ($M = 1.77, SE = .07$) experienced somewhat greater subjective feelings of happiness in response to the message that they read than did people in the strong hope appeal condition ($M = 1.42, SE = .08$) or the weak hope appeal condition ($M = 1.46, SE = .07$). The covariate perceived message clarity did not provide a statistically significant unique adjustment: $F(1, 283) = 0.21, p = .644$, partial $\eta^2 = .001$. Table 5.26 includes the means and standard deviations for post-message subjective feelings of happiness and perceptions of message clarity by message condition.

Anger. After adjusting for assessments of message clarity and using the more stringent significance level, the message condition did not have a significant main effect on post-message subjective feelings of anger: $F(2, 283) = 4.20, p = .016$, partial $\eta^2 = .03$. Although the finding is not significant, the adjusted means indicate that people in the strong hope appeal ($M = 2.04, SE = .09$) and weak hope appeal ($M = 1.96, SE = .09$) conditions experienced somewhat greater subjective feelings of anger in response to the message than did people in the attention control condition ($M = 1.69, SE = .09$). The covariate perceived message clarity provided a statistically

significant unique adjustment: $F(1, 283) = 22.72$ $p < .0005$, partial $\eta^2 = .07$. Table 5.26 includes the means and standard deviations for post-message subjective feelings of anger and perceptions of message clarity by message condition.

Table 5.26: Study 2 Seasonal Influenza Data Means and Standard Deviations for Perceived Message Clarity and Post-Message Subjective Feelings by Message Condition

Condition	<i>n</i>	Message				
		Clarity	Guilt	Sadness	Happiness	Anger
Strong	94	4.57 (0.49)	1.39 (0.60)	1.45 (0.69)	1.43 (0.58)	1.96 (0.87)
Weak	98	4.11 (0.87)	1.34 (0.59)	1.44 (0.70)	1.45 (0.66)	2.03 (0.98)
Control	95	4.30 (0.80)	1.37 (0.65)	1.45 (0.72)	1.77 (0.87)**	1.69 (0.89)

Note. ** = message conditions significantly differ at $p < .01$

In summary, the analyses show that participants felt different subjective feelings in response to the message manipulations (strong hope appeal, weak hope appeal, and attention control). Specifically, the climate change data indicated that participants in the strong hope appeal condition experienced more guilt than did people in the low hope appeal condition. The data also indicated that people in both the strong and weak hope appeal conditions felt more guilt than did people in the attention control condition. However, the seasonal influenza data did not indicate any differences between the conditions in terms of post-message subjective feelings of guilt. The climate change data indicated that people in the weak hope appeal condition experienced more sadness than did people in the strong hope appeal condition. The data also indicated that people in the weak and strong hope appeal conditions felt more sadness than did people in the control condition. However, the seasonal influenza data did not indicate any differences between the

conditions in terms of post-message subjective feelings of sadness. The climate change data did not indicate any differences between the conditions in terms of post-message subjective feelings of happiness. However, the seasonal influenza data indicated that people in the attention control condition experienced more happiness than did people in the strong or weak hope appeal conditions. The climate change data indicated that people in the weak hope appeal condition experienced more anger than did people in the strong hope appeal condition. The data also indicated that people in the weak and strong hope appeal conditions felt more anger than did people in the control condition. The seasonal influenza data did not indicate any differences between the conditions in terms of post-message subjective feelings of anger. Neither the climate change nor seasonal influenza data indicated differences between conditions in terms of post-message or follow-up subjective feelings of fear.

Hypothesis 8

The eighth hypothesis predicts that the strong hope appeal condition leads to higher post-message and follow-up appraisals of importance, goal congruence, positive future expectation, and possibility than do the weak hope appeal and attention control conditions. To test this hypothesis, I conducted four one-way multivariate analyses of covariance (MANCOVAs). For each analysis, the independent variable was the message condition (strong hope appeal, weak hope appeal, attention control) and perceived message clarity was the covariate. For each data set (climate change and seasonal influenza), I conducted two MANCOVAs, first using the four post-message appraisals as the dependent variables and second using the four follow-up appraisals as the dependent variables. For each analysis, I conducted a preliminary evaluation to ensure that there were no violations of the assumptions of normality, linearity, or homogeneity of variance-covariance matrices as well as to ensure that there were no multivariate outliers or concerns about multicollinearity or singularity. The results of these evaluations were satisfactory.

Climate change. Using Wilks' Lambda, the combined post-message appraisals were not significantly affected by message condition while controlling for perceived message clarity: $F(8, 564) = 1.49, p = .157$, partial $\eta^2 = .01$. However, in examining the results for the appraisals separately, the only difference to reach statistical significance, using a Bonferroni adjusted alpha level of .013, was the appraisals of possibility: $F(2, 285) = 4.86, p = .008$, partial $\eta^2 = .03$. The adjusted mean scores indicated that participants in the strong hope appeal condition experienced greater post-message appraisals of possibility ($M = 3.85, SE = .06$) than did participants in the weak hope appeal ($M = 3.60, SE = .06$) or attention control ($M = 3.65, SE = .06$) conditions. Thus, the post-message climate change data provided partial support for hypothesis eight. Table 5.27 provides the means and standard deviations for perceived message clarity and the post-message appraisals.

Table 5.27: Study 2 Climate Change Data Means and Standard Deviations for Perceived Message Clarity and Post-Message Appraisals by Message Condition

Condition	<i>n</i>	Message Clarity	Importance Appraisal	Goal Congr Appraisal	Future Expect Appraisal	Possibility Appraisal
Strong	95	4.27 (0.64)	3.94 (0.65)	2.95 (0.88)	3.42 (0.66)	3.86 (0.54)**
Weak	95	3.84 (0.81)	3.87 (0.60)	2.95 (0.79)	3.28 (0.72)	3.58 (0.69)
Control	99	4.22 (0.82)	3.96 (0.60)	3.03 (0.82)	3.37 (0.74)	3.66 (0.49)

Note. ** = message had a significant effect, $p < .01$

Using Wilks' Lambda, the combined follow-up appraisals were not significantly affected by message condition while controlling for perceived message clarity: $F(8, 562) = 1.49, p = .157$, partial $\eta^2 = .01$. An examination of the results for the appraisals separately also revealed no

significant differences between the message conditions. Thus, the follow-up climate change data did not provide support for hypothesis eight. Table 5.28 provides the means and standard deviations for perceived message clarity and the follow-up appraisals.

Table 5.28: Study 2 Climate Change Data Means and Standard Deviations for Perceived Message Clarity and Follow-Up Appraisals by Message Condition

Condition	<i>n</i>	Message	Importance	Goal Congr	Future Expect	Possibility
		Clarity	Appraisal	Appraisal	Appraisal	Appraisal
Strong	95	4.27 (0.64)	3.85 (0.68)	3.07 (0.90)	3.47 (0.68)	3.71 (0.56)
Weak	95	3.84 (0.81)	3.87 (0.69)	3.03 (0.80)	3.27 (0.78)	3.62 (0.62)
Control	99	4.22 (0.82)	3.99 (0.66)	3.16 (0.74)	3.48 (0.73)	3.75 (0.54)

Note. There were no significant differences.

Seasonal influenza. Using Wilks' Lambda, the combined post-message appraisals were significantly affected by message condition while controlling for perceived message clarity: $F(8, 558) = 5.78, p < .0005$, partial $\eta^2 = .08$. In examining the results for the appraisals separately using a Bonferroni adjusted alpha level of .013, the differences for all of the appraisals reached statistical significance.

Message condition had a significant effect on post-message appraisals of importance while controlling for perceived message clarity: $F(2, 282) = 6.77, p = .001$, partial $\eta^2 = .05$. The adjusted means indicated that participants in the strong hope appeal condition experienced greater post-message appraisals of importance ($M = 3.83, SE = .08$) than did participants in the weak hope appeal ($M = 3.42, SE = .08$) or attention control ($M = 3.64, SE = .08$) conditions.

Message condition also had a significant effect on post-message appraisals of goal congruence while controlling for perceived message clarity: $F(2, 282) = 5.79, p = .003$, partial $\eta^2 = .04$. The adjusted means indicated that participants in the strong hope appeal condition experienced greater post-message appraisals of goal congruence ($M = 3.17, SE = .10$) than did participants in the weak hope appeal ($M = 2.73, SE = .10$) or attention control ($M = 2.80, SE = .09$) conditions.

In addition, message condition had a significant effect on post-message appraisals of future expectation while controlling for perceived message clarity: $F(2, 282) = 13.61, p < .0005$, partial $\eta^2 = .09$. The adjusted means indicated that participants in the strong hope appeal condition experienced greater post-message appraisals of future expectation ($M = 3.01, SE = .08$) than did participants in the weak hope appeal ($M = 2.40, SE = .08$) or attention control ($M = 2.76, SE = .08$) conditions.

Finally, message condition had a significant effect on post-message appraisals of possibility while controlling for perceived message clarity: $F(2, 282) = 14.33, p < .0005$, partial $\eta^2 = .09$. The adjusted means indicated that participants in the strong hope appeal condition experienced greater post-message appraisals of possibility ($M = 3.72, SE = .09$) than did participants in the weak hope appeal ($M = 3.11, SE = .08$) or attention control ($M = 3.42, SE = .08$) conditions.

Thus, the post-message seasonal influenza data provided complete support for hypothesis eight. Table 5.29 provides the means and standard deviations for perceived message clarity and the post-message appraisals.

Table 5.29: Study 2 Seasonal Influenza Data Means and Standard Deviations for Perceived Message Clarity and Post-Message Appraisals by Message Condition

		Message	Importance	Goal Congr	Future Expect	Possibility
Cond	<i>n</i>	Clarity	Appraisal	Appraisal	Appraisal	Appraisal
Strong	94	4.57 (0.49)	3.85 (0.69)**	3.16 (0.93)**	2.98 (0.77)**	3.73 (0.90)**
Weak	98	4.11 (0.87)	3.41 (0.82)	2.73 (0.93)	2.43 (0.82)	3.10 (0.87)
Control	95	4.30 (0.80)	3.64 (0.72)	2.80 (0.89)	2.76 (0.77)	3.59 (0.65)

Note. Cond = Message condition, ** = message had a significant effect, $p < .01$

Using Wilks' Lambda, the combined follow-up appraisals were significantly affected by message condition while controlling for perceived message clarity: $F(8, 556) = 3.37, p = .001$, partial $\eta^2 = .05$. In examining the results for the appraisals separately using a Bonferroni adjusted alpha level of .013, the differences for appraisals of future expectation and possibility reached statistical significance. However, message condition did not have a significant effect on appraisals of importance: $F(2, 281) = 2.58, p = .078$, partial $\eta^2 = .02$ or goal congruence: $F(2, 281) = 2.48, p = .051$, partial $\eta^2 = .02$, while controlling for perceived message clarity.

Message condition had a significant effect on follow-up appraisals of future expectation while controlling for perceived message clarity: $F(2, 281) = 8.97, p < .0005$, partial $\eta^2 = .06$. The adjusted means indicated that participants in the strong hope appeal condition experienced greater follow-up appraisals of future expectation ($M = 3.14, SE = .08$) than did participants in the weak hope appeal ($M = 2.63, SE = .08$) or attention control ($M = 2.88, SE = .08$) conditions.

Message condition also had a significant effect on follow-up appraisals of possibility while controlling for perceived message clarity: $F(2, 281) = 7.72, p = .001$, partial $\eta^2 = .05$. The adjusted means indicated that participants in the strong hope appeal condition experienced greater

follow-up appraisals of possibility ($M = 3.63$, $SE = .08$) than did participants in the weak hope appeal ($M = 3.20$, $SE = .08$) or attention control ($M = 3.56$, $SE = .08$) conditions.

Thus, the follow-up seasonal influenza data provided partial support for hypothesis eight. Table 5.30 provides the means and standard deviations for perceived message clarity and the follow-up appraisals.

Table 5.30: Study 2 Seasonal Influenza Data Means and Standard Deviations for Perceived Message Clarity and Follow-Up Appraisals by Message Condition

Condition	<i>n</i>	Message	Importance	Goal Congr	Future Expect	Possibility
		Clarity	Appraisal	Appraisal	Appraisal	Appraisal
Strong	94	4.57 (0.49)	3.71 (0.68)	3.30 (0.95)	3.12 (0.77)**	3.64 (0.75)**
Weak	98	4.11 (0.87)	3.43 (0.81)	2.97 (0.95)	2.66 (0.85)	3.18 (0.90)
Control	95	4.30 (0.80)	3.56 (0.69)	3.08 (0.82)	2.88 (0.77)	3.55 (0.68)

Note. ** = message had a significant effect, $p < .01$

In summary, the climate change and seasonal influenza data provided partial support for hypothesis eight. Both the climate change and seasonal influenza data supported the hypothesis that the strong hope appeal condition leads to higher post-message appraisals of possibility than do the weak hope appeal and attention control conditions. However, only the seasonal influenza data provided support for the hypothesis that the strong hope appeal condition leads to higher post-message appraisals of importance, goal congruence, and future expectation. Similarly, only the seasonal influenza data provided support for the hypothesis that the strong hope appeal condition leads to higher follow-up appraisals of future expectation and possibility than do the weak hope appeal and attention control conditions. However, neither the climate change nor

seasonal influenza data provided support for the hypothesis that the strong hope appeal condition leads to higher follow-up appraisals of importance and goal congruence than do the other message conditions. Thus, the data partially supported hypothesis eight.

Hypotheses 9, 10 and 11

The ninth hypothesis predicts that the strong hope appeal condition leads to more positive attitudes toward the behaviors at post-message and follow-up than do the weak hope appeal and attention control conditions. Because the strong and weak hope appeals contained the same behavior portion of the message, the self-efficacy and responses efficacy statements were the same in both conditions. Thus, the tenth hypothesis predicts that the strong and weak hope appeals lead to greater perceived self-efficacy and perceived response efficacy at post-message and follow-up than the attention control condition. The eleventh hypothesis predicts that the strong hope appeal leads to greater behavioral intentions at post-message and follow-up than do the weak hope appeal and attention control conditions.

To test these hypotheses, I conducted four one-way multivariate analyses of covariance (MANCOVAs). For each analysis, the independent variable was the message condition (strong hope appeal, weak hope appeal, attention control) and perceived message clarity was the covariate. For each data set (climate change and seasonal influenza), I conducted two MANCOVAs. For the first MANCOVA, I used post-message attitudes toward the behaviors, perceived self-efficacy, perceived response efficacy, and behavioral intentions as the dependent variables. For the second MANCOVA, I used follow-up attitudes toward the behaviors, perceived self-efficacy, perceived response efficacy, and behavioral intentions as the dependent variables. For each analysis, I conducted a preliminary evaluation to ensure that there were no violations of the assumptions of normality, linearity, or homogeneity of variance-covariance matrices as well

as to ensure that there were no multivariate outliers or concerns about multicollinearity or singularity. The results of these evaluations were satisfactory.

Climate change. Using Wilks' Lambda, the combined dependent variables were significantly affected by message condition while controlling for perceived message clarity: $F(8, 562) = 2.35, p = .017$, partial $\eta^2 = .03$. However, in examining the results for the appraisals separately, no differences reached statistical significance, using a Bonferroni adjusted alpha level of .013. Thus, the post-message climate change data did not provide support for hypotheses 9, 10, and 11. Table 5.31 provides the means and standard deviations for post-message perceived message clarity, attitudes toward the behaviors, perceived self-efficacy, perceived response efficacy, and behavioral intentions.

Table 5.31: Study 2 Climate Change Data Means and Standard Deviations for Covariate Perceived Message Clarity and Post-Message Dependent Variables by Message Condition

Condition	<i>n</i>	Message		Self-	Response	Behavioral
		Clarity	Attitudes	Efficacy	Efficacy	Intentions
Strong	95	4.27 (0.64)	3.76 (0.61)	3.67 (0.64)	3.69 (0.75)	3.49 (0.82)
Weak	95	3.84 (0.81)	3.86 (0.63)	3.78 (0.62)	3.62 (0.86)	3.46 (0.88)
Control	99	4.22 (0.82)	3.96 (0.60)	3.67 (0.71)	3.78 (0.75)	3.35 (0.88)

Note. There were no significant differences.

Using Wilks' Lambda, the combined dependent variables were not significantly affected by message condition while controlling for perceived message clarity: $F(8, 564) = 1.16, p = .323$, partial $\eta^2 = .02$. An examination of the results for the dependent variables separately also revealed no significant differences between the message conditions. Thus, the follow-up climate change

data did not provide support for hypothesis 9, 10, or 11. Table 5.32 provides the means and standard deviations for perceived message clarity and follow-up attitudes toward the behaviors, perceived self-efficacy, perceived response efficacy, and behavioral intentions.

Table 5.32: Study 2 Climate Change Data Means and Standard Deviations for Covariate Perceived Message Clarity and Follow-Up Dependent Variables by Message Condition

Condition	<i>n</i>	Message		Self-	Response	Behavioral
		Clarity	Attitudes	Efficacy	Efficacy	Intentions
Strong	95	4.27 (0.64)	3.68 (0.64)	3.68 (0.67)	3.60 (0.75)	3.36 (0.85)
Weak	95	3.84 (0.81)	3.73 (0.70)	3.74 (0.65)	3.57 (0.84)	3.57 (0.86)
Control	99	4.22 (0.82)	3.78 (0.63)	3.66 (0.62)	3.67 (0.78)	3.35 (0.85)

Note. There were no significant differences.

Seasonal influenza. Using Wilks' Lambda, the combined post-message dependent variables were significantly affected by message condition while controlling for perceived message clarity: $F(8, 558) = 2.49, p = .012$, partial $\eta^2 = .03$. In examining the results for the dependent variables separately using a Bonferroni adjusted alpha level of .013, only the differences for post-message perceptions of response efficacy reached statistical significance. Message condition had a significant effect on post-message perceptions of response efficacy while controlling for perceived message clarity: $F(2, 282) = 5.23, p = .006$, partial $\eta^2 = .04$. The adjusted means indicated that participants in the strong hope appeal condition experienced greater post-message perceptions of response efficacy ($M = 4.18, SE = .07$) than did participants in the weak hope appeal ($M = 4.05, SE = .07$) or attention control ($M = 3.88, SE = .07$) conditions. Table 5.33 provides the means and standard deviations for perceived message clarity and post-message

attitudes toward the behaviors, perceived self-efficacy, perceived response efficacy, and behavioral intentions.

Table 5.33: Study 2 Seasonal Influenza Data Means and Standard Deviations for Covariate Perceived Message Clarity and Post-Message Dependent Variables by Message Condition

Condition	<i>n</i>	Message		Self-	Response	Behavioral
		Clarity	Attitudes	Efficacy	Efficacy	Intentions
Strong	94	4.57 (0.49)	4.19 (0.51)	4.10 (0.55)	4.21 (0.62) ^{**}	3.77 (0.65)
Weak	98	4.11 (0.87)	4.12 (0.55)	4.11 (0.60)	4.02 (0.68)	3.68 (0.72)
Control	95	4.30 (0.80)	4.00 (0.54)	4.01 (0.58)	3.87 (0.65)	3.54 (0.73)

Note. ^{**} = message had a significant effect, $p < .01$

Using Wilks' Lambda, the combined follow-up dependent variables were significantly affected by message condition while controlling for perceived message clarity: $F(8, 560) = 2.26$, $p = .022$, partial $\eta^2 = .03$. In examining the results for the dependent variables separately using a Bonferroni adjusted alpha level of .013, only the difference for follow-up perceptions of self-efficacy reached statistical significance. Message condition had a significant effect on follow-up perceptions of self-efficacy while controlling for perceived message clarity: $F(2, 283) = 6.41$, $p = .002$, partial $\eta^2 = .04$. Given that the strong and weak hope appeals had the same self-efficacy statements, I hypothesized no differences between the hope appeals, but greater self-efficacy for the hope appeals than the attention control. The adjusted means partially supported these hypotheses, indicating that participants in the weak hope appeal condition ($M = 4.18$, $SE = .06$) experienced greater follow-up perceptions of self-efficacy than did participants in the attention control condition ($M = 3.93$, $SE = .06$). However, participants in the strong hope appeal condition

($M = 3.94$, $SE = .06$) did not. Table 5.34 provides the means and standard deviations for perceived message clarity and follow-up attitudes toward the behaviors, perceived self-efficacy, perceived response efficacy, and behavioral intentions.

Table 5.34: Study 2 Seasonal Influenza Data Means and Standard Deviations for Covariate Perceived Message Clarity and Follow-Up Dependent Variables by Message Condition

Condition	<i>n</i>	Message			Response	Behavioral
		Clarity	Attitudes	Self-Efficacy	Efficacy	Intentions
Strong	94	4.57 (0.49)	3.98 (0.55)	4.01 (0.56)**	4.00 (0.60)	3.51 (0.67)
Weak	98	4.11 (0.87)	4.05 (0.60)	4.12 (0.54)	3.99 (0.64)	3.61 (0.75)
Control	95	4.30 (0.80)	3.86 (0.58)	3.92 (0.54)	3.88 (0.59)	3.36 (0.73)

Note. ** = message had a significant effect, $p < .01$

In summary, the data did not support hypothesis 9 or 11 and provided partial support for hypothesis 10. Neither the climate change nor seasonal influenza provided support for the hypothesis that the strong hope appeal condition leads to more positive attitudes toward the behaviors at post-message and follow-up than do the weak hope appeal and attention control conditions. Thus, the data did not support hypothesis 9. The post-message seasonal influenza data provided support for the hypothesis that strong and weak hope appeals lead to greater perceived response efficacy than the attention control condition, whereas the climate change data and the follow-up seasonal influenza data did not. The follow-up seasonal influenza data provided support for the hypothesis that strong and weak hope appeals lead to greater perceived self-efficacy than the attention control condition, whereas the climate change data and the post-message seasonal influenza data did not. Thus, the data partially supported hypothesis 10. Neither

the climate change nor seasonal influenza provided support for the hypothesis that the strong hope appeal condition leads to greater behavioral intentions at post-message and follow-up than do the weak hope appeal and attention control conditions. Thus, the data did not support hypothesis 11.

Research Question 4

The fourth²⁶ research question asks if post-message subjective feelings of hope along with type of hope appeal, current behavior, perceived barriers, attitudes toward the behaviors, perceived response efficacy, perceived self-efficacy, perceptions of severity and susceptibility, subjective knowledge, and environmental identity predict behavioral intention. I conducted a multiple regression analysis to answer this research question. For the regression, behavioral intention (measured post-message) was the dependent variable. Post-message subjective feelings of hope, the type of hope appeal (strong versus weak), environmental identity, post-message perceived barriers, attitudes toward the behaviors, perceived response efficacy, and perceived self-efficacy as well as current behavior, perceived severity, perceived susceptibility, and subjective knowledge (measured pre-message) were the independent variables. The analysis only includes participants exposed to the strong and weak hope appeals because the post-message subjective feelings of hope questions ask about hope experienced as a result of the message. Results of the evaluation of assumptions indicated that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity.

²⁶ The numbering of research questions skips research question three because this research question is addressed exclusively in Study 1.

Climate change. The R for regression ($R = .81$) was significantly different from zero, $F(11, 177) = 31.32, p < .0005$, with an R^2 value of .66. The R^2 value indicates that about two-thirds of the variability in behavioral intentions was predicted by post-message subjective feelings of hope along with hope appeals, current behavior, perceived barriers, attitudes toward the behaviors, perceived response efficacy, perceived self-efficacy, perceptions of severity and susceptibility, subjective knowledge, and environmental identity. The regression coefficients for perceived barriers, perceived response efficacy, perceived self-efficacy, current behavior, subjective knowledge, and environmental identity all significantly differed from zero, whereas the regression coefficients for post-message subjective feelings of hope, the message condition, attitudes toward the behaviors, and perceptions of severity and susceptibility did not. The size and direction of the relationships suggest that behavior intentions are greater among people with lower perceived barriers, higher perceptions of response efficacy, higher perceptions of self-efficacy, a greater index of current behaviors, lower subjective knowledge, and a more environmental identity. Table 5.35 presents the correlations among the independent and dependent variables. Table 5.36 presents the B and β weights, t statistics, and significant levels from the regression.

Table 5.35: Study 2 Climate Change Data Correlations among Post-Message Behavioral Intentions and Regression Independent Variables

	Beh					Resp	Self-				Subj
	Int	Msg	Hope	Barr	Attit	Effic	Effic	Beh	Susc	Sev	Knw
Msg	.02										
Hope	.10	.31**									
Barr	-.65**	.05	-.04								
Attit	.58**	-.08	.02	-.62**							
Resp											
Effic	.54**	.05	.22**	-.40**	.61**						
Self-											
Effic	.63**	-.09	.06	-.71**	.60**	.32**					
Beh	.56**	-.02	.06	-.42**	.36**	.19**	.39**				
Susc	.30**	-.17**	.16*	-.22**	.32**	.34**	.20**	.21**			
Sever	.25**	-.14*	.13*	-.28**	.37**	.30**	.26**	.12*	.60**		
Subj											
Knw	-.03	-.04	.10	-.01	.08	-.04	.03	.18**	.14*	.17**	
Ident	.44**	-.05	.14*	-.40**	.41**	.33**	.33**	.36**	.40**	.53**	.27**

Note. Message was coded as 1 = strong hope appeal, 0 = weak hope appeal, Beh Int = Behavioral

Intent, Msg = Message, Barr = Barriers, Attit = Attitudes toward the Behaviors, Resp Effic =

Response Efficacy, Self-Effic = Self-Efficacy, Beh = Behaviors, Susc = Perceived Susceptibility,

Sever = Perceived Severity, Subj Knw = Subjective Knowledge, Ident = Environmental Identity,

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

Table 5.36: Study 2 Climate Change Data Multiple Regression on Post-Message Behavior

Intentions

	B	β	<i>t</i>	<i>p</i>
Message Condition	.09	.06	1.15	.253
Post-Message Hope	-.02	-.03	-0.52	.603
Perceived Barriers	-.22 [*]	-.18 [*]	-2.54	.012
Attitudes toward the Behaviors	-.01	.00	-0.05	.959
Perceived Response Efficacy	.29 ^{**}	.28 ^{**}	4.66	< .0005
Perceived Self-Efficacy	.36 ^{**}	.27 ^{**}	4.06	< .0005
Pre-Message Behavior	.29 ^{**}	.31 ^{**}	6.01	< .0005
Perceived Susceptibility	.06	.06	0.95	.345
Perceived Severity	-.05	-.05	-0.74	.462
Subjective Knowledge	-.11 [*]	-.11 [*]	-2.42	.016
Environmental Identity	.15 [*]	.12 [*]	2.01	.046

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, ^{*} = $p < .05$,

^{**} = $p < .01$

Seasonal influenza. The *R* for regression ($R = .79$) was significantly different from zero, $F(11, 179) = 26.96$, $p < .0005$, with an R^2 value of .62. The R^2 indicates that about two-thirds of the variability in behavioral intentions was predicted by post-message subjective feelings of hope along with hope appeals, current behavior, perceived barriers, attitudes toward the behaviors, perceived response efficacy, perceived self-efficacy, perceptions of severity and susceptibility, subjective knowledge, and environmental identity. The regression coefficients for post-message subjective feelings of hope, attitudes toward the behaviors, current behavior, subjective

knowledge, and perceptions of severity and susceptibility all significantly differed from zero, whereas the regression coefficients for perceived barriers, the message conditions, perceived response efficacy, perceived self-efficacy, and environmental identity did not. The size and direction of the relationships suggest that behavior intentions are greater among people with greater subjective feelings of hope, more positive attitudes toward the behaviors, a greater index of current behaviors, higher perceptions of susceptibility, and higher perceptions of severity. Table 5.37 presents the correlations among the independent and dependent variables. Table 5.38 presents the B and β weights, t statistics, and significant levels from the regression.

In summary, the climate change and seasonal influenza data provided partial support for predictors tested in research question four. Both the climate change and seasonal influenza data supported current behavior and subjective knowledge as predictors of behavioral intentions. Only the climate change data supported perceived barriers, perceived response efficacy, perceived self-efficacy, and environmental identity as predictors of behavioral intentions. Only the seasonal influenza data supported post-message subjective feelings of hope, attitudes toward the behaviors, perceptions of severity, and perceptions of susceptibility as predictors of behavioral intention. Neither the climate change nor the seasonal influenza data supported type of hope appeal as a predictor for behavioral intentions.

Table 5.37: Study 2 Seasonal Influenza Data Correlations among Post-Message Behavioral Intentions and Regression Independent Variables

	Beh					Resp	Self-				Subj
	Int	Msg	Hope	Barr	Attit	Effic	Effic	Beh	Susc	Sev	Knw
Msg	.07										
Hope	.18**	.03									
Barr	-.53**	.02	.09								
Attit	.61**	.05	.06	-.64**							
Resp											
Effic	.59**	.15*	.06	-.53**	.68**						
Self-											
Effic	.46**	-.01	-.07	-.68**	.52**	.51**					
Beh	.60**	-.11	-.01	-.45**	.45**	.43**	.40**				
Susc	.28**	-.02	.17*	-.13*	.18**	.20**	.00	.10			
Sever	.40**	.01	.15*	-.19**	.23**	.32**	.15*	.22**	.21**		
Subj											
Knw	.12*	-.02	-.03	-.15*	.21**	.19**	.09	.16*	.08	.01	
Ident	.30**	.10	-.01	-.24**	.20**	.18**	.18**	.25**	.08	.16*	.15*

Note. Message was coded as 1 = strong hope appeal, 0 = weak hope appeal, Beh Int = Behavioral

Intent, Msg = Message, Barr = Barriers, Attit = Attitudes toward the Behaviors, Resp Effic =

Response Efficacy, Self-Effic = Self-Efficacy, Beh = Behaviors, Susc = Perceived Susceptibility,

Sever = Perceived Severity, Subj Knw = Subjective Knowledge, Ident = Environmental Identity,

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

Table 5.38: Study 2 Seasonal Influenza Data Multiple Regression on Post-Message Behavior

Intentions

	B	β	<i>t</i>	<i>p</i>
Message Condition	.09	.07	1.38	.170
Post-Message Hope	.12**	.13**	2.70	.008
Perceived Barriers	-.11	-.09	-1.24	.215
Attitudes toward the Behaviors	.27**	.21**	2.91	.004
Perceived Response Efficacy	.13	.12	1.75	.083
Perceived Self-Efficacy	.09	.08	1.17	.243
Pre-Message Behavior	.31**	.33**	5.98	.000
Perceived Susceptibility	.09*	.12*	2.38	.018
Perceived Severity	.18**	.16**	3.22	.002
Subjective Knowledge	-.04	-.04	-0.76	.446
Environmental Identity	.08	.09	1.76	.081

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

Hypothesis 12

The twelfth hypothesis predicts that subjective feelings of hope felt in response to a hope appeal and the appraisals evoked by a hope appeal are negatively related to subjective knowledge. I used a Pearson's correlation to test the association between the post-message subjective feelings of hope scale, the four post-message appraisals, and the subjective knowledge scale (also measured post-message).

For the climate change data, there was no significant relationship between post-message subjective feelings of hope and subjective knowledge, $r(190) = .10, p = .169$. There was a significant positive relationship between subjective knowledge and appraisals of goal congruence, $r(191) = .30, p < .0005$, indicating that greater subjective knowledge was associated with higher appraisals of goal congruence. There were no significant relationships between subjective knowledge and appraisals of importance, $r(191) = .12, p = .091$, future expectation, $r(191) = .08, p = .257$, or possibility, $r(191) = .07, p = .359$.

For the seasonal influenza data, there was also no significant relationship between post-message subjective feelings of hope and subjective knowledge, $r(192) = -.03, p = .676$. There were significant positive relationships between subjective knowledge and appraisals of importance, $r(192) = .19, p = .008$, and between subjective knowledge and appraisals of goal congruence, $r(192) = .15, p = .038$. These relationships indicate that greater subjective knowledge was associated with higher appraisals of importance and goal congruence. There were no significant relationships between subjective knowledge and appraisals of future expectations, $r(192) = .05, p = .506$, or between subjective knowledge and appraisals of possibility, $r(191) = .04, p = .566$.

In summary, neither the climate change nor seasonal influenza data provided support for a relationship between subjective knowledge and subjective feelings of hope. Both the climate change and seasonal influenza data provided support for a positive relationship between subjective knowledge and appraisals of goal congruence. The seasonal influenza data provided support for a positive relationship between subjective knowledge and appraisals of importance, whereas the climate change data did not. Neither the climate change nor the seasonal influenza data provided support for relationships between subjective knowledge and appraisals of future expectation or between subjective knowledge and appraisals of possibility.

Research Question 5

The fifth research question asks how subjective feelings of hope felt in response to a hope appeal and appraisals evoked by a hope appeal are related to perceived susceptibility, perceived severity, and environmental identity. I used Pearson's correlations to test the associations between the post-message subjective feelings of hope scale and the four post-message appraisals and perceived susceptibility, perceived severity, and environmental identity.

Climate change. For the climate change data, there was a significant positive relationship between post-message subjective feelings of hope and perceived severity, $r(190) = .16, p = .025$, indicating that the more severe participants perceive climate change to be, the stronger subjective feelings of hope they felt in response to a hope appeal. There were no significant relationships between post-message subjective feelings of hope and perceived susceptibility, $r(190) = .13, p = .082$ or environmental identity, $r(190) = .14, p = .057$.

There were significant positive relationships between post-message appraisals of importance and perceived susceptibility, $r(191) = .50, p < .0005$; perceived severity, $r(191) = .54, p < .0005$; and environmental identity, $r(191) = .65, p < .0005$. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of importance. There were significant positive relationships between post-message appraisals of goal congruence and perceived susceptibility, $r(191) = .35, p < .0005$; perceived severity, $r(191) = .39, p < .0005$; and environmental identity, $r(191) = .65, p < .0005$. These relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of goal congruence. There were significant positive relationships between post-message appraisals of future expectation and perceived susceptibility, $r(191) = .28, p < .0005$; perceived severity, $r(191) = .36, p < .0005$; and environmental identity, $r(191) = .40, p < .0005$. These relationships indicate that

greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with more positive appraisals of future expectation. There was a significant positive relationship between post-message appraisals of possibility and environmental identity, $r(191) = .24, p = .001$, indicating that more environmental identity is associated with higher appraisals of possibility. There were no significant relationships between appraisals of possibility and perceptions of susceptibility and severity.

Seasonal influenza. For the seasonal influenza data, there was a significant positive relationship between post-message subjective feelings of hope and perceived severity, $r(192) = .15, p = .042$, indicating that the more severe participants perceive seasonal influenza to be, the stronger subjective feelings of hope they felt in response to a hope appeal. In addition, there was a significant positive relationship between post-message subjective feelings of hope and perceived susceptibility, $r(192) = .17, p = .022$, indicating that the more susceptible participants perceived themselves to be to seasonal influenza, the stronger subjective feelings of hope they felt in response to a hope appeal. There were no significant relationship between post-message subjective feelings of hope and environmental identity for the seasonal influenza data, $r(192) = -.01, p = .871$.

For the seasonal influenza data, there were significant positive relationships between post-message appraisals of importance and perceived susceptibility, $r(192) = .15, p = .041$; perceived severity, $r(192) = .49, p < .0005$; and environmental identity, $r(192) = .32, p < .0005$. These relationships indicate that greater perceived susceptibility to seasonal influenza, greater perceived severity of seasonal influenza, and a more environmental identity are associated with higher appraisals of the importance of seasonal influenza prevention. There were significant positive relationships between post-message appraisals of goal congruence and perceived susceptibility, $r(192) = .21, p = .003$; perceived severity, $r(192) = .36, p < .0005$; and environmental identity, $r(192) = .31, p < .0005$. These relationships indicate that greater

perceived susceptibility to seasonal influenza, greater perceived severity of seasonal influenza, and a more environmental identity are associated with higher appraisals of goal congruence. There were significant positive relationships between post-message appraisals of future expectation and perceived severity, $r(192) = .44, p < .0005$; and environmental identity, $r(192) = .18, p = .015$. These relationships indicate that greater perceived severity of seasonal influenza and a more environmental identity are associated with more positive appraisals of future expectation. There was no significant relationship between perceived susceptibility and appraisals of future expectation. There was a significant positive relationship between post-message appraisals of possibility and perceived severity, $r(192) = .23, p = .002$; and environmental identity, $r(191) = .23, p = .002$, indicating that greater perceptions of the severity of seasonal influenza and more environmental identity are associated with higher appraisals of possibility. There were no significant relationships between appraisals of possibility and perceptions of susceptibility.

In summary, both the climate change and seasonal influenza data provided support for a positive relationship between post-message subjective feelings of hope and perceived severity. However, only the seasonal influenza data provided support for a positive relationship between post-message subjective feelings of hope and perceived susceptibility. I did not expect the seasonal influenza data to support a relationship between post-message subjective feelings of hope and environmental identity, and they did not. However, the climate change data also did not provide support for a relationship between post-message subjective feelings of hope and environmental identity.

Both the climate change and seasonal influenza data provided support for a positive relationship between subjective knowledge and appraisals of goal congruence. Only the seasonal influenza data provided support for a relationship between subjective knowledge and appraisals of importance. Neither the climate change nor seasonal influenza data provided support for a

relationship between subjective knowledge and appraisals of future expectation and possibility. Both the climate change and seasonal influenza data provided support for a positive relationship between perceived severity and appraisals of importance, goal congruence, and future expectation. Only the seasonal influenza data provided support for a positive relationship between perceived severity and appraisals of possibility. Both the climate change and seasonal influenza data provided support for a positive relationship between perceived susceptibility and appraisals of importance and goal congruence. Only the climate change data provided support for a positive relationship between perceived susceptibility and appraisals of future expectation. Neither the climate change nor seasonal influenza data provided support for a positive relationship between perceived susceptibility and appraisals of possibility. Both the climate change and seasonal influenza data provided support for a positive relationship between environmental identity and all four appraisals.

Research Question 6

The sixth research question asks how much of the variance in post-message subjective feelings of hope can be explained by subjective knowledge, perceived severity, perceived susceptibility, and environmental identity in addition to message condition and appraisals of importance, goal congruence, future expectation, and possibility. I conducted multiple regression analyses to test this research question using post-message subjective feelings of hope as the dependent variable. Message (strong versus weak hope appeal), pre-message assessments of subjective knowledge, severity, and susceptibility; post-message appraisals of importance, goal congruence, future expectation, and possibility; along with environmental identity (measured post-message) were the independent variables. Results of the evaluation of assumptions indicated

that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity.

Climate change. The R for regression ($R = .47$) was significantly different from zero, $F(9, 180) = 5.69, p < .0005$, with an R^2 value of .22. The R^2 value indicates that almost a quarter of the variability in post-message subjective feelings of hope was predicted by the independent variables. The regression coefficients for message (strong/weak) and future expectations were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message subjective feelings of hope are greater among people in the strong hope appeal condition and people with more positive future expectations. Table 5.39 presents the correlations among the independent variables and post-message subjective feelings of hope. Table 5.40 presents the B and β weights, from the regression.

Table 5.39: Study 2 Climate Change Data Correlations among Post-Message Subjective Feelings of Hope and Regression Independent Variables

						Subj.		Goal	Future
	Hope	Msg	Ident	Susc	Sever	Know	Impt	Cong	Exp
Message	.31**								
Identity	.14*	-.04							
Susceptibility	.16*	-.17*	.40**						
Severity	.13*	-.14*	.53**	.60**					
Subjective									
Knowledge	.10	-.05	.28**	.16*	.18**				
Importance	.23**	.05	.65**	.50**	.54**	.13*			

Goal								
Congruence	.23**	.00	.65**	.35**	.39**	.31**	.56**	
Future								
Expectations	.32**	.10	.40**	.27**	.35**	.09	.47**	.47**
Possibility	.29**	.22**	.24**	.10	.11	.07	.32**	.25** .39**

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

Table 5.40: Study 2 Climate Change Data Multiple Regression on Post-Message Subjective Feelings of Hope

	B	β	<i>t</i>	<i>p</i>
Message Condition	.58**	.28**	4.00	< .0005
Environmental Identity	-.16	-.10	-1.02	.310
Perceived Susceptibility	.16	.13	1.50	.136
Perceived Severity	.00	.00	0.00	.996
Subjective Knowledge	.07	.06	0.89	.374
Appraisal of Importance	.05	.03	0.30	.768
Appraisal of Goal Congruence	.13	.10	1.07	.284
Appraisal of Future Expectation	.26*	.18*	2.15	.033
Appraisal of Possibility	.21	.13	1.72	.087

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

Seasonal influenza. The R for regression ($R = .26$) was not significantly different from zero, $F(9, 181) = 1.45$, $p = .171$, with an R^2 value of .07. Table 5.41 presents the correlations among the independent variables and post-message subjective feelings of hope. Table 5.42 presents the B and β weights, from the regression.

Table 5.41: Study 2 Seasonal Influenza Data Correlations among Post-Message Subjective Feelings of Hope and Regression Independent Variables

	Subj.						Goal	Future	
	Hope	Msg	Ident	Susc	Sever	Know	Impt	Cong	Exp
Message	.03								
Identity	-.01	.10							
Susceptibility	.17*	-.02	.08						
Severity	.15*	.03	.16*	.21**					
Subjective									
Knowledge	-.03	-.03	.15*	.08	.03				
Importance	.09	.28**	.32**	.15*	.49**	.19**			
Goal									
Congruence	.13*	.22**	.31**	.21**	.38**	.15*	.60**		
Future									
Expectations	.18**	.33**	.18**	.10	.44**	.05	.61**	.56**	
Possibility	.08	.34**	.23**	.00	.23**	.04	.64**	.36**	.43**

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

Table 5.42: Study 2 Seasonal Influenza Data Multiple Regression on Post-Message Subjective Feelings of Hope

	B	β	<i>t</i>	<i>p</i>
Message Condition	-.03	-.02	-0.25	.802
Environmental Identity	-.05	-.05	-0.66	.511
Perceived Susceptibility	.13	.15	1.96	.051
Perceived Severity	.10	.08	0.89	.374
Subjective Knowledge	-.04	-.03	-0.43	.665
Appraisal of Importance	-.11	-.11	-0.91	.365
Appraisal of Goal Congruence	.03	.04	0.44	.662
Appraisal of Future Expectation	.15	.16	1.62	.106
Appraisal of Possibility	.06	.07	0.72	.471

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal. There were no significant findings.

In summary, the climate change and seasonal influenza data provided minimal support for predictors tested in research question six. The climate change data provided support for message condition and appraisals of future expectation as predictors of post-message subjective feelings of hope, whereas the seasonal influenza data did not. Neither the climate change data nor the seasonal influenza data provided support for subjective knowledge, perceived severity, perceived susceptibility, environmental identity, or appraisals of importance, goal congruence, or possibility as predictors of post-message subjective feelings of hope.

Research Question 7

Research question seven asks if individual characteristics affect the appraisals and if the appraisals affect each other. To answer this question, I conducted eight multiple regression analyses to test this research question, with each of the appraisals as the dependent variable for two of the regressions (one each for climate change and seasonal influenza). Message (strong versus weak hope appeal), pre-message assessments of subjective knowledge, severity, and susceptibility; post-message appraisals of importance, goal congruence, future expectation, and possibility; along with environmental identity (measured post-message) were the independent variables. Results of the evaluation of assumptions indicated that there were no violations of the assumptions of normality, linearity, multicollinearity, or homoscedasticity.

Importance Appraisal. For the climate change data, the R for regression ($R = .76$) was significantly different from zero, $F(8, 182) = 30.75, p < .0005$, with an R^2 value of .58. The R^2 value indicates that almost 60% of the variability in post-message appraisals of importance was predicted by the independent variables. The regression coefficients for perceived susceptibility, perceived severity, environmental identity, and appraisals of goal congruence and possibility were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of importance are higher among people with higher perceived susceptibility, higher perceived severity, higher appraisals of goal congruence, higher appraisals of possibility, and a more environmental identity. Table 5.39 above in research question six contains the correlations among the independent variables and post-message appraisals of importance. Table 5.43 below presents the B and β weights, from the regression.

Table 5.43: Study 2 Climate Change Data Multiple Regression on Post-Message Appraisals of Importance

	B	β	<i>t</i>	<i>p</i>
Message Condition	.11	.09	1.70	.091
Perceived Susceptibility	.14**	.19**	3.12	.002
Perceived Severity	.13*	.16*	2.44	.016
Subjective Knowledge	-.06	-.08	-1.65	.101
Appraisal of Goal Congruence	.11*	.15*	2.19	.030
Appraisal of Future Expectation	.10	.11	1.80	.073
Appraisal of Possibility	.11*	.11*	2.09	.038
Environmental Identity	.32**	.35**	4.99	<.0005

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

For the seasonal influenza data, the R for regression ($R = .82$) was significantly different from zero, $F(8, 182) = 44.97$, $p < .0005$, with an R^2 value of .66. The R^2 value indicates that about two-thirds of the variability in post-message appraisals of importance was predicted by the independent variables. The regression coefficients for perceived severity, subjective knowledge, and appraisals of goal congruence, future expectation, and possibility were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of importance are higher among people with higher perceived severity, higher subjective knowledge, higher appraisals of goal congruence, more positive appraisals of future expectation, and higher appraisals of possibility. Table 5.41 above in research question six contains the correlations among the

independent variables and post-message appraisals of importance. Table 5.44 below presents the B and β weights, from the regression.

Table 5.44: Study 2 Seasonal Influenza Data Multiple Regression on Post-Message Appraisals of Importance

	B	β	<i>t</i>	<i>p</i>
Message Condition	.04	.03	0.53	.596
Perceived Susceptibility	.02	.02	0.47	.639
Perceived Severity	.28**	.22**	4.51	<.0005
Subjective Knowledge	.13**	.12**	2.67	.008
Appraisal of Goal Congruence	.18**	.22**	3.90	<.0005
Appraisal of Future Expectation	.18**	.19**	3.23	.001
Appraisal of Possibility	.33**	.40**	7.90	<.0005
Environmental Identity	.08	.07	1.57	.118

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

In summary, both the climate change and seasonal influenza data indicated that perceived severity, appraisals of goal congruence, and appraisals of possibility predict appraisals of importance. Only the climate change data supports environmental identity and perceived susceptibility as predictors of appraisals of importance. Only the seasonal influenza data supported subjective knowledge and appraisals of future expectation as predictors of appraisals of importance.

Goal Congruence Appraisal. For the climate change data, the *R* for regression ($R = .71$) was significantly different from zero, $F(8, 182) = 23.72$, $p < .0005$, with an R^2 value of .51. The

R^2 value indicates that about half of the variability in post-message appraisals of goal congruence was predicted by the independent variables. The regression coefficients for subjective knowledge, environmental identity, and appraisals of importance and future expectation were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of goal congruence are higher among people with higher subjective knowledge, higher appraisals of importance, more positive appraisals of future expectation, and a more environmental identity. Table 5.39 above in research question six contains the correlations among the independent variables and post-message appraisals of goal congruence. Table 5.45 below presents the B and β weights, from the regression.

Table 5.45: Study 2 Climate Change Data Multiple Regression on Post-Message Appraisals of Goal Congruence

	B	β	<i>t</i>	<i>p</i>
Message Condition	-.02	-.01	-0.20	.841
Perceived Susceptibility	.05	.05	0.67	.502
Perceived Severity	-.07	-.06	-0.86	.393
Subjective Knowledge	.15**	.15**	2.83	.005
Appraisal of Importance	.23*	.17*	2.19	.030
Appraisal of Future Expectation	.26**	.22**	3.50	.001
Appraisal of Possibility	.01	.01	0.09	.929
Environmental Identity	.52**	.42**	5.71	<.0005

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

For the seasonal influenza data, the R for regression ($R = .67$) was significantly different from zero, $F(8, 182) = 18.71, p < .0005$, with an R^2 value of .45. The R^2 value indicates that almost half of the variability in post-message appraisals of goal congruence was predicted by the independent variables. The regression coefficients for environmental identity and appraisals of importance and future expectation were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of the goal congruence of seasonal influenza prevention are higher among people with higher appraisals of importance, more positive appraisals of future expectation, and a more environmental identity. Table 5.41 above in research question six contains the correlations among the independent variables and post-message appraisals of goal congruence. Table 5.46 below presents the B and β weights, from the regression.

Table 5.46: Study 2 Seasonal Influenza Data Multiple Regression on Post-Message Appraisals of Goal Congruence

	B	β	t	p
Message Condition	.06	.03	0.49	.626
Perceived Susceptibility	.12	.11	1.93	.055
Perceived Severity	.02	.01	0.20	.843
Subjective Knowledge	.05	.04	0.69	.489
Appraisal of Importance	.43**	.36**	3.90	<.0005
Appraisal of Future Expectation	.35**	.31**	4.20	<.0005
Appraisal of Possibility	-.04	-.04	-0.54	.590
Environmental Identity	.17*	.13*	2.30	.022

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

In summary, both the climate change and seasonal influenza data provided support for environmental identity, appraisals of importance, and appraisals of future expectation as predictors for appraisals of goal congruence. Only the climate change data supported subjective knowledge as a predictor of appraisals of goal congruence.

Future Expectation Appraisal. For the climate change data, the R for regression ($R = .60$) was significantly different from zero, $F(8, 182) = 12.63$, $p < .0005$, with an R^2 value of .36. The R^2 value indicates that more than a third of the variability in post-message appraisals of future expectation was predicted by the independent variables. The regression coefficients for appraisals of goal congruence and possibility were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of future expectation are more positive among people with higher appraisals of goal congruence and higher appraisals of possibility. Table 5.39 above in research question six contains the correlations among the independent variables and post-message appraisals of future expectation. Table 5.47 below presents the B and β weights, from the regression.

Table 5.47: Study 2 Climate Change Data Multiple Regression on Post-Message Appraisals of Future Expectation

	B	β	<i>t</i>	<i>p</i>
Message Condition	.07	.05	0.84	.403
Perceived Susceptibility	.01	.01	0.11	.910
Perceived Severity	.13	.15	1.83	.068
Subjective Knowledge	-.05	-.06	-0.98	.329
Appraisal of Importance	.18	.16	1.80	.073
Appraisal of Goal Congruence	.24**	.29**	3.50	.001
Appraisal of Possibility	.26**	.24**	3.70	<.0005
Environmental Identity	-.01	-.01	-0.15	.881

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

For the seasonal influenza data, the R for regression ($R = .70$) was significantly different from zero, $F(8, 182) = 21.37, p < .0005$, with an R^2 value of .48. The R^2 value indicates that almost half of the variability in post-message appraisals of future expectation was predicted by the independent variables. The regression coefficients for message condition (strong versus weak hope appeal), perceived severity, and appraisals of importance and goal congruence were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of future expectation are more positive among people exposed to the strong hope appeal who have higher perceived severity and higher appraisals of importance and goal congruence. Table 5.41 above in research question six contains the correlations among the independent variables and

post-message appraisals of future expectation. Table 5.48 below presents the B and β weights, from the regression.

Table 5.48: Study 2 Seasonal Influenza Data Multiple Regression on Post-Message Appraisals of Future Expectation

	B	β	<i>t</i>	<i>p</i>
Message Condition	.27**	.16**	2.81	.005
Perceived Susceptibility	-.03	-.03	-0.53	.600
Perceived Severity	.26**	.19**	3.03	.003
Subjective Knowledge	-.05	-.04	-0.73	.466
Appraisal of Importance	.31**	.29**	3.23	.001
Appraisal of Goal Congruence	.25**	.29**	4.20	<.0005
Appraisal of Possibility	.05	.06	0.84	.402
Environmental Identity	-.07	-.06	-1.03	.305

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

In summary, both the climate change and seasonal influenza data provided support for appraisals of goal congruence as a predictor for appraisals of future expectation. However, only the climate change data supported appraisals of possibility as a predictor. Only the seasonal influenza data supported type of hope appeal, perceived severity, and appraisals of importance as predictors of appraisals of future expectation.

Possibility Appraisal. For the climate change data, the *R* for regression ($R = .47$) was significantly different from zero, $F(8, 182) = 6.36$, $p < .0005$, with an R^2 value of .22. The R^2

value indicates that almost 22% of the variability in post-message appraisals of possibility was predicted by the independent variables. The regression coefficients for message condition (strong versus weak hope appeal) and appraisals of importance and future expectation were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of possibility are higher among people exposed to the strong hope appeal who have higher appraisals of importance and more positive appraisals of future expectation. Table 5.39 above in research question six contains the correlations among the independent variables and post-message appraisals of possibility. Table 5.49 below presents the B and β weights, from the regression.

Table 5.49: Study 2 Climate Change Data Multiple Regression on Post-Message Appraisals of Possibility

	B	β	<i>t</i>	<i>p</i>
Message Condition	.22*	.17*	2.49	.014
Perceived Susceptibility	-.01	-.01	-0.15	.877
Perceived Severity	-.09	-.11	-1.17	.243
Subjective Knowledge	.02	.03	0.44	.659
Appraisal of Importance	.21*	.21*	2.09	.038
Appraisal of Goal Congruence	.01	.01	0.09	.929
Appraisal of Future Expectation	.27**	.29**	3.70	<.0005
Environmental Identity	.04	.04	0.39	.696

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

For the seasonal influenza data, the R for regression ($R = .68$) was significantly different from zero, $F(8, 182) = 19.01, p < .0005$, with an R^2 value of .46. The R^2 value indicates that almost half of the variability in post-message appraisals of possibility was predicted by the independent variables. The regression coefficients for message condition (strong versus weak hope appeal) and appraisals of importance were significantly different from zero. However, the regression coefficients for the remaining variables were not. The size and direction of the relationships suggest that post-message appraisals of possibility are higher among people exposed to the strong hope appeal who have higher appraisals of importance. Table 5.41 above in research question six contains the correlations among the independent variables and post-message appraisals of possibility. Table 5.50 below presents the B and β weights, from the regression.

Table 5.50: Study 2 Seasonal Influenza Data Multiple Regression on Post-Message Appraisals of Possibility

	B	β	t	p
Message Condition	.27*	.14*	2.41	.017
Perceived Susceptibility	-.08	-.07	-1.22	.224
Perceived Severity	-.14	-.10	-1.44	.152
Subjective Knowledge	-.10	-.07	-1.30	.194
Appraisal of Importance	.76**	.64**	7.90	<.0005
Appraisal of Goal Congruence	-.04	-.04	-0.54	.590
Appraisal of Future Expectation	.07	.06	0.84	.402
Environmental Identity	.05	.04	0.68	.500

Note. Message condition was coded as 1 = strong hope appeal, 0 = weak hope appeal, * = $p < .05$,

** = $p < .01$

In summary, both the climate change and seasonal influenza data supported message condition (strong versus weak hope appeal) and appraisals of importance as predictors of appraisals of possibility. However, only the climate change data provided support for appraisals of future expectation as a predictor for appraisals of possibility.

Research Question 8

Research question eight asks what is the best model for the relationships between message condition, individual characteristics, appraisals, and subjective feelings of hope. I used a three-step process to examine relationships between the appraisals, individual characteristics, hope appeals, and subjective feelings of hope. First, I examined the bivariate correlations between message condition, individual characteristics, and the appraisals generated in my analysis of research question six. Second, I used these bivariate relationships to guide the choice of independent variables for multivariate regressions on each of the appraisals in research question seven. Third, I used the results of the regressions in research questions six and seven and persuasive hope theory to develop path models of the relationships. I analyzed these path models via structural equation modeling to examine how the constructs work together.

Below I present the model generated through this process and an alternative model. I assessed model fit using four indices: (a) model chi-square, (b) the Steiger-Lind root mean square error of approximation (RMSEA; Steiger, 1990) with its 90% confidence interval, (c) the Bentler comparative fit index (CFI; Bentler, 1990), and (d) the standardized root mean square residual (SRMR). The reason for reporting multiple fit indices is threefold. First, the fit indices measure different aspects of model fit, and when used in concert provide a better sense of model fit. Second, there is not a standard, preferred fit index that is commonly used across researchers; therefore, providing multiple indices assists in the comparison of model fit across research studies. Third, the chi-square is strongly affected by sample size and can indicate a lack of good

model fit even when the model is a good fit (Kline, 2005). To assess model fit, I used the strict guidelines recommended by Hu and Bentler (1999) to determine if there was a close fit between the model and the data (i.e., CFI > .95, SRMR < .08, and RMSEA < .06). Each model discussed below is recursive and identified (Kline, 2005; Rigdon, 1995) and meets the Kline (2005) recommendation of a ratio of at least five subjects for each model parameter.

The model tests causal pathways between the appraisals and subjective feelings of hope. The model tests direct, causal relationships between the appraisals and subjective feelings of hope, as predicted by persuasive hope theory as well as indirect effects and relationships between the appraisals. The model includes a dichotomous variable for type of hope appeal (1 = strong, 0 = weak).

Climate change. For the climate change data, model indices indicate a good fit ($\chi^2 = 32.04$, $df = 23$, $p = .10$; RMSEA = .05, SRMR = .04, CFI = .99). The model indicates that the message condition ($\beta = .14$, $p = .007$), environmental identity ($\beta = .47$, $p < .001$), perceived susceptibility ($\beta = .22$, $p < .001$), and perceived severity ($\beta = .18$, $p = .009$) all significantly predict appraisals of importance. Environmental identity ($\beta = .49$, $p < .001$) and appraisals of importance ($\beta = .24$, $p < .001$) significantly predict appraisals of goal congruence, whereas message condition does not ($\beta = .01$, $p = .93$). Perceived severity ($\beta = .21$, $p = .001$), appraisals of goal congruence ($\beta = .32$, $p < .001$), and appraisals of possibility ($\beta = .27$, $p < .001$) significantly predicted appraisals of future expectation, whereas message condition did not ($\beta = .07$, $p = .25$). Message condition ($\beta = .20$, $p = .002$) and appraisals of importance ($\beta = .32$, $p < .001$) both significantly predicted appraisals of possibility. Message condition ($\beta = .30$, $p < .001$), appraisals of future expectation ($\beta = .17$, $p = .01$), and pre-message subjective feelings of hope ($\beta = .50$, $p < .001$) significantly predicted post-message subjective feelings of hope. However, appraisals of importance ($\beta = .05$, $p = .48$), goal congruence ($\beta = -.01$, $p = .93$), and possibility ($\beta = .08$, $p = .23$) did not significantly predict post-message subjective feelings of hope. Environmental

identity significantly covaried with perceived severity ($\beta = .53, p < .001$) and perceived susceptibility ($\beta = .40, p < .001$). In addition, perceived severity significantly covaried with perceived susceptibility ($\beta = .60, p < .001$). The modification indices did not indicate any theoretically valid paths that would improve the fit of the model. Figure 5.1 presents the model and Table 5.51 provides the standardized direct, indirect, and total effects of this model.

Figure 5.1: Study 2 Climate Change Data Standardized Effects for Model

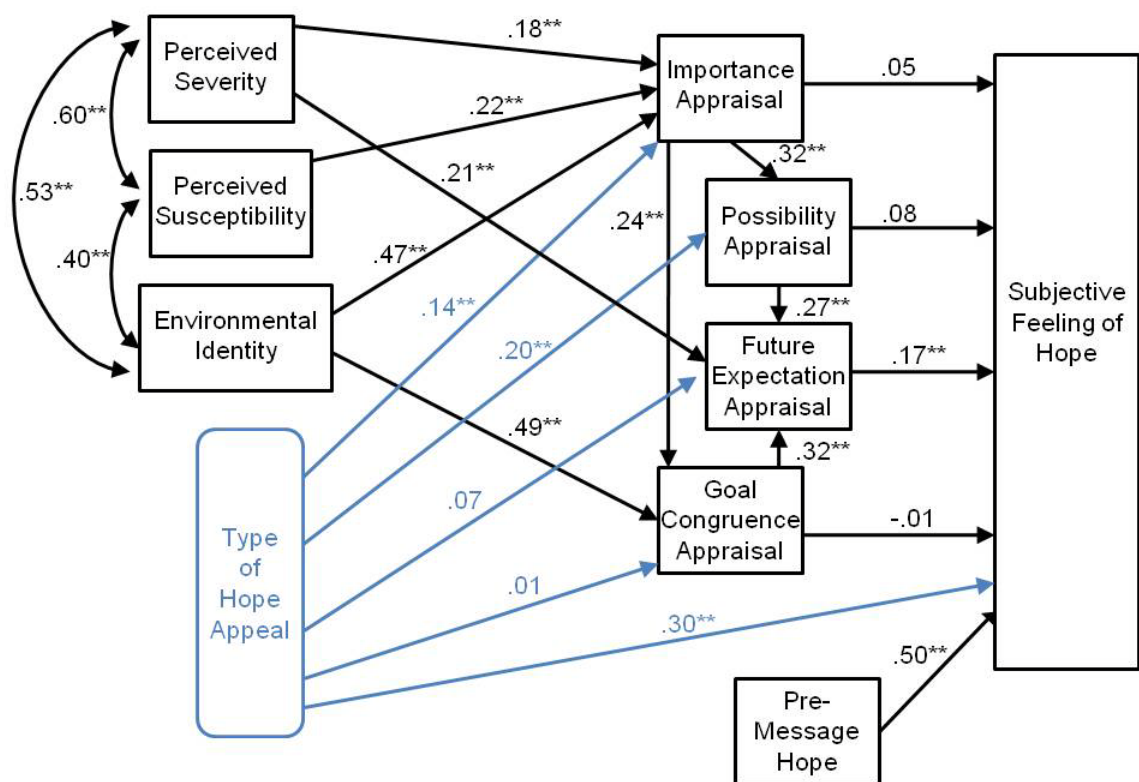


Table 5.51: Study 2 Climate Change Data Standardized Direct, Indirect, and Total Effects for Model

				Pre- Msg Hope	Msg Cond	Impt Appr	Goal Cong Appr	Possib Appr	Future Exp Appr
Import									
Direct	.18	.22	.47	–	.14	–	–	–	–
Indirect	–	–	–	–	–	–	–	–	–
Total	.18	.22	.47	–	.14	–	–	–	–
Goal Cong									
Direct	–	–	.49	–	.01	.24	–	–	–
Indirect	.04	.05	.11	–	.03	–	–	–	–
Total	.04	.05	.61	–	.04	.24	–	–	–
Possibility									
Direct	–	–	–	–	.20	.32	–	–	–
Indirect	.06	.07	.15	–	.04	–	–	–	–
Total	.06	.07	.15	–	.25	.32	–	–	–
Future Exp									
Direct	.21	–	–	–	.07	–	.32	.27	–
Indirect	.03	.04	.24	–	.08	.16	–	–	–
Total	.24	.04	.24	–	.15	.16	.32	.27	–
Hope									
Direct	–	–	–	.50	.30	.05	-.01	.08	.17
Indirect	.05	.02	.07	–	.05	.05	.06	.05	–
Total	.05	.02	.07	.50	.35	.10	.05	.12	.17

Note. Message condition coded as 1 = strong hope appeal, 0 = weak hope appeal

Seasonal Influenza. For the seasonal influenza data, model indices indicate a good fit ($\chi^2 = 37.68$, $df = 23$, $p = .03$; RMSEA = .06, SRMR = .04, CFI = .97). The model indicates that the message condition ($\beta = .14$, $p < .001$), environmental identity ($\beta = .47$, $p < .001$) and perceived severity ($\beta = .18$, $p = .009$) significantly predict appraisals of importance, whereas perceived susceptibility ($\beta = .22$, $p < .50$) does not. Environmental identity ($\beta = .49$, $p = .03$) and appraisals of importance ($\beta = .24$, $p < .001$) significantly predict appraisals of goal congruence, whereas message condition does not ($\beta = .01$, $p = .34$). Message condition ($\beta = .07$, $p = .002$), perceived severity ($\beta = .21$, $p < .001$), appraisals of goal congruence ($\beta = .32$, $p < .001$), and appraisals of possibility ($\beta = .27$, $p = .003$) all significantly predicted appraisals of future expectation. Message condition ($\beta = .20$, $p = .002$) and appraisals of importance ($\beta = .32$, $p < .001$) both significantly predicted appraisals of possibility. Pre-message subjective feelings of hope ($\beta = .50$, $p < .001$) significantly predicted post-message subjective feelings of hope. However, message condition ($\beta = .30$, $p = .72$), appraisals of importance ($\beta = .05$, $p = .27$), goal congruence ($\beta = -.01$, $p = .36$), appraisals of future expectation ($\beta = .17$, $p = .15$), and possibility ($\beta = .08$, $p = .60$) did not significantly predict post-message subjective feelings of hope. Environmental identity significantly covaried with perceived severity ($\beta = .17$, $p = .03$), but not with perceived susceptibility ($\beta = .08$, $p = .26$). In addition, perceived severity significantly covaried with perceived susceptibility ($\beta = .21$, $p = .004$). The modification indices did not indicate any theoretically valid paths that would improve the fit of the model. Figure 5.2 presents the model and Table 5.52 provides the standardized direct, indirect, and total effects of this model.

Figure 5.2: Study 2 Seasonal Influenza Data Standardized Effects for Model

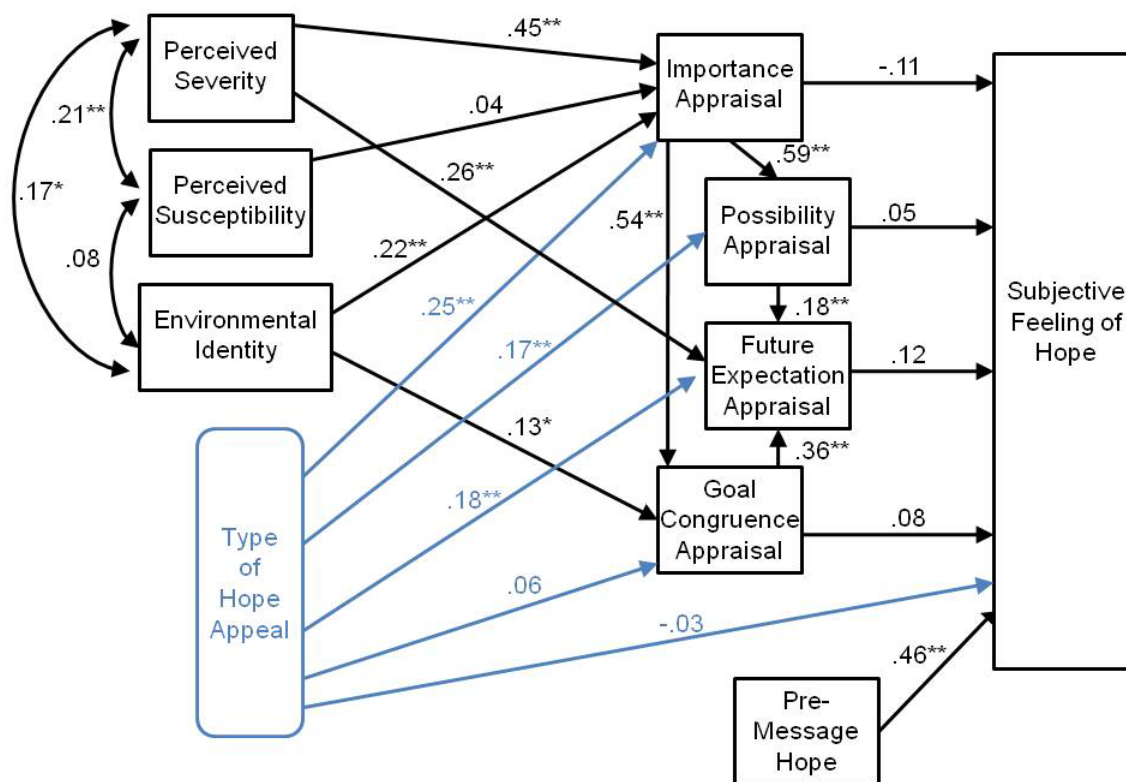


Table 5.52: Study 2 Seasonal Influenza Data Standardized Direct, Indirect, and Total Effects for Model 1

				Pre- Msg Hope	Msg Cond	Impt Appr	Goal Cong Appr	Possib Appr	Future Exp Appr
<hr/>									
Import									
Direct	.45	.04	.22	–	.25	–	–	–	–
Indirect	–	–	–	–	–	–	–	–	–
Total	.45	.04	.22	–	.25	–	–	–	–
Goal Cong									
Direct	–	–	.13	–	.06	.54	–	–	–
Indirect	.24	.02	.12	–	.14	–	–	–	–
Total	.24	.02	.25	–	.19	.54	–	–	–
Possibility									
Direct	–	–	–	–	.17	.59	–	–	–
Indirect	.26	.02	.13	–	.15	–	–	–	–
Total	.26	.02	.13	–	.32	.59	–	–	–
Future Exp									
Direct	.26	–	–	–	.18	–	.36	.18	–
Indirect	.14	.01	.12	–	.13	.30	–	–	–
Total	.39	.01	.12	–	.31	.30	.36	.18	–
Hope									
Direct	–	–	–	.46	-.03	-.11	.08	.05	.12
Indirect	.03	–	.02	–	.04	.11	.04	.02	–
Total	.03	–	.02	.46	.02	–	.12	.07	.12

Note. Message condition coded as 1 = strong hope appeal, 0 = weak hope appeal

In summary, the models indicate that for climate change, the effects of the appraisals of importance, goal congruence, and possibility on subjective feelings of hope are mediated through their effect on the appraisal of future expectation. Similarly, the effect of the type of hope appeal on appraisals of future expectation and goal congruence are mediated through the appeal's affect on appraisals of importance and possibility. However, for seasonal influenza, the appraisals did not affect subjective feelings of hope, likely due to limitations in the hope appeals themselves. Unlike the climate change data, the seasonal influenza data shows direct effects of the type of hope appeal on all the appraisals except goal congruence. Interestingly, in the seasonal influenza condition, environmental identity had a significant effect on appraisals of importance and goal congruence. It is possible that the environmental identity measure is tapping into a sense of social responsibility that affects willingness to take action to protect others from seasonal influenza.

Summary

The goals of Study 2 were to (a) test the PHT's proposed relationships between the subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility, (b) examine the relationships between subjective feelings of hope and behavioral antecedents, (c) assess the effects of hope appeals developed in accordance with PHT, and (d) identify individual characteristics that may affect the relationship between hope appeals and subjective feelings of hope. Overall, the climate change and seasonal influenza data provided partial support for the proposed relationships and effects.

Relationships between subjective feelings of hope and appraisals. The data provided partial support for the hypothesized relationships between subjective feelings of hope and

appraisals. The climate change data provided support for positive relationships between subjective feelings of hope and all the appraisals. However, the seasonal influenza data only provided full support for a positive relationship between subjective feelings of hope and appraisals of future expectations. In addition, the follow-up seasonal influenza data provided support for a positive relationship between subjective feelings of hope and appraisals of goal congruence. Table 5.53 summarizes the support for the hypothesized relationships.

Table 5.53: Study 2 Support for a Positive Relationship between Subjective Feelings of Hope and Each Appraisal

Appraisals	Climate Change		Seasonal Influenza	
	Post-Message	Follow-Up	Post-Message	Follow-Up
Importance	●	●		
Goal Congruence	●	●		●
Future Expectation	●	●	●	●
Possibility	●	●		

The climate change and seasonal influenza data also provided partial support for the appraisals as predictors of subjective feelings of hope. Neither the climate change data nor the seasonal influenza data provided support for appraisals of importance as a predictor for subjective feelings of hope. Only the climate change follow-up data provided support for appraisals of goal congruence as a predictor. The climate change post-message and follow-up data as well as the seasonal influenza follow-up data provided support for appraisals of future expectations as a predictor of subjective feelings of hope. Only the climate change post-message data provided

support for appraisals of possibility as a predictor of subjective feelings of hope. Table 5.54 summarizes the support for each appraisal as a predictor of subjective feelings of hope.

Table 5.54: Study 2 Support for a Positive Relationship between Subjective Feelings of Hope and Each Appraisal

Appraisals	Climate Change		Seasonal Influenza	
	Post-Message	Follow-Up	Post-Message	Follow-Up
Importance				
Goal Congruence		•		
Future Expectation	•	•		•
Possibility	•			

Relationships between subjective feelings of hope and behavioral antecedents. I

examined the relationships between various behavioral antecedents and *total* subjective feelings of hope (i.e., not controlling for pre-message feelings) as well as the relationships the antecedents and *changes* in subjective feelings of hope after exposure to a hope appeal. Neither the climate change nor the seasonal influenza data provided support for relationships between message attention and subjective feelings of hope or between message attention and changes in subjective feelings of hope after exposure to a message. Both the climate change and the seasonal influenza data provided support for a relationship between the total amount of subjective feelings of hope and interest in learning about the message topic. However, only the seasonal influenza data provided support for a relationship between changes in subjective feelings of hope after exposure to a hope appeal and interest in learning about the message topic. The climate change data did not provide support for a relationship between changes in subjective feelings of hope after exposure

to a hope appeal and behavior intentions. Whereas the seasonal influenza data did provide support for this relationship. Similarly, the climate change data did not provide support for a relationship between the total amount of subjective feelings of hope and behavioral intentions. However, the seasonal influenza data did provide support for this relationship. Neither the climate change nor the seasonal influenza data provided support for relationships between attitudes toward the behaviors and subjective feelings of hope or between message attention and changes in subjective feelings of hope after exposure to a message. Table 5.55 summarizes the support for the relationships between each behavioral antecedent and *total* subjective feelings of hope. Table 5.56 summarizes the support for the relationships between each behavioral antecedent and *changes* subjective feelings of hope after exposure to a message.

Table 5.55: Study 2 Support for a Positive Relationship between Total Subjective Feelings of Hope and Each Behavioral Antecedent

Behavioral Antecedent	Climate Change	Seasonal Influenza
Message Attention		
Interest	•	•
Attitudes toward the Behaviors		
Behavioral Intentions		•

Table 5.56: Study 2 Support for a Positive Relationship between Changes in Subjective Feelings of Hope after Exposure to a Message and Each Behavioral Antecedent

Behavioral Antecedent	Climate Change	Seasonal Influenza
Message Attention		
Interest		●
Attitudes toward the Behaviors		
Behavioral Intentions		●

Effects of hope appeals. I analyzed the effects of message condition (strong hope appeal, weak hope appeal, attention control) on subjective feelings of hope. The post-message climate change data provided support for the hypothesis that the strong hope appeal leads to more post-message hope than does the weak hope appeal. However, the seasonal influenza data did not support this hypothesis. In addition, neither the climate change nor seasonal influenza data supported the hypothesis that the strong hope appeal leads to more post-message hope than does the attention control message. Similarly, neither the climate change nor the seasonal influenza data supported the hypothesis that the strong hope appeal leads to more follow-up hope than does the weak hope appeal or attention control. Thus, the data only provided partial support for an effect of message condition on subjective feelings of hope.

I also analyzed the effects of message condition on other emotions. The analyses show that participants felt different subjective feelings in response to the message conditions. Specifically, neither the climate change nor seasonal influenza data indicated differences between conditions in terms of post-message or follow-up subjective feelings of fear. The climate change data indicated that participants in the strong hope appeal condition experienced more guilt than did people in the low hope appeal condition. The data also indicated that people in both the strong

and weak hope appeal conditions felt more guilt than did people in the attention control condition. However, the seasonal influenza data did not indicate any differences between the conditions in terms of post-message subjective feelings of guilt. The climate change data indicated that people in the weak hope appeal condition experienced more sadness than did people in the strong hope appeal condition. The data also indicated that people in the weak and strong hope appeal conditions felt more sadness than did people in the control condition. However, the seasonal influenza data did not indicate any differences between the conditions in terms of post-message subjective feelings of sadness. The climate change data did not indicate any differences between the conditions in terms of post-message subjective feelings of happiness. However, the seasonal influenza data indicated that people in the attention control condition experienced more happiness than did people in the strong or weak hope appeal conditions. The climate change data indicated that people in the weak hope appeal condition experienced more anger than did people in the strong hope appeal condition. The data also indicated that people in the weak and strong hope appeal conditions felt more anger than did people in the control condition. The seasonal influenza data did not indicate any differences between the conditions in terms of post-message subjective feelings of anger. Table 5.57 summarizes the support for the effect of message condition on subjective feelings.

Table 5.57: Study 2 Support for an Effect of Message Condition on Each Subjective Feeling

Subjective Feeling	Climate Change	Seasonal Influenza
Hope	•	
Fear		
Guilt	•	
Sadness	•	
Happiness		•
Anger	•	

Note. A dot indicates that there was a significant effect of message condition on the subjective feeling. For the hope and guilt findings, the strong hope appeal had the greatest feelings. For the sadness and anger findings, the weak hope appeal had the greatest feelings. For the happiness finding, the attention control message had the greatest feelings.

I also examined the effects of message condition on appraisals of importance, goal congruence, future expectation, and possibility. The climate change and seasonal influenza data provided partial support for these effects. Both the climate change and seasonal influenza data supported the hypothesis that the strong hope appeal condition leads to higher post-message appraisals of possibility than do the weak hope appeal and attention control conditions. However, only the seasonal influenza data provided support for the hypothesis that the strong hope appeal condition leads to higher post-message appraisals of importance, goal congruence, and future expectation. Similarly, only the seasonal influenza data provided support for the hypothesis that the strong hope appeal condition leads to higher follow-up appraisals of future expectation and possibility than do the weak hope appeal and attention control conditions. However, neither the climate change nor seasonal influenza data provided support for the hypothesis that the strong

hope appeal condition leads to higher follow-up appraisals of importance and goal congruence than do the other message conditions. Table 5.58 summarizes the support for the effect of message condition on subjective feelings.

Table 5.58: Study 2 Support for an Effect of Message Condition on Each Appraisal

Appraisal	Climate Change		Seasonal Influenza	
	Post-Message	Follow-Up	Post-Message	Follow-Up
Importance			•	
Goal Congruence			•	
Future Expectation			•	•
Possibility	•		•	•

Note. A dot indicates that there was a significant effect of message condition on the subjective feeling. For all the findings, the strong hope appeal had the highest appraisals.

In addition, I tested the effects of the message condition on behavioral antecedents. The data did not support an effect of message condition on attitudes toward the behavior or behavior intention. The data partially supported an effect of message condition on self-efficacy and response efficacy. Specifically, the post-message seasonal influenza data provided support for the hypothesis that strong and weak hope appeals lead to greater perceived response efficacy than the attention control condition; however, the climate change data and the follow-up seasonal influenza data did not. The follow-up seasonal influenza data provided support for the hypothesis that strong and weak hope appeals lead to greater perceived self-efficacy than the attention control condition; however, the climate change data and the post-message seasonal influenza data

did not. Table 5.59 summarizes the support for the effect of message condition on the behavioral antecedents.

Table 5.59: Study 2 Support for an Effect of Message Condition on Each Behavioral Antecedent

Behavioral Antecedent	Climate Change		Seasonal Influenza	
	Post-Message	Follow-Up	Post-Message	Follow-Up
Self-Efficacy				●
Response Efficacy			●	
Attitudes toward the				
Behaviors				
Behavior Intention				

I also examined whether message condition along with other independent variables predicted behavioral intentions. The climate change and seasonal influenza data provided partial support for the independent variables as predictors. Both the climate change and seasonal influenza data supported current behavior and subjective knowledge as predictors of behavioral intentions. Only the climate change data supported perceived barriers, perceived response efficacy, perceived self-efficacy, and environmental identity as predictors of behavioral intentions. Only the seasonal influenza data supported post-message subjective feelings of hope, attitudes toward the behaviors, perceptions of severity, and perceptions of susceptibility as predictors of behavioral intention. Neither the climate change nor the seasonal influenza data supported type of hope appeal as a predictor for behavioral intentions. Table 5.60 summarizes the support for each independent variable as a predictor of behavioral intentions.

Table 5.60: Study 2 Support for Each Independent Variable as a Predictor of Behavioral Intentions

Predictor	Climate Change	Seasonal Influenza
Message Condition		
Post-Message Hope		●
Perceived Barriers	●	
Attitudes toward the Behaviors		●
Perceived Response Efficacy	●	
Perceived Self-Efficacy	●	
Pre-Message Behavior	●	●
Perceived Susceptibility		●
Perceived Severity		●
Subjective Knowledge	●	●
Environmental Identity	●	

Individual characteristics that may affect the relationship between hope appeals and subjective feelings of hope. I examined individual characteristics that may affect the relationship between hope appeals and subjective feelings of hope for their relationships with subjective feelings of hope. Neither the climate change nor seasonal influenza data provided support for a relationship between subjective feelings of hope and subjective knowledge. Both the climate change and seasonal influenza data provided support for a positive relationship between post-message subjective feelings of hope and perceived severity. However, only the seasonal influenza data provided support for a positive relationship between post-message subjective feelings of hope and perceived susceptibility. Neither the climate change nor the seasonal influenza data

provided support for a relationship between post-message subjective feelings of hope and environmental identity. Table 5.61 summarizes the support for the relationship between subjective feelings of hope and each individual characteristic.

Table 5.61: Study 2 Support for a Positive Relationship between Total Subjective Feelings of Hope and Each Behavioral Antecedent

Individual Characteristic	Climate Change	Seasonal Influenza
Subjective Knowledge		
Perceived Severity	•	•
Perceived Susceptibility		•
Environmental Identity		

I examined several independent variables as predictors for post-message subjective feelings of hope. The climate change and seasonal influenza data provided minimal support for predictors. The climate change data provided support for message condition and appraisals of future expectation as predictors of post-message subjective feelings of hope; however, the seasonal influenza data did not. Neither the climate change data nor the seasonal influenza data provided support for subjective knowledge, perceived severity, perceived susceptibility, environmental identity, or appraisals of importance, goal congruence, or possibility as predictors of post-message subjective feelings of hope. Table 5.62 summarizes the support for each independent variable as a predictor of subjective feelings of hope.

Table 5.62: Study 2 Support for Each Independent Variable as a Predictor of Subjective Feelings of Hope

Predictor	Climate Change	Seasonal Influenza
Message Condition	●	
Environmental Identity		
Perceived Susceptibility		
Perceived Severity		
Subjective Knowledge		
Appraisal of Importance		
Appraisal of Goal Congruence		
Appraisal of Future Expectation	●	
Appraisal of Possibility		

Individual characteristics that may affect relationships between hope appeals and the four appraisals. I examined individual characteristics that may affect the relationship between hope appeals and the appraisals for their relationship with the appraisals. Both the climate change and seasonal influenza data provided support for a positive relationship between subjective knowledge and appraisals of goal congruence. Only the seasonal influenza data provided support for a relationship between subjective knowledge and appraisals of importance. Neither the climate change nor seasonal influenza data provided support for a relationship between subjective knowledge and appraisals of future expectation and possibility. Both the climate change and seasonal influenza data provided support for a positive relationship between perceived severity and appraisals of importance, goal congruence, and future expectation. Only the seasonal influenza data provided support for a positive relationship between perceived severity and

appraisals of possibility. Both the climate change and seasonal influenza data provided support for a positive relationship between perceived susceptibility and appraisals of importance and goal congruence. Only the climate change data provided support for a positive relationship between perceived susceptibility and appraisals of future expectation. Neither the climate change nor seasonal influenza data provided support for a positive relationship between perceived susceptibility and appraisals of possibility. Both the climate change and seasonal influenza data provided support for a positive relationship between environmental identity and all four appraisals. Table 5.63 summarizes the support for the relationships between the four appraisals and each individual characteristic.

Table 5.63: Study 2 Support for a Positive Relationship between the Four Appraisals and Each Individual Characteristic

	Appraisal of Importance		Appraisal of Goal Congruence		Appraisal of Future Expect.		Appraisal of Possibility	
Indiv. Char	CC	SI	CC	SI	CC	SI	CC	SI
Subjective								
Knowledge		•	•	•				
Perceived								
Severity	•	•	•	•	•	•		•
Perceived								
Susceptibility	•	•	•	•	•			
Environmental								
Identity	•	•	•	•	•	•	•	•

Note. CC = Climate change data, SI = Seasonal influenza data

Relationships among the appraisals and between the appraisals and individual characteristics. Both the climate change and seasonal influenza data indicated that the appraisals do affect one another and that individual characteristics do affect the appraisals. Specifically, both the climate change and seasonal influenza data indicated that perceived severity, appraisals of goal congruence, and appraisals of possibility predict appraisals of importance. Only the climate change data supports environmental identity and perceived susceptibility as predictors of appraisals of importance. Only the seasonal influenza data supported subjective knowledge and appraisals of future expectation as predictors of appraisals of importance. Table 5.64 summarizes the support for each independent variable as a predictor of appraisals of importance.

Table 5.64: Study 2 Support for Each Independent Variable as a Predictor of Appraisals of Importance

Predictor	Climate Change	Seasonal Influenza
Message Condition		
Environmental Identity	•	
Perceived Susceptibility	•	
Perceived Severity	•	•
Subjective Knowledge		•
Appraisal of Goal Congruence	•	•
Appraisal of Future Expectation		•
Appraisal of Possibility	•	•

Both the climate change and seasonal influenza data provided support for environmental identity, appraisals of importance, and appraisals of future expectation as predictors for appraisals of goal congruence. Only the climate change data supported subjective knowledge as a predictor of appraisals of goal congruence. Table 5.65 summarizes the support for each independent variable as a predictor of appraisals of goal congruence.

Table 5.65: Study 2 Support for Each Independent Variable as a Predictor of Appraisals of Goal Congruence

Predictor	Climate Change	Seasonal Influenza
Message Condition		
Environmental Identity	•	•
Perceived Susceptibility		
Perceived Severity		
Subjective Knowledge	•	
Appraisal of Importance	•	•
Appraisal of Future Expectation	•	•
Appraisal of Possibility		

Both the climate change and seasonal influenza data provided support for appraisals of goal congruence as a predictor for appraisals of future expectation. However, only the climate change data supported appraisals of possibility as a predictor. Only the seasonal influenza data supported type of hope appeal, perceived severity, and appraisals of importance as predictors of appraisals of future expectation. Table 5.66 summarizes the support for each independent variable as a predictor of appraisals of future expectation.

Table 5.66: Study 2 Support for Each Independent Variable as a Predictor of Appraisals of Future Expectation

Predictor	Climate Change	Seasonal Influenza
Message Condition		•
Environmental Identity		
Perceived Susceptibility		
Perceived Severity		•
Subjective Knowledge		
Appraisal of Importance		•
Appraisal of Goal Congruence	•	•
Appraisal of Possibility	•	

Both the climate change and seasonal influenza data supported message condition (strong versus weak hope appeal) and appraisals of importance as predictors of appraisals of possibility. However, only the climate change data provided support for appraisals of future expectation as a predictor for appraisals of possibility. Table 5.67 summarizes the support for each independent variable as a predictor of appraisals of possibility.

Table 5.67: Study 2 Support for Each Independent Variable as a Predictor of Appraisals of Possibility

Predictor	Climate Change	Seasonal Influenza
Message Condition	●	●
Environmental Identity		
Perceived Susceptibility		
Perceived Severity		
Subjective Knowledge		
Appraisal of Importance	●	●
Appraisal of Goal Congruence		
Appraisal of Future Expectation	●	

Model of type of hope appeal, individual characteristics, appraisals, and subjective feelings of hope. The models indicate that for climate change, the effects of the appraisals of importance, goal congruence, and possibility on subjective feelings of hope are mediated through their effect on the appraisal of future expectation. Similarly, the effect of the type of hope appeal on appraisals of future expectation and goal congruence are mediated through the appeal's affect on appraisals of importance and possibility. However, for seasonal influenza, the appraisals did not affect subjective feelings of hope, likely due to limitation in the hope appeals themselves. Unlike the climate change data, the seasonal influenza data shows direct effects of the type of hope appeal on all the appraisals except goal congruence. Interestingly, environmental identity had a significant effect on appraisals of importance and goal congruence. It is possible that the

environmental identity measure is tapping into a sense of social responsibility that affects willingness to take action to protect others from seasonal influenza.

CHAPTER SIX:

Discussion

The overall purpose of this dissertation was twofold. First, I sought to enhance previous research on the role of emotions in persuasion and to offer new insights by conceptualizing and operationalizing hope and hope appeals in a persuasive context. I achieved this purpose by developing persuasive hope theory (PHT) and by creating hope appeals based on PHT and my formative research. Second, I sought to empirically test the role of hope and hope appeals in persuasion by examining relationships between subjective feelings of hope and appraisals, exploring relationships between subjective feelings of hope and behavioral antecedents, assessing the effects of hope appeals, and identifying individual characteristics that affect the above relationships and effects.

There are at least four major reasons why a formal conceptualization and operationalization (i.e., a theory) of persuasive hope was needed in communication science. First, human behavior is often motivated by future cognitions. Second, hope is a future-oriented emotion that can tap into these motivations. Third, appeals to hope are frequently used in applied contexts without theoretical guidance. Fourth, despite its utility as a future-oriented emotion and its frequent application, hope has rarely been theorized or tested in a persuasive context. Without a clear articulation of what hope is and its potential role in persuasive contexts, researchers and practitioners will not know how to create effective messages that evoke hope, nor will they know what effects an appeal to hope might create. Given the lack of theory and research on hope appeals, the broad use of hope appeals, and the potential for hope to motivate future-oriented behavior, I believed that it was imperative to formally conceptualize and operationalize hope and hope appeals in a persuasive context.

I chose to conceptualize and operationalize hope and hope appeals in the context of climate protection because climate change is an important challenge facing us that has numerous implications for our health and well-being. Communicators have many significant roles to play in addressing this challenge, one of which is to use persuasive communication to change or reinforce the public's attitudes, beliefs, and behaviors to support climate protection. Messages designed to evoke hope have the potential to be an effective strategy for influencing behavior and behavioral antecedents related to climate protection.

Although numerous individuals and organizations will need to change their behavior to mitigate climate change, I chose college students as the target audience because they are at an age that is most susceptible to changes in attitudes, beliefs, and behaviors. As mentioned previously, an individual's personality, identity, attitudes, beliefs, and values are extremely malleable between the ages of 18 and 25 and they continue to be malleable until age 30 or 35 (Alwin & McCammon, 2003). Thus, interventions that aim to change mitigation behaviors are likely to be most effective if targeted to audiences aged 35 years or less, which includes college students. In addition, college students are future leaders of organizations and governments that also need to help protect the climate. Therefore, the use of college-age students as the study population was warranted.

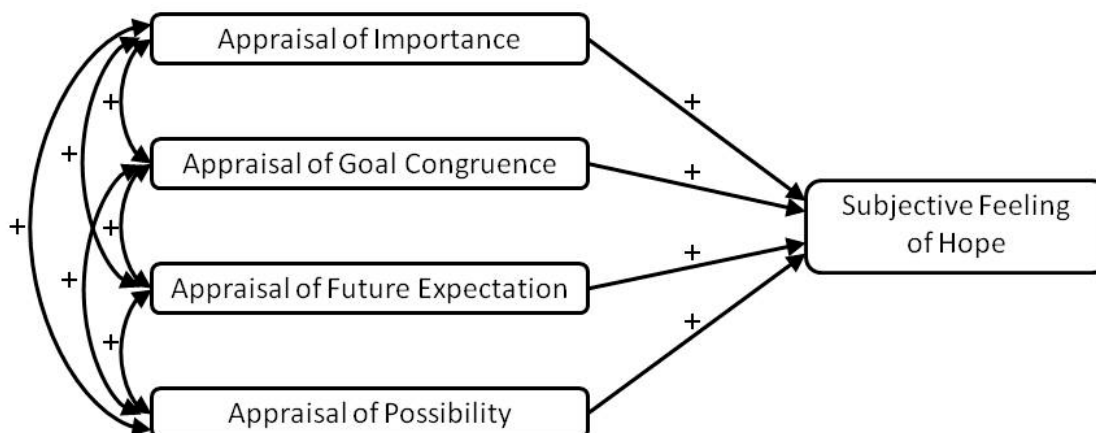
After conducting formative research to understand my audience better and to develop messages, I empirically tested the role of hope and hope appeals in persuasion via two quasi-experimental studies. The findings from these studies predominantly support the relationships between hope and appraisals of importance, goal congruence, future expectation, and possibility as predicted by persuasive hope theory. The findings provide some support for the implications of PHT for message design as demonstrated in the effects of hope appeals in the studies. In addition, the findings indicate that communicators *can* design messages that create subjective feelings of hope and that increase appraisals associated with subjective feelings of hope. These appraisals

and subjective feelings of hope both have implications for antecedents to behavior. Thus, this research offers several theoretical as well as practical implications for communication and persuasion scholarship and practice. This chapter summarizes the results of the four goals of the research, discusses the implications of the findings, presents strengths and limitations of this research, and identifies areas for future research. Throughout the chapter, I use the term “practitioners” to refer to people who might develop messages using persuasive hope theory and/or might use hope appeals. Practitioners may include communicators from governmental and non-governmental organizations, advocates from interest groups, and marketing or advertising professionals among others.

Subjective Feelings of Hope and Appraisals

The first goal of the empirical studies was to test the relationships proposed by PHT between subjective feelings of hope and appraisals of importance, goal congruence, future expectation, and possibility. The data provided some support for positive relationships between subjective feelings of hope and all four of the appraisals. In addition, the data provided some support for appraisals of importance, goal congruence, future expectation, and possibility as predictors of subjective feelings of hope. The data from both studies fully support significant, positive relationships between the appraisals. Figure 6.1 presents the relationships that I proposed in persuasive hope theory (Figure 2.2 in chapter 2), all of which received at least some support.

Figure 6.1: Support for Proposed Relationships between the Appraisals and for the Appraisals as Predictors of Subjective Feelings of Hope

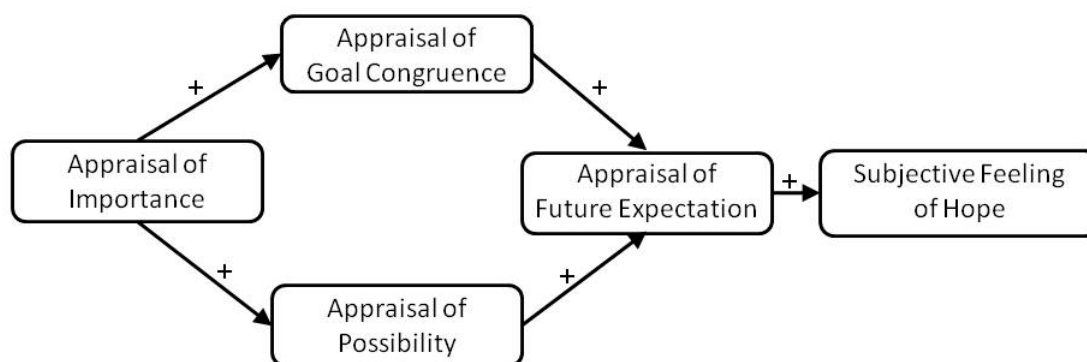


Although there is partial support for appraisals of importance as a predictor of subjective feelings of hope, the support is weak. There are several possible explanations for appraisals of importance not receiving strong support as a direct predictor of subjective feelings of hope. One possible explanation is that participants strongly believed that protecting the climate and preventing seasonal influenza were important regardless of the emotions they felt in response to these issues. Overall, appraisals of importance in the study were fairly high. In Study 1, participants' appraisals of importance before the message were high ($M = 4.14$) as were their appraisals after the message ($M = 4.00$). For Study 2, participants' appraisals after the message were similarly high for the climate protection conditions ($M = 3.92$), but not as high after the message for the seasonal influenza condition ($M = 3.63$). Thus, participants may have had high appraisals of importance regardless of the emotions that they felt.

A second possible explanation that my data supported is that importance may have an indirect effect on subjective feelings of hope rather than a direct effect. The data from Study 2 support path models with indirect relationships between appraisals of importance and subjective feelings of hope. In addition, the path models support the removal of the direct relationship

between appraisals of goal congruence and subjective feelings of hope and removal of the direct relationship between appraisals of possibility and subjective feelings of hope. The effects of the other three appraisals are fully mediated through the appraisal of future expectation. Figure 6.2 demonstrates the indirect relationships between the appraisals and subjective feelings of hope supported by the data.

Figure 6.2: Relationships between the Appraisals and Subjective Feelings of Hope Supported by the Path Models



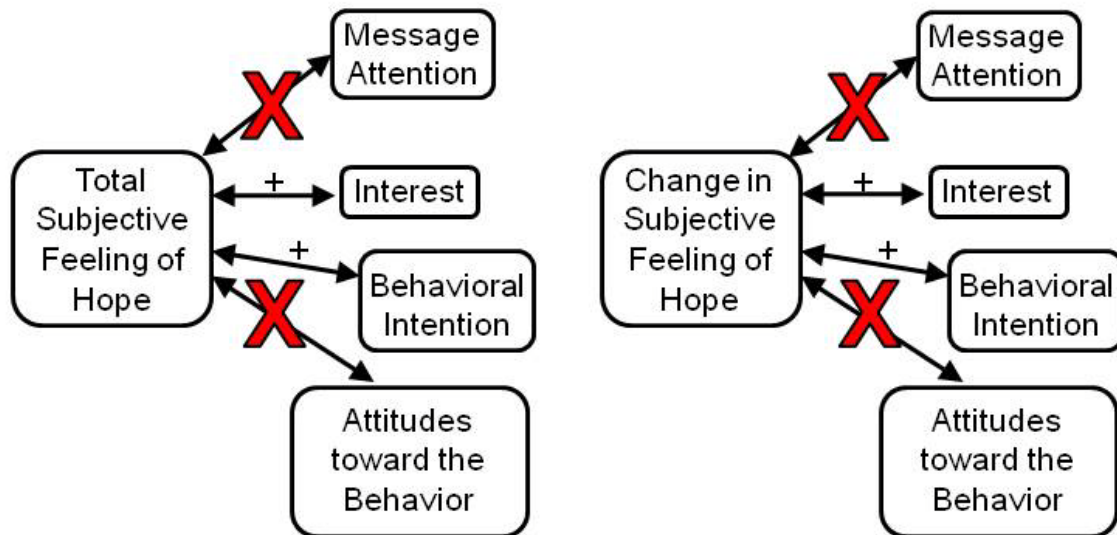
Regardless of the specific model of the relationships between the appraisals and subjective feelings of hope, the fact that appraisals of importance, goal congruence, positive future expectation, and possibility are associated with subjective feelings of hope is a significant contribution of this research to communication science. Knowing the appraisals associated with subjective feelings of hope allows communicators to create messages that attempt to evoke these appraisals and thereby create hope.

Hope and Behavioral Antecedents

The second goal of the empirical studies was to explore relationships between subjective feelings of hope and behavioral antecedents. Studies 1 and 2 examined the relationships between

subjective feelings of hope and message attention, interest in learning about the topic of the message, and behavioral intentions. Study 2 also examined relationships between subjective feelings of hope and attitudes toward the behaviors. None of the data from the two studies supported a relationship between subjective feelings of hope and message attention. Study 2 provided full support for a relationship between total subjective feelings of hope and interest in the message topic, but Study 1 did not provide support for this relationship. The Study 2 seasonal influenza data and the Study 1 data provided support for a positive relationship between changes in subjective feelings of hope after exposure to a message and interest in the message topic. Only the Study 2 seasonal influenza data provided support for a positive relationship between total subjective feelings of hope and behavioral intentions. Similarly, only the Study 2 seasonal influenza data provided support for a positive relationship between changes in subjective feelings of hope after exposure to a message and behavioral intentions. None of the data from Study 2 supported a relationship between either total subjective feelings of hope or changes in subjective feelings of hope after message exposure and attitudes toward the behaviors. Figure 6.3 presents the relationships that I proposed in persuasive hope theory (from Figure 2.6 in chapter 2) with the unsupported relationships crossed out.

Figure 6.3: Support for Proposed Relationships between Subjective Feelings of Hope and Behavioral Antecedents



There are several possible explanations for the lack of relationships between subjective feelings of hope and message attention. According to the cognitive-functional model (Nabi, 1999) a person's attention to a message is a function of his or her expectation that the message contains goal-relevant information. If receivers expect the message to provide information related to goals, they are motivated to process the information (Nabi, 1999, 2002). Because the survey told participants to pay attention to the message and the participants were receiving course credit for participating, their attention may have been affected more by outside influences than by the experimental messages themselves. Future research should use modified procedures to rule out these influences on message attention.

The findings that both total subjective feelings of hope and changes in subjective feelings of hope are positively related to interest in the message topic conform to existing research in

political communication that associates hope/enthusiasm²⁷ with interest and involvement (Marcus & MacKuen, 1993). Because the data in this dissertation were predominantly cross-sectional, I am unable to determine if greater subjective feelings of hope *caused* increases in interest or if greater interest *caused* increased subjective feelings of hope. Future research may be able to distinguish the direction of the relationship between these two constructs. There are implications of the relationship between subjective feelings of hope and interest for communication practitioners. Messages that evoke hope may present an opportunity for practitioners to provide additional persuasion and/or education after the hope appeal that capitalizes on receivers' increased interest in the topic. Subjective feelings of hope may also lead to increased information seeking as a result of increased interest. Conversely, if interest affects whether a person feels hope in response to a message, then interest becomes an important audience segmentation criterion for hope appeals.

The finding that subjective feelings of hope have a positive relationship with intentions to perform seasonal influenza prevention behaviors also has implications for message designers. Unlike climate protection behaviors, seasonal influenza prevention behaviors have clear, direct personal benefits. This difference between the two message topics may explain the difference in the findings. It is possible that messages that evoke hope will be more effective at increasing behavioral intentions for message topics that have direct personal benefits. However, this effect may also be due to the age of the sample (mostly 18-22 years old). People in this age range may be more focused on personal benefits than older populations might be, particularly older populations who are parents, grandparents, and/or guardians. Future research should assess

²⁷ As mentioned previously, the research measuring enthusiasm often used "hope" as one of the items in the measurement scale.

perceptions of personal benefits in both college-aged and older populations to determine if perceptions of direct personal benefits are a differentiating factor between the climate change and seasonal influenza findings.

There are several possible explanations for the finding that subjective feelings of hope are not related to attitudes toward the behaviors. It is worth noting that neither hope nor any of the manipulated hope appeal components or conditions affected attitudes toward the behaviors. This lack of effect may be due to a lack of relationship between subjective feelings of hope and attitudes toward the behaviors or it may be due to strongly held attitudes or measurement issues. If participants had strong attitudes toward the behaviors before reading their assigned message, the message may not have been able to affect those attitudes. Alternatively, social desirability²⁸ (Zerbe & Paulhus, 1987) may have caused all participants to report that behaviors that protect the climate and prevent seasonal influenza are good. Social desirability may be influenced by the age of the sample and the results might be different for older populations. Because attitudes toward recommended behaviors are predictive of behavioral intention (Fishbein & Ajzen, 1975), future research should use modified procedures and different sample populations to rule out the influence of strongly held attitudes or social desirability on attitudes toward the behaviors.

Effects of Hope Appeals

The third goal of the empirical studies was to assess the effects of hope appeals. I examined the effects of hope appeals on subjective feelings of hope, the appraisals, other subjective feelings, and behavioral antecedents. Below, I summarize and discuss the findings

²⁸ Social desirability is the tendency of individual to report socially desirable attitudes and behaviors and to deny socially undesirable attitudes and behaviors.

from this examination. I also present implications of the findings for communication theory, communication practice, and future research.

Effects of hope appeals on subjective feelings of hope. As recommended by O'Keefe (2003), I defined persuasive hope appeals by intrinsic message features rather than the appeal's effects. Thus, a persuasive hope appeal is a hope appeal because it contains elements designed to create the appraisals of hope, not merely because a receiver feels hopeful after reading it. That said, I also anticipated that hope appeals would generate subjective feelings of hope. The data provided partial support for hope appeals as a predictor of subjective feelings of hope. The Study 1 data supported the manipulations of goal congruence and possibility as predictors of subjective feelings of hope. The Study 2 climate change data supported the hypothesis that the strong hope appeal leads to more post-message hope than does the weak hope appeal. However, the seasonal influenza data did not support this hypothesis.

One possible explanation for the Study 1 finding that manipulations of goal congruence and possibility predicted subjective feelings of hope, whereas the manipulations of importance and future expectation did not, is that participants had strong beliefs about importance and future expectation prior to the study. These strong beliefs would dampen any effects of the message manipulations on appraisals. As mentioned above, the data provided only weak support of appraisals of importance as a predictor of subjective feelings of hope; therefore, it is unsurprising that the manipulation of importance did not affect subjective feelings of hope. The finding that manipulations of goal congruence and possibility affect subjective feelings of hope has implications for communication practitioners. Practitioners who want to evoke feelings of hope may only need to address goal congruence and possibility in their messages. Future components studies should examine changes in appraisals and utilize a variety of persuasive topics to understand further the role of each component of the hope appeal on subjective feelings of hope.

Study 2, which compared the effects of a strong hope appeal to a weak hope appeal, indicated that the strong climate protection hope appeal led to higher subjective feelings of hope. Pre-message perceptions of severity, susceptibility, and subjective knowledge; subjective feelings of hope and fear; as well as the post-message perceptions of importance, future expectation, and possibility were significantly different between the climate change and seasonal influenza data. On all the variables except subjective knowledge, the means were lower for the seasonal influenza data. The fact that the seasonal influenza prevention hope appeal did not lead to higher subjective feelings of hope, whereas the climate change appeal did lead to higher subjective feelings of hope may be due to one or more of these factors. For practitioners, these factors may be key audience segmentation criteria for hope appeals. Future research should continue to test hope appeals in persuasive contexts that are different on these dimensions to identify which dimensions influence subjective feelings of hope in response to a hope appeal.

Effects of hope appeals on appraisals. In both Studies 1 and 2, I examined the effects of hope appeals on appraisals of importance, goal congruence, future expectation, and possibility. In Study 1, the strong possibility manipulation led to greater appraisals of possibility; however, the other manipulations did not affect appraisals. In Study 2, both the climate change and seasonal influenza data indicated that the strong hope appeal led to higher post-message appraisals of possibility. Only the seasonal influenza data indicated that the strong hope appeal led to higher post-message appraisals of importance, goal congruence, and future expectation. As mentioned previously, the possibility manipulation was the last manipulated paragraph in the message, so there may be some effect of recency on the post-message appraisals. Also, seasonal influenza differed from climate change on several dimensions. Future research should continue to test hope appeals in persuasive contexts that are different on these dimensions to identify which dimensions influence appraisals in response to a hope appeal.

Effects of hope appeals on other subjective feelings. The studies indicate that hope appeals can evoke emotions other than hope. Specifically, the weak possibility condition in Study 1 led to more subjective feelings of anger than did the strong condition. Similarly, the Study 2 data indicated that the weak hope appeal led to greater feelings of anger. The anger that participants experienced may be reactance to the message or may be anger generated by being faced with a significant problem and being told that it is difficult to do anything about the problem. This finding does not necessarily mean that strong hope appeals decrease anger and thereby are a good tool for addressing angry audiences. It does mean that message developers may unintentionally make receivers angry if the hope appeal is not strong enough to reflect the beliefs of the receivers (e.g., the message says that climate change is merely important when the receiver believes climate change is the most important problem facing us today).

In addition, Study 2 indicated that the weak hope appeal led to greater feelings of sadness, whereas the strong hope appeal led to greater feelings of guilt. In Study 2, I collected, but have not yet analyzed, qualitative data on subjective feelings. These data may provide further insights into the causes of the subjective feelings.

The finding that hope appeals can create subjective feelings other than hope is important for persuasion practitioners. When determining if hope appeals are the most effective strategy for their persuasive campaign, practitioners should consider potential unintended effects of hope appeals in terms of the emotions evoked. The finding also underscores the importance of rigorously pilot testing messages with target audiences to be able to anticipate the effects of the messages.

Effects of hope appeals on behavioral antecedents. Studies 1 and 2 examined the effects of hope appeals on behavioral intentions. In addition, Study 2 examined the effects of hope appeals on self-efficacy, response efficacy, and attitudes toward the behaviors. Because I held the recommended actions component of the hope appeal constant in Study 2, I did not anticipate that

the strong hope appeal would affect either self-efficacy or response efficacy. However, the seasonal influenza data indicated that the strong hope appeal increased response efficacy. This effect may have been a result of the possibility manipulation. By indicating that preventing seasonal influenza is possible, the hope appeal may have also affected response efficacy. The potential amplification of response efficacy by hope appeals indicates that hope appeals may be an effective strategy for persuasion practitioners when creating messages designed to increase response efficacy.

Neither the climate change nor seasonal influenza data from Study 2 provided support for an effect of hope appeals on attitudes toward the behaviors. As mentioned previously, this finding may be due to a lack of relationship between the two, due to strongly held attitudes, or because of social desirability. Future research should use modified procedures with different populations to rule out the influence of strongly held attitudes or social desirability on attitudes toward the behaviors.

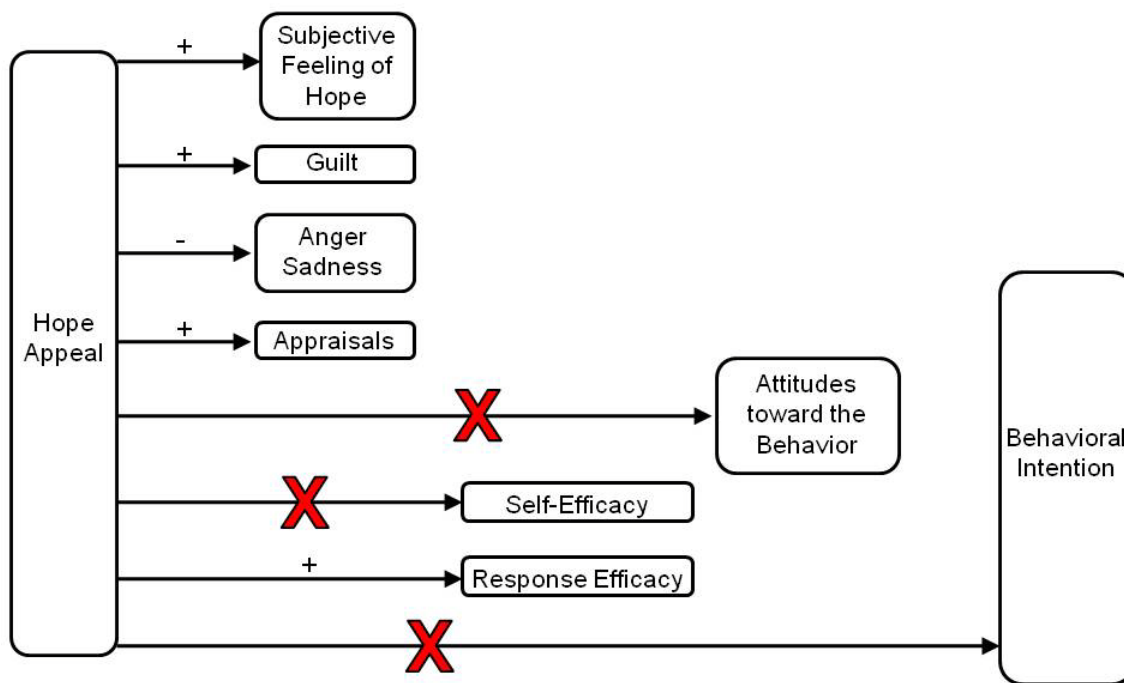
Study 1 indicated a complex interaction between manipulations of importance, goal congruence, and possibility on behavioral intention. Specifically, this interaction indicates that in the weak possibility condition, the strong goal congruence condition led to greater behavioral intention when the message also included the strong importance condition. Also in the weak possibility condition, the weak goal congruence condition led to less behavioral intention when the message also included the strong importance condition. However, for the strong possibility condition, the strong goal congruence condition led to less behavioral intention when the message also included the strong importance condition. Also in the strong possibility condition, the weak goal congruence condition led to greater behavioral intention when the message also included the strong importance condition. This interaction effect indicates that message components designed to evoke appraisals may affect behavioral intention differently in various combinations. Future research should include message component studies that examine the components designed to

evoke appraisals separately to further examine possible interactions between the components. Other than this interaction effect, Study 1 did not support effects of hope appeals on behavior intention.

Neither the climate change nor seasonal influenza data from Study 2 provided support for an effect of hope appeals on behavioral intention. The lack of findings for a relationship between hope appeals and behavioral intentions may be due to other factors, such as barriers, attitudes toward the behavior, self-efficacy, response efficacy, pre-message behavior, perceived susceptibility, and perceived severity, having greater effects on behavioral intentions than the message conditions. Each of these variables was a significant predictor of behavioral intentions. One hope appeal message is likely not strong enough by itself to shift substantially the other predictors of behavioral intentions. Future research should utilize experimental designs that employ multiple messages to amplify the effects of the hope appeals.

Figure 6.4 presents the effects that I proposed in persuasive hope theory (from Figure 2.8 in chapter 2) with the unsupported relationships crossed out.

Figure 6.4: Support for Proposed Effects of Hope Appeals



Individual Characteristics

The fourth goal of the empirical studies was to identify individual characteristics that affect the relationships between subjective feelings of hope, the appraisals, and the behavioral antecedents as well as individual characteristics that affect the effects of hope appeals. Below, I summarize and discuss the findings from my analysis of the individual characteristics. I also present implications of the findings for communication theory, communication practice, and future research.

Relationships between subjective feelings of hope and individual characteristics. I examined the relationships between subjective feelings of hope and perceived susceptibility, perceived severity, environmental identity, and subjective knowledge. Neither the Study 1 nor Study 2 data supported a relationship between subjective feelings of hope and subjective knowledge. Nabi and colleagues (2008) found that higher subjective knowledge was associated with lower fear arousal. Thus, I anticipated that subjective knowledge might similarly dampen arousal of hope in response to hope appeals. However, this relationship was not supported. Although Nabi and colleagues (2008) found that objective knowledge did not affect fear arousal, it may be that objective knowledge, rather than subjective knowledge, affects hope arousal. Future research should examine further the effects of both subjective and objective knowledge on feelings of hope.

The Study 2 data provided full support for a positive relationship between subjective feelings of hope and perceived severity. Study 2 also provided partial support for a positive relationship between subjective feelings of hope and perceived susceptibility. Hope appeals show individuals how to achieve desired outcomes as well as how to avoid negative outcomes. Thus, I hypothesized a relationship between feelings of hope and perceptions of the threat of a potential

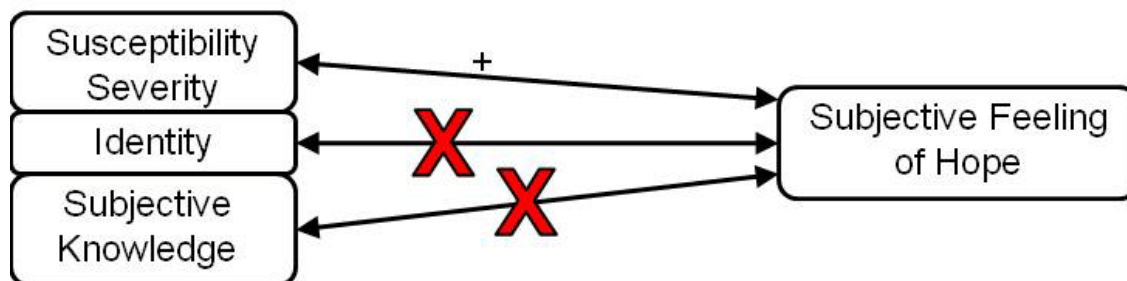
outcome (e.g., continued climate change). The data supported this relationship, indicating that the degree of threat²⁹ presented by a potential negative outcome enhanced participants' likelihood of feeling hopeful in response to a hope appeal. This finding has implications for persuasive hope theory in that threat might be a moderator or even a necessary condition for feeling hope. For persuasion practitioners, it will be important to assess perceptions of severity and susceptibility in target audiences to understand better the potential effects of hope appeals. Future research should continue to explore the association between threat and hope.

Neither Study 1 nor Study 2 provided support for a relationship between subjective feelings of hope and environmental identity. Identity can affect perceptions, judgments, decisions, and behavior (Oyserman, Coon, & Kemmelmeier, 2002). Thus, it makes sense that identity could affect emotions felt in response to a message. However, the data did not support this hypothesis. However, identity does affect other responses to hope appeals as discussed below. Future research should examine identities other than environmental identity to assess their effects on subjective feelings of hope.

Figure 6.5 presents the relationships that I proposed in persuasive hope theory (from Figure 2.7 in chapter 2) with the unsupported relationships crossed out.

²⁹ Perceived severity and perceived susceptibility combine to create perceptions of threat (Witte, 1992).

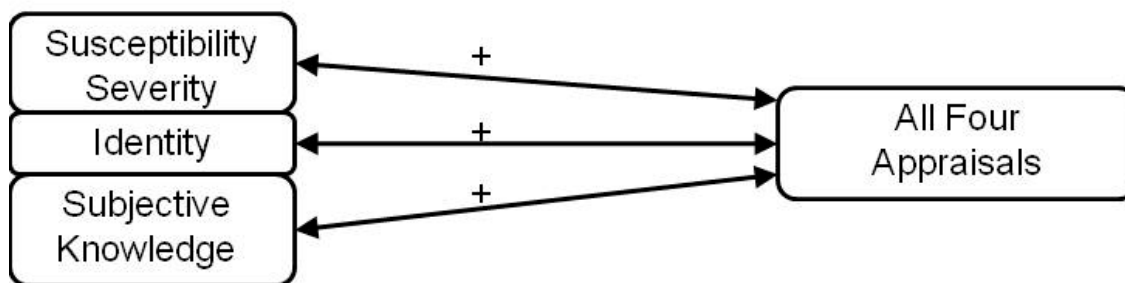
Figure 6.5: Support for Proposed Relationships between Subjective Feelings of Hope and Individual Characteristics



Relationships between the appraisals and individual characteristics. I examined the relationships between each of the four appraisals and perceived susceptibility, perceived severity, environmental identity, and subjective knowledge. Study 1 provided support for positive relationships between all four appraisals and each of the individual characteristics. Study 2 provided substantial support for positive relationships between the appraisals and the individual characteristics as well. The relationships indicate that greater perceived susceptibility to climate change impacts, greater perceived severity of climate change, and a more environmental identity are associated with higher appraisals of importance, higher appraisals of goal congruence, more positive future expectations, and higher appraisals of possibility. These relationships make sense intuitively. For example, people tend to know more about issues that are important to them. Threatening issues are more important and if the threat is averted, the future becomes more positive. Higher appraisals are consonant with a more environmental identity, *et cetera*. Future research should parse out which of these relationships are affected by hope appeals and which are not. For practitioners, subjective knowledge, perceptions of susceptibility and severity, and environmental identity may be important audience segmentation factors for persuasive campaigns.

Figure 6.6 presents the relationships that I proposed in persuasive hope theory (from Figure 2.7 in chapter 2) and the support these relationships received.

Figure 6.6: Support for Proposed Relationships between the Appraisals and Individual Characteristics



There are many individual characteristics in addition to those measured in this research that may affect responses to hope appeals. For messages about climate change, the belief that climate change is real is likely to have a substantial effect on responses to hope appeals about climate protection behaviors. Perceptions of susceptibility, severity, and identity are closely related to this belief, but I did not directly measure belief in climate change. Researchers from Yale and George Mason University have defined six groups within the U.S. population based on belief in global warming, concern, and motivation (Leiserowitz, Maibach, & Roser-Renouf, 2010). These “six Americas” are labeled as *alarmed*, *concerned*, *cautious*, *disengaged*, *doubtful*, and *dismissive*. Practitioners should understand their audience’s beliefs about climate change before developing climate protection messages. For the alarmed, concerned, and cautious populations, messages such as those used in this research are likely to be effective. However, for disengaged, doubtful, and dismissive populations, hope appeals that focus on economic benefits of climate protection behaviors and perhaps do not even mention climate change may be most effective.

Effect Sizes

Often, researchers use guidelines such as those offered by Cohen (1988) to classify effects as small, medium, or large. Under Cohen's guidelines, many of the effects reported in this dissertation are "small." However, this does not mean that the effects lack practical significance. For example, in Study 2, the main effect of the strong/weak hope appeal manipulation on post-message subjective feelings of hope had an effect size of $\eta^2 = .11$. Considering that persuasion and social influence campaigns such as those used in public health and environmental communication often use multiple message and target audiences of millions, a effect of $\eta^2 = .11$ from a single message translates into a substantial practical impact. The message effects found from Study 1 are even more practically significant despite their small size because they are effects of a single paragraph within a four-paragraph message.

Strengths, Limitations, and Future Research

The conclusions I advance in this dissertation are contextualized by the strengths and limitations of my research. In offering ideas for future research and next steps in testing persuasive hope theory, it is important to acknowledge the limitations of this research. The following section discusses the strengths and limitations of my research and presents guidance for future research.

Strengths

The major strength of this dissertation is that it explores new ground related to the role of hope and hope appeals in persuasive communication. Hope and hope appeals previously had not been conceptualized and operationalized in a persuasive context. This research begins what is likely to be a productive research agenda into relationships, effects, and individual characteristics

that affect hope and hope appeals in persuasive contexts. For communication practitioners, hope and hope appeals have the potential to be effective strategies for persuasive communication about health and environmental issues.

My dissertation also provides methodological contributions to communication and persuasion research. Unlike nearly all research on emotions and appraisals, my research measures both emotions and appraisals. Extant research typically either asks participants to describe a time when they felt a particular emotion and then deduces the appraisals from the description, or provides participants with vignettes that are manipulated on appraisal dimensions and then measures participants' emotions. To my knowledge, this dissertation is the only research that both manipulates and measures appraisals as well as measures emotions. My methods provide alternative ways of assessing appraisals and emotions for future research.

Another strength of this dissertation is the diversity of perspectives I included in it. In developing and testing persuasive hope theory, I drew from several distinct theoretical perspectives and bodies of literature. The integration of this literature into the development and testing of persuasive hope theory provided a more holistic understanding of the role of hope and hope appeals in persuasion. Specifically, appraisals theory from psychology provided the foundation for PHT, whereas motivation theory from educational psychology provided justification for hope as a potential motivator of behavior. Similarly, social movement rhetoric provided a long-term perspective on the role of persuasive communication with implications for hope appeals. Climate science provided the urgency for addressing climate protection as well as the scientific basis for the recommended behaviors. Message design and processing theories guided the development of the hope appeals as well as the relationships that I proposed between hope appeals and antecedents to behavior. I believe that my theory and research are stronger because of the integration of these disparate literatures. Future research should continue to

explore ways that these literatures shed light on the role of hope and hope appeals in persuasive contexts.

Limitations

Although this research provides numerous interesting and significant findings, it is important to acknowledge the limitations of this research. The limitations of this research are related predominantly to the messages I used, the measurement of the constructs, and the study samples. Improvement in these areas would likely improve the results and allow for clearer interpretation of the results.

Messages

When designing the messages, I held several factors constant. Therefore, my findings may only generalize to hope appeals that are similar to the ones I utilized in this study. First, I designed the hope appeals in this research to affect all four of the appraisals that are associated with subjective feelings of hope. Second, I held the organizational pattern of the messages constant. Third, I did not test or vary the recommended actions portion of the hope appeals. Additionally, the seasonal influenza and attention control messages could have benefited from rigorous pilot testing.

To induce hope, a message must present an *opportunity* to the receiver. Based on PHT, there are several tactics that can create this opportunity and induce hope, including (a) increasing the possibility of an important outcome, (b) raising the goal congruence of a possible, important outcome, (c) heightening the importance of a possible, goal congruent outcome, and (d) creating a vision for a better future if the outcome occurs. In my studies, I employed all four of these tactics in the hope appeals. However, a hope appeal does not have to employ all these tactics. Although the appraisals of importance, goal congruence, positive future expectation and possibility must all

be present for a person to feel hope, a hope appeal does not need to address all four appraisals if the audience already holds beliefs and attitudes that are consonant with the appraisals. Therefore, the findings from this research only generalize to hope appeals that attempt to affect all four appraisals. Future research should explore the persuasive effects of hope appeals that do not attempt to affect all four appraisals when audience members already hold beliefs that are consonant with the other appraisals.

In designing the hope appeals for this research, I held the organizational pattern of the messages constant. In each message, components designed to evoke appraisals of importance were followed in order by components designed to evoke appraisals of goal congruence, future expectation, and possibility. Because all the appraisals were significantly positively related, the order in which the message components were presented may have affected the results. In addition, the future expectation and possibility manipulations had the most consistent effects, which due to their placement at the end of the message, may have been influenced by recency effects. Future research should vary the organizational pattern of the hope appeals to better understand the effects of organizational pattern on the relationships and effects of hope and hope appeals.

Like other theoretical explications of emotional appeals, I advanced a framework for persuasive hope appeals that focused on two components, (a) the inducement of hope through the presentation of an opportunity and (b) the presentation of recommended actions to achieve the desired outcome. However, I did not test the effects of the recommended actions portion of hope appeals. I did not include this portion in Study 1 and I held it constant in Study 2. Therefore, future research should explore the role of the recommended actions portion of hope appeals in persuasive communication.

Both the seasonal influenza weak hope appeal and attention control message led to unexpected subjective feelings of hope. The formative research and pilot testing concentrated on

the climate change messages and did not test the seasonal influenza or attention control messages. Future research should include rigorous pilot testing of all experimental and control messages.

Measurement

Because my research explored a new area of communication science, I developed many of the measures and scales specifically for these studies. Although the measurement properties of my scales were good, the measures need to undergo continued analysis of their measurement properties. This analysis should be carried out in similar as well as different contexts and populations.

Interpretation of my findings may be limited by the lack of assessment of pre-message appraisals in Study 2. Study 1 measured appraisals both before and after participants read the messages. However, to reduce the burden on participants, Study 2 only measured appraisals after participants read the messages. Although the intention was for the control group to serve as a baseline for pre-message appraisals, individual-level changes in appraisal levels may be relevant to understanding the effects of hope and hope appeals. Future research should be conducted in a least two phases, such that the first phase measures appraisals and after a time lapse (e.g., at least a week), the second phase presents a message and measures post-message appraisals.

Sample

The generalization of my findings may be limited by the samples for my studies. I developed my messages and conducted my research with college students at The Pennsylvania State University. Reflecting the population of the University, my sample was predominately White/Caucasian, educated, and generally from a moderate to high socioeconomic bracket. Thus, my findings may only generalize to similar populations. To assess the extent that race/ethnicity,

education, and/or socioeconomic status influence how individuals respond to hope appeals, future research needs to test persuasive hope theory and hope appeals in more diverse populations.

Future Research

The results of this research provide several new avenues for communication and persuasion scholars to pursue. In this dissertation, I developed a new theory and began exploring the roles of hope and hope appeals in persuasive communication. Future research should continue to test persuasive hope theory and the roles of hope and hope appeals in health and environmental contexts as well as other persuasive contexts. This research will help refine and define boundary conditions for persuasive hope theory. In the above discussion of my study findings, strengths, and limitations, I identify manifold areas for future research, including research that examines possible alternative explanations for the findings. Overall, persuasive hope theory and the role of hope and hope appeals in communication are fertile ground for future research and practice.

Conclusion

The theory and research in this dissertation advocate for the role of hope and hope appeals in persuasive communication. Using appraisal theory, a discrete model of emotions, and message design theories, I developed persuasive hope theory. The theory enhances previous research on the role of emotions in persuasion and offers new insights into persuasive message design. PHT also offers numerous new areas for exploration in communication theory, research, and practice. In addition to developing persuasive hope theory, I empirically tested the role of hope and hope appeals in persuasion by examining relationships between subjective feelings of hope and appraisals, exploring relationships between subjective feelings of hope and behavioral antecedents, assessing the effects of hope appeals, and identifying individual characteristics that

affect the above relationships and effects. The findings from my research largely support the relationships predicted by persuasive hope theory. Most significantly, the findings indicate that communicators *can* design messages that create subjective feelings of hope and that increase appraisals of importance, goal congruence, positive future expectation, and possibility. The appraisals and subjective feelings of hope both have implications for antecedents to behavior. Thus, this research offers several theoretical as well as practical implications for communication and persuasion scholarship and practice.

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APPENDIX A:**Formative Focus Group Demographic Questionnaire**

Please circle the answers that best describes you:

Age:

18 19 20 21 22 Other_____

Year in school:

Freshman Sophomore Junior Senior Other_____

Sex/Gender:

Male Female Other_____

Race/Ethnicity:

Caucasian/ African Asian/ Native Hispanic/ Other_____
White American/ Pacific Hawaiian or Latino/a
Black Islander Alaskan

Major: _____

Did you primarily grow up in a place that was...

Urban Suburban Rural

Do you consider yourself to be pro-environment?

Yes No

Do you consider yourself to be an environmentalist?

Yes No

APPENDIX B:

Formative Focus Group Discussion Guide

Introduction to Group Process and Procedures (2 minutes)

Thank you for taking the time to be here. My name is Amy Chadwick. I am a doctoral student in the department of Communication Arts and Sciences.

I want to take a few minutes to tell you what to expect from our focus group discussion today and to give everyone the chance to introduce themselves.

A focus group is simply a group discussion that is *focused* on particular issues. Today we will be talking about issues related to the environment. You should know that I am not an expert in environmental issues, nor am I advocating a particular position about environmental issues. I am simply here to lead the discussion and make sure that everyone has a chance to talk. This is not a class, I am not here to teach you or give you information. In fact, I am here to listen to you and find out what you think.

I would like to hear your frank and honest opinions on issues related to the environment. To do that we all need to be respectful of each other's opinions. It is okay to disagree. I want to hear everyone's opinions. My role is to guide the discussion. I will ask the questions to provide a structure for the discussion and to draw information from you. At times, I may ask you to keep your comments brief or to summarize. I will go on to the next question if it appears we are spending too much time on one question. Please don't take it personally! I just want to make sure I can hear from you about all of the topics. I want to hear from all of you, so don't hesitate to speak up and please allow others to speak too.

I will use the information from this and the other focus groups to write a class paper and maybe a publication or conference presentation. I will not report your comments by name in any papers or publications, and ask that you respect one another's privacy in the same way. I will audiotape our discussion so that I can have an accurate transcript of what was said. Please try to speak clearly and one at a time, if possible.

Informed Consent (5 minutes)

Before we begin, I would like to review the informed consent agreement with you and ask you to sign it (pass out the form, verbally review it, and ask for questions).

Do you have any questions before we get started?

Demographic Survey (3 minutes)

I am passing out a brief questionnaire that asks about you. Please do not put your name on it. This information is just so that I can describe the people I talked to in these groups.

Warm-Up and Introductions (3 minutes)

At this time, I'd like to ask you to take a minute and think about what comes to mind when I say the word "environment." Then go ahead and write what comes to mind on the index card in front of you.

Now I'd like to go around the table and ask each of you to introduce yourselves briefly with the following information:

- Name
- Major
- What you wrote on your card

As you can see, we have diverse views on what the environment is. For the purpose of this discussion, we will be using the word "environment" to mean the plants, soil, air, water, and non-human animals that make up earth.

Discussion (45 minutes)

Environmental Issues (10 minutes)

I would like to start off by discussing environmental issues in general.

1. What kinds of environmental issues do you hear about?
2. Which of these issues concern you most? Why?
3. Which of these issues concern you least? Why?
4. What images come to mind when you think of these issues? [visual]
5. How do these issues make you feel? [emotion]
6. In your view, what are some of the challenges of addressing these issues?
 - a. What are some ethical issues that might come into play? [ethics]

Perceptions and Beliefs about Climate Change (20 minutes)

Now I would like to talk about one particular environmental issue, climate change.

1. Have you heard about climate change? [knowledge/beliefs]
 - a. What do you know about climate change?
 - b. What images come to mind when you think about climate change? [visual]
2. Have you heard of global warming? [knowledge/beliefs]
 - a. What do you know about global warming?
3. What images come to mind when you think about global warming? [visual]
 - b. Is climate change the same thing or different from global warming?
 - c. Is it the same thing or different from the ozone hole?
4. How serious a concern is climate change? Why? [perceived severity]
 - d. Are you worried about climate change? [severity/susceptibility]
5. What do you think will happen as a result of climate change? [outcome expectations]
6. How do you feel about climate change? [emotions]
7. What do you think climate change will affect the most? [outcome expectations]
8. Whom will climate change affect the most? [perceived susceptibility/beliefs]
9. How might climate change affect you? [perceived susceptibility]

Perceptions and Beliefs about Behaviors to Address Climate Change (15 minutes)

Now, for the purposes of this discussion, let's assume that climate change does need to be slowed down.

1. Whose responsibility is it to slow down climate change?
 - a. What can they do to slow down climate change?

2. What might be some ethical issues involved in slowing down climate change? [ethics]
3. What do you think individuals like us can do to slow down climate change? [behaviors]
 - a. Looking at the behaviors we've listed, how easy or hard are these behaviors? [self-efficacy]
4. What might motivate or influence you to do these behaviors? [motivation]
 - a. What might motivate or influence other students to do these behaviors? [motivation]
5. How confident are you about performing these behaviors? [self-efficacy]
 - a. What challenges might you face? [barriers]
 - b. What might help you do them? [facilitators]
6. What are the potential positive impacts of doing these behaviors [perceived benefits/outcome expectations]
7. What are the potential negative impacts of doing these behaviors [perceived barriers/outcome expectations]
8. How effective do you think these behaviors will be at slowing climate change? [response-efficacy/outcome expectations]

Closing (2 minutes)

Well, that is the last of my questions. Do you have anything you would like to add that we have not talked about? Thank you again for taking the time to participate in this discussion. I sincerely appreciate and value your input.

APPENDIX C:

Formative Survey

Welcome!

This survey is about **climate change or global warming** and should take you about **45 minutes** to complete.

For the purposes of this survey, **climate change and global warming mean the same thing.**

Climate is the average weather of a particular location over many decades or longer. Thus, the climate is made up of the air, living beings, earth, water, and frozen components.

Climate change is changes in the average weather and the air, living beings, earth, water, and frozen components beyond natural variation. These climate changes include increases in global temperature (global warming), modified patterns of atmospheric and ocean circulation, rise in sea level, changes in precipitation patterns, and changes in the human and ecological systems that depend on the climate.

One of the most significant climate changes is global warming.

[Begin survey]

Please indicate how much you disagree or agree with each statement below.

Climate change is...	Strongly Disagree³⁰	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
good.	1	2	3	4	5
bad.	1	2	3	4	5
beneficial.	1	2	3	4	5
undesirable.	1	2	3	4	5
desirable.	1	2	3	4	5
harmful.	1	2	3	4	5

³⁰ For the remainder of this survey, I use SD for strongly disagree, D for disagree, N for neither agree nor disagree, A for agree, and SA for strongly agree. In the actual survey, all words were written out (i.e., no abbreviations).

Please indicate how much you disagree or agree with each statement below.

Climate change...	SD	D	N	A	SA
is affecting me now.	1	2	3	4	5
will affect me in the next 10 years.	1	2	3	4	5
will affect me in my lifetime.	1	2	3	4	5
will affect the next generation, not my generation.	1	2	3	4	5
will never affect me.	1	2	3	4	5
is affecting people now.	1	2	3	4	5
will affect people in the next 10 years.	1	2	3	4	5
will affect people in the next 50 years.	1	2	3	4	5
will affect people in the next 100 years.	1	2	3	4	5
will never affect people.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Climate change will affect...	SD	D	N	A	SA
people in developing countries.	1	2	3	4	5
people in industrialized countries.	1	2	3	4	5
people living near the north pole.	1	2	3	4	5
people living near the south pole.	1	2	3	4	5
people living near me.	1	2	3	4	5
people living near the equator.	1	2	3	4	5
people in the U.S.	1	2	3	4	5
people in the Mid-Atlantic.	1	2	3	4	5
people in my state.	1	2	3	4	5
people in my hometown.	1	2	3	4	5
my family.	1	2	3	4	5
me.	1	2	3	4	5
my kids.	1	2	3	4	5
my grandkids.	1	2	3	4	5
people living far away from me.	1	2	3	4	5

The primary cause of global warming is an increase in greenhouse gases like carbon dioxide and methane in the atmosphere. These gases trap heat from the sun in the earth's atmosphere making it warmer. Thus, one way to slow down climate change is to reduce the emissions of these gases.

Please indicate how much you disagree or agree with each statement below.

People do not reduce their greenhouse gas emissions because...	SD	D	N	A	SA
they don't care.	1	2	3	4	5
it takes too much time.	1	2	3	4	5
it is expensive.	1	2	3	4	5
it will decrease their quality of life.	1	2	3	4	5
they don't know how to reduce their greenhouse gas emissions.	1	2	3	4	5
they have more important things to worry about.	1	2	3	4	5
they think climate change won't affect them.	1	2	3	4	5
it is inconvenient.	1	2	3	4	5
technology will make it so they don't have to.	1	2	3	4	5
they don't believe that climate change is a problem.	1	2	3	4	5
they don't believe that climate change is happening.	1	2	3	4	5
they don't think they can make a difference.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

	SD	D	N	A	SA
Even if I were to do everything I could to slow down climate change, it wouldn't make a difference.	1	2	3	4	5
Reducing greenhouse gas emissions only works if everyone does it.	1	2	3	4	5
One person can't make a difference in reducing greenhouse gas emissions to slow down climate change.	1	2	3	4	5
I can't make a difference in reducing greenhouse gas emissions to slow down climate change.	1	2	3	4	5
It is too difficult for someone like me to slow down climate change by reducing greenhouse gas emissions.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

	SD	D	N	A	SA
I have control over slowing down climate change.	1	2	3	4	5
Slowing down climate change would make me feel good.	1	2	3	4	5
There is little I am able to do to slow down climate change.	1	2	3	4	5
I don't know how to slow down climate change.	1	2	3	4	5
I would like to slow down climate change.	1	2	3	4	5
I can do things to slow down climate change.	1	2	3	4	5
I am anxious about what will happen if we don't slow down climate change.	1	2	3	4	5
I would enjoy doing things to slow down climate change.	1	2	3	4	5
If we don't slow down climate change, bad things will happen.	1	2	3	4	5
Slowing down climate change is out of my control.	1	2	3	4	5
I am worried about what might happen if we don't slow down climate change.	1	2	3	4	5
I feel helpless to slow down climate change.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Climate change will cause...	SD	D	N	A	SA
glaciers to melt.	1	2	3	4	5
sea level to rise.	1	2	3	4	5
coastal areas to flood.	1	2	3	4	5
more droughts.	1	2	3	4	5
more floods.	1	2	3	4	5
the ozone hole to get bigger.	1	2	3	4	5
more storms.	1	2	3	4	5
more hurricanes.	1	2	3	4	5
more natural disasters.	1	2	3	4	5
more extreme (hot and cold) temperatures.	1	2	3	4	5
more mild weather.	1	2	3	4	5
death.	1	2	3	4	5
an increase in infectious diseases.	1	2	3	4	5
an increase in mental health conditions.	1	2	3	4	5
an increase in skin cancer.	1	2	3	4	5
human migration.	1	2	3	4	5
animal migration.	1	2	3	4	5
animal extinction.	1	2	3	4	5
changes in what crops we can grow.	1	2	3	4	5
human extinction.	1	2	3	4	5
parts of the U.S., like Florida, to be underwater.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Climate change is...	SD	D	N	A	SA
a serious problem.	1	2	3	4	5
overblown.	1	2	3	4	5
severe.	1	2	3	4	5
exaggerated.	1	2	3	4	5
a big deal.	1	2	3	4	5
nothing to worry about.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

	SD	D	N	A	SA
In uncertain times, I usually expect the best.	1	2	3	4	5
It's easy for me to relax.	1	2	3	4	5
If something can go wrong for me, it will.	1	2	3	4	5
I'm always optimistic about my future.	1	2	3	4	5
I enjoy my friends a lot.	1	2	3	4	5
It's important for me to keep busy.	1	2	3	4	5
I hardly ever expect things to go my way.	1	2	3	4	5
I don't get upset too easily.	1	2	3	4	5
I rarely count on good things happening to me.	1	2	3	4	5
Overall, I expect more good things to happen to me than bad.	1	2	3	4	5

Please indicate your response to each statement below.

Slowing down climate change is...

Unimportant		Neither		Important
1	2	3	4	5

Slowing down climate change is...

Of No Concern		Neither		Of Much Concern
1	2	3	4	5

Slowing down climate change...

Means Nothing		Neither		Means A Lot
1	2	3	4	5

Slowing down climate change...

Doesn't Matter to Me		Neither		Does Matter to Me
1	2	3	4	5

Slowing down climate change is...

Insignificant		Neither		Significant
1	2	3	4	5

Slowing down climate change is...

Irrelevant		Neither		Relevant
1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Climate change is a serious threat to...	SD	D	N	A	SA
me.	1	2	3	4	5
my family.	1	2	3	4	5
the U.S.	1	2	3	4	5
other people.	1	2	3	4	5
the world.	1	2	3	4	5
animals.	1	2	3	4	5
plants.	1	2	3	4	5
humans.	1	2	3	4	5
minorities.	1	2	3	4	5
poor people.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

	SD	D	N	A	SA
My friends are concerned about climate change.	1	2	3	4	5
My family is <u>not</u> worried about climate change.	1	2	3	4	5
People who are important to me try to reduce their greenhouse gas emissions.	1	2	3	4	5
Most of my friends do <u>not</u> try to reduce their greenhouse gas emissions.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

	SD	D	N	A	SA
It is likely that climate change will affect my job.	1	2	3	4	5
It is likely that climate change will affect my family.	1	2	3	4	5
Climate change will affect me, but I don't know how it will affect me.	1	2	3	4	5
It is likely that climate change will make prices for products like food higher.	1	2	3	4	5
I am at risk for developing health problems because of climate change.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

I would believe advice about reducing my greenhouse gas emissions if that advice came from....	SD	D	N	A	SA
a friend	1	2	3	4	5
my parent	1	2	3	4	5
a doctor	1	2	3	4	5
a scientist	1	2	3	4	5
my religious or spiritual leader	1	2	3	4	5
the federal government	1	2	3	4	5
my local politician	1	2	3	4	5
my professor	1	2	3	4	5
a newscaster	1	2	3	4	5
the internet	1	2	3	4	5
my favorite comedian	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

	SD	D	N	A	SA
Climate change is an important problem.	1	2	3	4	5
I care about climate change.	1	2	3	4	5
It is important to me to reduce my greenhouse gas emissions.	1	2	3	4	5
I have more important things to worry about than climate change.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Reducing my greenhouse gas emissions...	SD	D	N	A	SA
Doesn't matter	1	2	3	4	5
takes too much time.	1	2	3	4	5
costs too much.	1	2	3	4	5
will decrease my quality of life.	1	2	3	4	5
Is a waste of effort	1	2	3	4	5
it is inconvenient.	1	2	3	4	5

Please indicate how much you feel each emotion.

When I think about climate change, I feel...	None of this Emotion				A Great Deal of this Emotion
Happy	1	2	3	4	5
Angry	1	2	3	4	5
Hopeful	1	2	3	4	5
Proud	1	2	3	4	5
Guilty	1	2	3	4	5
Afraid	1	2	3	4	5
Surprised	1	2	3	4	5
Disgusted	1	2	3	4	5
Enthusiastic	1	2	3	4	5
Distressed	1	2	3	4	5
Sad	1	2	3	4	5
Bored	1	2	3	4	5
Optimistic	1	2	3	4	5
Worried	1	2	3	4	5
Ashamed	1	2	3	4	5
Expectant	1	2	3	4	5
Calm	1	2	3	4	5
Anxious	1	2	3	4	5
Sorrowful	1	2	3	4	5
Unconcerned	1	2	3	4	5
Frustrated	1	2	3	4	5
Remorseful	1	2	3	4	5
Elated	1	2	3	4	5
Hopeless	1	2	3	4	5
Carefree	1	2	3	4	5
Resigned	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Assuming that climate change needs to be slowed down, who is responsible for slowing it down?	SD	D	N	A	SA
Businesses.	1	2	3	4	5
The U.S. government.	1	2	3	4	5
All industrialized countries.	1	2	3	4	5
U.S. state governments.	1	2	3	4	5
The U.S. with other industrialized countries.	1	2	3	4	5
The U.S. with all other countries.	1	2	3	4	5
Everyone	1	2	3	4	5
Industry.	1	2	3	4	5
Me.	1	2	3	4	5
My family.	1	2	3	4	5
Environmental organizations.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

It is hard for me to...	SD	D	N	A	SA
buy recycled paper.	1	2	3	4	5
buy a fuel-efficient car.	1	2	3	4	5
buy locally grown foods.	1	2	3	4	5
switch to ethanol fuel.	1	2	3	4	5
buy organic products.	1	2	3	4	5
educate others about what they can do to slow climate change.	1	2	3	4	5
eat fewer dairy products (e.g., milk, ice cream, cheese).	1	2	3	4	5
keep my car or truck tuned up.	1	2	3	4	5
learn more about how to reduce my greenhouse gas emissions.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

It is easy for me to...	SD	D	N	A	SA
reduce my greenhouse gas emissions.	1	2	3	4	5
replace my incandescent light bulbs with compact fluorescent light bulbs.	1	2	3	4	5
turn my air conditioning 2 degrees warmer in the summer.	1	2	3	4	5
plant a tree.	1	2	3	4	5
turn off my computer when I am not using it.	1	2	3	4	5
buy fresh instead of frozen foods.	1	2	3	4	5
use less hot water by washing my clothes in warm or cold water.	1	2	3	4	5
drive less by walking.	1	2	3	4	5
recycle.	1	2	3	4	5
eat less meat.	1	2	3	4	5
carpool.	1	2	3	4	5
write policy makers.	1	2	3	4	5
use less hot water by taking shorter showers.	1	2	3	4	5
use a reusable water bottle instead of plastic bottles.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

It is inconvenient for me to...	SD	D	N	A	SA
unplug my cell phone charger when I am not using it.	1	2	3	4	5
drive less by biking.	1	2	3	4	5
turn my heat 2 degrees colder in the winter.	1	2	3	4	5
take mass transportation.	1	2	3	4	5
run my dishwasher with only a full load.	1	2	3	4	5
bring reusable bags to the grocery store.	1	2	3	4	5
air dry my clothes instead of drying them in the dryer.	1	2	3	4	5
use less hot water by taking fewer showers.	1	2	3	4	5

Read each item carefully. Using the scale shown below, please select the number that best describes YOU.

	Definitely False	Somewhat False	Neither True nor False	Somewhat True	Definitely True
I can think of many ways to get out of a jam.	1	2	3	4	5
I energetically pursue my goals.	1	2	3	4	5
I feel tired most of the time.	1	2	3	4	5
There are lots of ways around any problem.	1	2	3	4	5
I am easily downed in an argument.	1	2	3	4	5
I can think of many ways to get the things in life that are important to me.	1	2	3	4	5
I worry about my health.	1	2	3	4	5
Even when others get discouraged, I know I can find a way to solve the problem.	1	2	3	4	5
My past experiences have prepared me well for my future.	1	2	3	4	5
I've been pretty successful in life.	1	2	3	4	5
I usually find myself worry about something.	1	2	3	4	5
I meet the goals that I set for myself.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Climate change can be slowed down by...	SD	D	N	A	SA
educating people about what they can do.	1	2	3	4	5
replacing incandescent light bulbs with compact fluorescent light bulbs.	1	2	3	4	5
turning the air conditioning 2 degrees warmer in the summer.	1	2	3	4	5
turning the heat 2 degrees colder in the winter.	1	2	3	4	5
turning off electronic devices like computers when they are not being used.	1	2	3	4	5
using less hot water by taking shorter showers.	1	2	3	4	5
using less hot water by taking fewer showers.	1	2	3	4	5
using less hot water by washing clothes in warm or cold water.	1	2	3	4	5
unplugging electronics like cell phone chargers when they are not in use.	1	2	3	4	5
recycling.	1	2	3	4	5
buying recycled paper.	1	2	3	4	5
planting a tree.	1	2	3	4	5
reducing greenhouse gas emissions	1	2	3	4	5
buying locally grown foods.	1	2	3	4	5
buying fresh instead of frozen foods.	1	2	3	4	5
buying organic products.	1	2	3	4	5
having fewer children.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Climate change can be slowed down by...	SD	D	N	A	SA
eating less meat.	1	2	3	4	5
eating fewer dairy products (e.g., milk, ice cream, and cheese).	1	2	3	4	5
switching to ethanol fuel.	1	2	3	4	5
buying a fuel-efficient car.	1	2	3	4	5
replacing gas-burning power plants with coal burning plants.	1	2	3	4	5
walking.	1	2	3	4	5
biking.	1	2	3	4	5
taking mass transportation.	1	2	3	4	5
carpooling.	1	2	3	4	5
keeping personal vehicles (cars and trucks) tuned up.	1	2	3	4	5
writing policymakers.	1	2	3	4	5
running the dishwasher with only a full load.	1	2	3	4	5
not having children	1	2	3	4	5
bringing reusable bags to the grocery store.	1	2	3	4	5
using a reusable water bottle instead of plastic bottles.	1	2	3	4	5
air drying clothes instead of drying them in the dryer.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

	SD	D	N	A	SA
I have very few fears compared to my friends.	1	2	3	4	5
Even if something bad is about to happen to me, I rarely experience fear or nervousness.	1	2	3	4	5
When I go after something, I use a “no holds barred” approach.	1	2	3	4	5
I often act on the spur of the moment.	1	2	3	4	5
If I see a chance to get something I want, I move on it right away.	1	2	3	4	5
When I get something I want, I feel excited and energized.	1	2	3	4	5
Criticism or scolding hurts me quite a bit.	1	2	3	4	5
I worry about making mistakes.	1	2	3	4	5
When I see an opportunity for something I like, I get excited right away.	1	2	3	4	5
I feel worried when I think I have done poorly at something.	1	2	3	4	5
I crave excitement and new sensations.	1	2	3	4	5
When I want something, I usually go all-out to get it.	1	2	3	4	5
When I’m doing well at something, I love to keep at it.	1	2	3	4	5
It would excite me to win a contest.	1	2	3	4	5
I will often do things for no other reason than that they might be fun.	1	2	3	4	5
I’m always willing to try something new if I think it will be fun.	1	2	3	4	5
I go out of my way to get things I want.	1	2	3	4	5
When good things happen to me, it affects me strongly.	1	2	3	4	5
If I think something unpleasant is going to happen I usually get pretty “worked up.”	1	2	3	4	5
I feel pretty worried or upset when I think of know somebody is angry with me.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Currently I...	SD	D	N	A	SA
educate myself about what I can do to slow climate change.	1	2	3	4	5
have replaced my incandescent light bulbs with compact fluorescent light bulbs.	1	2	3	4	5
turn my air conditioning 2 degrees warmer in the summer.	1	2	3	4	5
turn my heat 2 degrees colder in the winter.					
turn off my computer when I am not using it.	1	2	3	4	5
use less hot water by taking shorter showers.	1	2	3	4	5
use less hot water by taking fewer showers.	1	2	3	4	5
use less hot water by washing my clothes in warm or cold water.	1	2	3	4	5
unplug my cell phone charger when I am not using it.	1	2	3	4	5
recycle.	1	2	3	4	5
buy recycled paper.	1	2	3	4	5
plant trees.	1	2	3	4	5
buy locally grown foods.	1	2	3	4	5
buy fresh instead of frozen foods.	1	2	3	4	5
buy organic products.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Currently I...	SD	D	N	A	SA
eat less meat.	1	2	3	4	5
eat fewer dairy products (e.g., milk, ice cream, cheese).	1	2	3	4	5
bike instead of driving.	1	2	3	4	5
drive a fuel-efficient car.	1	2	3	4	5
walk instead of driving.	1	2	3	4	5
take mass transportation.	1	2	3	4	5
carpool.	1	2	3	4	5
keep my car or truck tuned up.	1	2	3	4	5
write policy makers about slowing down climate change.	1	2	3	4	5
talk with my friends about how to slow down climate change.	1	2	3	4	5
run my dishwasher only with a full load.	1	2	3	4	5
try to reduce my greenhouse gas emissions.	1	2	3	4	5
bring reusable bags to the grocery store.	1	2	3	4	5
use a reusable water bottle instead of plastic bottles.	1	2	3	4	5
air dry my clothes instead of drying them in the dryer.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

In the next month, I intend to...	SD	D	N	A	SA
learn more about what I can do to slow climate change.	1	2	3	4	5
replace my incandescent light bulbs with compact fluorescent light bulbs.	1	2	3	4	5
turn my heat 2 degrees colder.	1	2	3	4	5
turn off my computer when I am not using it.	1	2	3	4	5
use less hot water by taking shorter showers.	1	2	3	4	5
use less hot water by taking fewer showers.	1	2	3	4	5
use less hot water by washing my clothes in warm or cold water.	1	2	3	4	5
unplug my cell phone charger when I am not using it.	1	2	3	4	5
recycle.	1	2	3	4	5
buy recycled paper.	1	2	3	4	5
plant a tree.	1	2	3	4	5
buy locally grown foods.	1	2	3	4	5
buy fresh instead of frozen foods.	1	2	3	4	5
buy organic products.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

In the next month, I intend to...	SD	D	N	A	SA
eat less meat.	1	2	3	4	5
eat fewer dairy products (e.g., milk, ice cream, cheese).	1	2	3	4	5
bike instead of driving.	1	2	3	4	5
drive a fuel-efficient car.	1	2	3	4	5
walk instead of driving.	1	2	3	4	5
take mass transportation.	1	2	3	4	5
carpool.	1	2	3	4	5
keep my car or truck tuned up.	1	2	3	4	5
write policy makers about slowing down climate change.	1	2	3	4	5
talk with my friends about how to slow down climate change.	1	2	3	4	5
run my dishwasher only with a full load.	1	2	3	4	5
try to reduce my greenhouse gas emissions.	1	2	3	4	5
bring reusable bags to the grocery store.	1	2	3	4	5
use a reusable water bottle instead of plastic bottles.	1	2	3	4	5
air dry my clothes instead of drying them in the dryer.	1	2	3	4	5

Please indicate how much you disagree or agree with each statement below.

Climate change is mostly about...	SD	D	N	A	SA
energy.	1	2	3	4	5
morals.	1	2	3	4	5
politics.	1	2	3	4	5
health.	1	2	3	4	5
technology.	1	2	3	4	5
justice.	1	2	3	4	5
economics.	1	2	3	4	5
science.	1	2	3	4	5
safety.	1	2	3	4	5
the environment.	1	2	3	4	5
people.	1	2	3	4	5

Age:

18 19 20 21 22 Other_____

Year in school:

Freshman Sophomore Junior Senior Other_____

Sex/Gender:

Male Female Transgender

Race/Ethnicity: (check all that apply)

Caucasian/ White	African American/ Black	Asian/ Pacific Islander	Native Hawaiian or Alaskan	Hispanic/Latino/a	Other_____
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Major: _____**Did you primarily grow up in a place that was...**

Urban Suburban Small Town Rural

Do you consider yourself to be pro-environment?

Yes No

Do you consider yourself to be an environmentalist?

Yes No

APPENDIX D:

Tables from Formative Survey

Table D.1: How Easy College Students Perceive Climate Change Mitigation Behaviors to Be

	Percentages			
	Strongly			
It is easy for me to...	Agree	Agree	Mean	SD
Recycle	14.9	52.0	3.62	1.00
Replace my incandescent light bulbs with compact fluorescent light bulbs	15.5	43.2	3.56	1.02
Use less hot water by washing clothes in warm or cold water	13.5	47.3	3.54	1.01
Run my dishwasher with only a full load	14.2	45.9	3.54	1.02
Use a reusable water bottle instead of plastic bottles	14.2	47.3	3.52	1.05
Buy recycled paper	6.1	47.3	3.39	0.91
Turn off my computer when I am not using it	10.8	44.6	3.34	1.10
Buy fresh instead of frozen foods	7.4	46.6	3.34	1.02
Drive less by walking	12.8	39.2	3.32	1.13
Unplug my cell phone charger when not in use	10.1	41.2	3.27	1.10
Buy locally grown foods	8.8	38.5	3.24	1.05
Keep my car or truck tuned up	5.4	36.5	3.24	0.91
Use less hot water by taking shorter showers	9.5	38.5	3.20	1.14
Carpool	8.8	33.1	3.15	1.07
Reduce my greenhouse gas emissions	6.8	26.4	3.14	0.91

Turn my heat 2 degrees colder in the winter	7.4	37.8	3.14	1.07
Plant a tree	6.8	30.4	3.08	1.02
Buy organic products	6.8	33.1	3.04	1.09
Take mass transportation	8.1	30.4	2.99	1.14
Bring reusable bags to the grocery store	6.8	29.1	2.99	1.07
Educate others about slowing climate change	3.4	23.6	2.82	0.98
Drive less by biking	4.7	22.3	2.77	1.05
Use less hot water by taking fewer showers	4.1	27.7	2.77	1.14
Write policy makers	3.4	15.5	2.73	0.93
Eat fewer dairy products	3.4	24.3	2.71	1.07
Eat less meat	5.4	21.6	2.65	1.17
Air dry my clothes	6.8	20.3	2.65	1.16
Buy a fuel-efficient car	2.7	19.6	2.54	1.04

Table D.2: How Efficacious College Students Perceive Climate Change Mitigation Behaviors Are

	Percentages			
	Strongly		Mean	SD
Climate change can be slowed down by...	Agree	Agree		
Reducing greenhouse gas emissions	35.8	48.6	4.16	0.79
Educating people about what they can do	30.4	50.0	4.07	0.80
Buying a fuel-efficient car	26.4	56.1	4.05	0.76
Walking	23.6	58.8	4.03	0.73
Taking mass transportation	23.0	56.1	3.98	0.77
Carpooling	22.3	59.5	3.98	0.80
Using a reusable water bottle instead of plastic ones	24.3	54.1	3.97	0.82
Biking	21.6	58.1	3.95	0.82
Replacing incandescent light bulbs with compact fluorescent light bulbs	22.3	54.7	3.93	0.83
Recycling	23.6	54.1	3.93	0.88
Buying recycled paper	20.3	58.1	3.93	0.78
Running the dishwasher with only a full load	18.9	58.1	3.93	0.74
Planting a tree	20.9	55.4	3.91	0.81
Bringing reusable bags to the grocery store	21.6	54.1	3.90	0.84
Turning off computers when not in use	20.3	56.1	3.89	0.86
Using less hot water by taking shorter showers	18.2	58.1	3.89	0.80
Air drying clothes	20.3	54.7	3.89	0.81
Turning the heat 2 degrees colder in the winter	18.2	58.1	3.85	0.86
Unplugging cell phone chargers when not in use	18.2	56.1	3.84	0.84

Washing clothes in warm or cold water	17.6	54.7	3.82	0.84
Keeping personal vehicles (cars and trucks) tuned up	18.2	50.0	3.80	0.83
Using less hot water by taking fewer showers	16.9	52.0	3.78	0.85
Buying fresh instead of frozen foods	16.2	52.0	3.78	0.83
Buying locally grown foods	16.2	51.4	3.77	0.82
Buying organic products	15.5	41.9	3.58	0.97
Writing policymakers	10.8	38.5	3.42	0.95
Eating fewer dairy products	10.1	27.7	3.18	1.05
Eating less meat	10.1	28.4	3.11	1.12

Table D.3: College Students' Current Climate Change Mitigation Behaviors

Currently, I...	Percentages		Mean	SD
	Strongly Agree	Agree		
Walk instead of driving	20.9	46.6	3.70	1.05
Recycle	19.6	48.0	3.61	1.16
Run my dishwasher only with a full load	21.6	35.1	3.56	1.13
Take mass transportation	11.5	37.8	3.26	1.13
Keep my car or truck tuned up	9.5	34.5	3.26	1.04
Use less hot water by washing my clothes in warm or cold water	14.9	34.5	3.24	1.21
Carpool	8.8	31.8	3.01	1.17
Buy fresh instead of frozen foods	7.4	28.4	2.98	1.10
Use a reusable water bottle instead of plastic bottles	12.2	25.0	2.96	1.22
Try to reduce my greenhouse gas emissions	4.1	28.4	2.93	1.04
Use less hot water by taking shorter showers	8.1	29.7	2.92	1.18
Buy recycled paper	8.1	26.4	2.90	1.15
Buy locally grown foods	6.8	23.6	2.84	1.10
Turn my heat 2 degrees colder in the winter	6.8	24.3	2.82	1.13
Have replaced my incandescent light bulbs with compact fluorescent light bulbs	7.4	25.7	2.80	1.18
Turn off my computer when I am not using it	8.8	20.3	2.74	1.18
Buy organic products	6.1	20.3	2.70	1.10
Drive a fuel-efficient car	6.8	14.9	2.66	1.11
Unplug my cell phone charger if I am not using it	5.4	23.6	2.64	1.15

Use less hot water by taking fewer showers	5.4	14.9	2.51	1.08
Bike instead of driving	6.8	7.4	2.46	1.09
Talk with my friends about how to slow down climate change	3.4	12.2	2.39	1.03
Air dry my clothes	6.1	12.2	2.38	1.13
Bring reusable bags to the grocery store	3.4	11.5	2.37	1.02
Eat fewer dairy products	2.7	12.2	2.27	1.08
Plant trees	3.4	6.8	2.21	0.96
Eat less meat	3.4	10.9	2.14	1.10
Write policy makers	1.4	4.1	1.95	0.85

Table D.4: College Students' Intentions to Perform Climate Change Mitigation Behaviors

In the next month, I intend to...	Percentages		Mean	SD
	Strongly Agree	Agree		
Recycle	23.6	48.6	3.76	1.08
Run my dishwasher only with a full load	20.9	41.2	3.68	1.02
Walk instead of driving	14.2	52.0	3.60	1.05
Unplug my cell phone charger when not using it	14.2	44.6	3.43	1.13
Turn off my computer when I am not using it	13.5	42.6	3.39	1.12
Keep my car or truck tuned up	10.8	38.5	3.39	0.97
Buy fresh instead of frozen foods	10.8	37.2	3.31	1.05
Try to reduce my greenhouse gas emissions	12.2	35.1	3.28	1.11
Washing my clothes in warm or cold water	12.2	37.2	3.27	1.13
Take mass transportation	11.5	38.5	3.24	1.16
Buy recycled paper	9.5	35.8	3.22	1.09
Buy locally grown foods	9.5	31.8	3.20	1.05
Use a reusable water bottle instead of plastic bottles	12.8	34.5	3.20	1.20
Carpool	10.1	35.8	3.19	1.14
Turn my heat 2 degrees colder	8.8	31.8	3.14	1.08
Use less hot water by taking shorter showers	8.1	34.5	3.11	1.11
Replace my incandescent light bulbs with compact fluorescent light bulbs	8.1	23.6	2.98	1.08
Buy organic products	6.8	27.0	2.96	1.09
Bike instead of driving	12.8	15.5	2.84	1.21
Drive a fuel-efficient car	9.5	14.2	2.80	1.12

Bring reusable bags to the grocery store	7.4	18.9	2.76	1.14
Talk with my friends about how to slow down climate change	6.1	19.6	2.75	1.09
Air dry my clothes	8.1	21.6	2.75	1.20
Use less hot water by taking fewer showers	6.8	22.3	2.71	1.17
Plant a tree	6.1	11.5	2.55	1.05
Eat fewer dairy products	3.4	16.9	2.46	1.11
Eat less meat	6.1	12.2	2.43	1.15
Write policy makers	3.4	3.4	2.22	0.93

APPENDIX E:**Current Behavior Measure*****Study 1 Pilot and Study 1***

In the past 30 days, I have...

1. Unplugged my cell phone charger when I was not using it.
2. Brought reusable bags to the grocery store.
3. Used a reusable water bottle instead of plastic bottles.
4. Turned off my computer when I was not using it.
5. Used compact fluorescent light bulbs rather than regular light bulbs.
6. Driven less by walking, carpooling, riding a bike, or taking mass transit.
7. Washed my clothes in cold water instead of warm or hot water.
8. Adjusted my thermostat by 2 degrees to save energy.
9. Used less hot water by taking shorter showers.
10. Used less hot water by taking fewer showers.
11. Bought recycled paper.

Note. Items were measured on a five-point scale with 1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Usually*, and 5 = *Always*.

Study 2 Climate Change

In the past 30 days, I have...

1. Unplugged my cell phone charger when I was not using it.
2. Brought reusable bags to the grocery store.
3. Used a reusable water bottle instead of plastic bottles.
4. Turned off my computer when I was not using it.

Study 2 Seasonal Influenza

In the past 30 days, I have...

1. Coughed into my upper arm or a disposable tissue whenever I coughed.
2. Washed my hands after coughing or sneezing.
3. Sneezed into my upper arm or a disposable tissue whenever I sneezed.
4. Used alcohol-based hand sanitizer when I couldn't wash my hands.
5. Used alcohol-based hand sanitizer after coughing or sneezing.
6. Washed my hands frequently to prevent the spread of the flu.

Note. Items were measured on a five-point scale with 1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Usually*, and 5 = *Always*.

APPENDIX F:
Perceived Severity Measure

Study 1 Pilot

Climate change is...

1. a serious problem.
2. overblown. **R**
3. severe.
4. exaggerated. **R**
5. a big deal.
6. nothing to worry about. **R**

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

Study 1 and Study 2 Climate Change

Climate change is...

1. a very serious problem.
2. very overblown. **R**
3. very severe.
4. very much exaggerated. **R**
5. a very big deal.
6. nothing to worry about. **R**

Study 2 Seasonal Influenza

Seasonal influenza is...

1. a very serious problem.
2. very overblown. **R**
3. very severe.
4. very much exaggerated. **R**
5. a very big deal.
6. nothing to worry about. **R**

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

APPENDIX F:
Perceived Susceptibility Measure

Study 1 Pilot

1. It is possible that I will personally experience negative effects of climate change.
2. I am at risk for personally experiencing negative effects of climate change.
3. I am susceptible to negative effects of climate change.
4. I am likely to experience negative effects of climate change.
5. I do not expect to experience personally the negative effects of climate change. **R**

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

Study 1 and Study 2 Climate Change

1. It is likely that I will personally experience negative effects of climate change.
2. I am at very much at risk for personally experiencing negative effects of climate change.
3. I am very susceptible to negative effects of climate change.
4. I am very likely to experience negative effects of climate change.
5. I do not expect to experience personally the negative effects of climate change.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

Study 2 Seasonal Influenza

1. It is very likely that I will personally experience negative effects of seasonal influenza.
2. I am very much at risk for personally experiencing negative effects of seasonal influenza.
3. I am very susceptible to negative effects of seasonal influenza.
4. I am very likely to experience negative effects of seasonal influenza.
5. I do not expect to experience personally the negative effects of seasonal influenza.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX H:
Subjective Feelings Measures

Study 1 Pilot

When I read this message, I felt...

Hope Scale

1. hopeful
2. eager
3. enthusiastic
4. optimistic
5. positive
6. encouraged

Guilt Scale

1. guilty
2. ashamed
3. embarrassed
4. remorseful

Happiness Scale

1. happy
2. elated
3. cheerful
4. joyful

Sadness Scale

1. sad
2. sorrowful
3. dreary
4. dismal

Anger Scale

1. angry
2. mad
3. irritated
4. annoyed
5. frustrated

Fear Scale

1. fearful
2. distressed
3. worried
4. afraid
5. anxious
6. scared

Note. Items were measured on a five-point scale with 1 = *None of this emotion* and 5 = *A great deal of this emotion*.

Study 1 and Study 2

When I read this message, I felt...

Hope Scale

1. hopeful
2. eager
3. enthusiastic
4. optimistic
5. positive
6. encouraged

Guilt Scale

1. guilty
5. ashamed
6. embarrassed
7. remorseful

Happiness Scale

1. happy
2. glad
3. pleased
4. cheerful
5. joyful

Sadness Scale

1. sad
2. sorrowful
3. dreary
4. blue
5. down

Fear Scale

1. fearful
7. distressed
8. worried
9. afraid
10. anxious
11. scared

Anger Scale

1. angry
6. mad
7. irritated
8. annoyed
9. frustrated

Note. Items were measured on a five-point scale with 1 = *None of this emotion* and 5 = *A great deal of this emotion*.

APPENDIX I:**Appraisal of Importance Measure***Study 1 Pilot*

Protecting the climate...

1. Does not matter to me/Does matter to me
2. Is important/Is unimportant **R**
3. Is nonessential/Is essential
4. Means nothing/Means a lot
5. Is significant/Is insignificant **R**
6. Is of no concern/Is of much concern
7. Is relevant/Is irrelevant **R**
8. Is not needed/Is needed

Note. Items were measured on a five-point scale with the above anchors at 1 and 5, respectively.
R = reverse-coded item.

Study 1 and Study 2 Climate Change

Protecting the climate...

1. Does not matter at all to me, Does not matter to me, Neither, Matters somewhat to me,
Matters very much to me

Protecting the climate is...

2. Very important , Important, Neither, Unimportant, Very unimportant **R**
3. Very nonessential, Nonessential, Neither, Essential, Very essential
4. Very significant, Significant, Neither, Insignificant, Very insignificant **R**
5. Of no concern, Of very little concern, Neither, Of much concern, Of very much concern
6. Very relevant, Relevant, Neither, Irrelevant, Very irrelevant **R**
7. Not needed at all, Needed very little, Neither, Needed, Needed very much

Note. Items were measured on a five-point scale with each word or phrase given a number starting at 1 and ending at 5. **R** = reverse-coded item.

Study 2 Seasonal Influenza

Preventing seasonal influenza...

1. Does not matter at all to me, Does not matter to me, Neither, Matters somewhat to me,
Matters very much to me

Preventing seasonal influenza is...

2. Very important , Important, Neither, Unimportant, Very unimportant **R**
3. Very nonessential, Nonessential, Neither, Essential, Very essential
4. Very significant, Significant, Neither, Insignificant, Very insignificant **R**
5. Of no concern, Of very little concern, Neither, Of much concern, Of very much concern
6. Very relevant, Relevant, Neither, Irrelevant, Very irrelevant **R**
7. Not needed at all, Needed very little, Neither, Needed, Needed very much

Note. Items were measured on a five-point scale with each word or phrase given a number starting at 1 and ending at 5. **R** = reverse-coded item.

APPENDIX J:
Appraisal of Goal Congruence Measure

Study 1 Pilot

Protecting the climate...

1. is one of my goals.
2. is relevant to my personal goals.
3. would keep me from achieving other important goals. **R**
4. interferes with meeting my personal goals. **R**
5. fits with my personal values.
6. is consistent with my ideals.
7. is important to meeting my personal goals.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

Study 1 and Study 2 Climate Change

Protecting the climate...

1. is one of my goals.
2. relates to my personal goals.
3. would help me achieve other important goals.
4. Helps me meet my personal goals.
5. fits with my personal values.
6. is consistent with my ideals.
7. is important to meeting my personal goals.

Study 2 Seasonal Influenza

Preventing seasonal influenza...

1. is one of my goals.
2. relates to my personal goals.
3. would help me achieve other important goals.
4. Helps me meet my personal goals.
5. fits with my personal values.
6. is consistent with my ideals.
7. is important to meeting my personal goals.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX K:
Appraisal of Future Expectations Measure

Study 1 Pilot

1. Protecting the climate will make the future better.
2. Not protecting the climate will make the future worse.
3. If we protect the climate, we can create a better future.
4. If we do not protect the climate, we will create a worse future.
5. A better climate creates a better future.
6. A worse climate creates a worse future.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

Study 1 and Study 2 Climate Change

1. Protecting the climate will make the future wonderful.
2. Not protecting the climate will make the future awful.
3. Failing to protect the climate will create a bleak future.
4. Protecting the climate will create a bright future.
5. A better climate equals a much better future.
6. A worse climate equals a much worse future.

Study 2 Seasonal Influenza

1. Preventing seasonal influenza will make the future wonderful.
2. Not preventing seasonal influenza will make the future awful.
3. Failing to prevent seasonal influenza will create a bleak future.
4. Preventing seasonal influenza will create a bright future.
5. Less influenza equals a much better future.
6. More influenza equals a much worse future.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX L:
Appraisal of Possibility Measure

Study 1 Pilot

Slowing down climate change is

1. Impossible/possible
2. Likely/unlikely **R**
3. Improbable/probable
4. Achievable/unachievable **R**
5. Not feasible/feasible
6. Attainable/unattainable **R**

Note. Items were measured on a five-point scale with the above anchors at 1 and 5, respectively.

R = reverse-coded item.

Study 1 and Study 2 Climate Change

Protecting the climate is ...

1. Very impossible, Impossible, Neither, Possible, Very possible
2. Very likely, Likely, Neither, Unlikely, Very unlikely **R**
3. Very improbable, Improbable, Neither, Probable, Very probable
4. Very achievable, Achievable, Neither, Unachievable, Very unachievable **R**
5. Not at all feasible, Mostly infeasible, Neither, Feasible, Very feasible
6. Very attainable, Attainable, Neither, Unattainable, Very unattainable **R**

Study 2 Seasonal Influenza

Preventing seasonal influenza is...

1. Very impossible, Impossible, Neither, Possible, Very possible
2. Very likely, Likely, Neither, Unlikely, Very unlikely **R**
3. Very improbable, Improbable, Neither, Probable, Very probable
4. Very achievable, Achievable, Neither, Unachievable, Very unachievable **R**
5. Not at all feasible, Mostly infeasible, Neither, Feasible, Very feasible
6. Very attainable, Attainable, Neither, Unattainable, Very unattainable **R**

Note. Items were measured on a five-point scale with each word or phrase given a number starting at 1 and ending at 5. **R** = reverse-coded item.

APPENDIX L:
Manipulation Checks

Study 1 Pilot

The message you read stated that:

1. The climate affects your well-being. [High importance]
2. The climate affects people's well-being. [Low importance]
3. The climate affects people's well-being in few ways. [Low importance]
4. The climate affects your well-being in many ways. [High importance]
5. That protecting the climate is important. [High importance]
6. That protecting the climate is not very important. [Low importance]
7. Protecting the climate directly saves you money. [High goal congruence]
8. Protecting the climate indirectly saves people money. [Low goal congruence]
9. Small changes can save you a lot of money. [High goal congruence]
10. Small changes can save people a little money. [Low goal congruence]
11. You can help make the climate much better. [High future expectation]
12. People can help make the climate a little better. [Low future expectation]
13. Protecting our climate will bring a much better future. [High future expectation]
14. Protecting the climate will bring a little better future. [Low future expectation]
15. It is likely that we can make the climate better. [High possibility]
16. It is unlikely that people can make the climate better. [Low possibility]
17. Many people are taking action to protect the climate. [High possibility]
18. Few people are taking action to protect the climate. [Low possibility]

Note. Items were measured on a dichotomous scale with 1 = *No* and 2 = *Yes*. The manipulations for which “yes” should be selected are indicated in the brackets.

Study 1 and Study 2 Climate Change

The message you just read stated that:

1. The message you read stated that the climate AFFECTS your well-being in MANY ways.
2. The message you read stated that the climate DOES NOT affect your well-being very much.
3. The message you read stated that a bad climate WILL cost you money.
4. The message you read stated that a bad climate WILL NOT cost you money.
5. The message you read stated that protecting the climate is VERY IMPORTANT for your well-being.
6. The message you just read stated that protecting the climate is NOT VERY IMPORTANT for your well-being.
7. The message you just read stated that protecting the climate saves you A LOT of money.
8. The message you just read stated that protecting the climate saves you ONLY A LITTLE money.
9. The message you just read stated that small changes will DIRECTLY save you at least \$500 per year.
10. The message you just read stated that small changes will INDIRECTLY save you up to \$22 per year.
11. The message you just read stated that protecting the climate will make the future MUCH BETTER.
12. The message you just read stated that protecting the climate will have LITTLE EFFECT on the future.
13. The message you just read stated that by helping protect the climate, you can help create a WONDERFUL future.
14. The message you just read stated that by helping protect the climate change, you would only make the future A TINY BIT BETTER.

15. The message you just read stated that it is **VERY LIKELY** that we can make the climate better.
16. The message you just read stated that it is **VERY UNLIKELY** that we can make the climate better.
17. The message you just read stated that **BILLIONS** of people are taking action to protect the climate.
18. The message you just read stated that **VERY FEW** people are taking action to protect the climate.

Study 2 Seasonal Influenza

The message you just read stated that:

1. The message you read stated that seasonal influenza is a **SERIOUS** illness.
2. The message you read stated that seasonal influenza is usually a **MILD** illness.
3. The message you read stated that the flu **HURTS** your quality of life.
4. The message you read stated that the flu will **NOT HURT** your quality of life very much.
5. The message you read stated that prevent the flu is **VERY IMPORTANT** for you and the people around you.
6. The message you just read stated that preventing the flu is **NOT VERY IMPORTANT** for you and the people around you.
7. The message you just read stated that preventing the flu **GREATLY** improves your quality of life.
8. The message you just read stated that preventing the flu **ONLY SLIGHTLY** improves your quality of life.
9. The message you just read stated that small changes will **DIRECTLY** save you **LOTS** of time.

10. The message you just read stated that small changes will INDIRECTLY save you A LITTLE time.
11. The message you just read stated that preventing the flu will make the future MUCH BETTER.
12. The message you just read stated that preventing the flu will have LITTLE EFFECT on the future.
13. The message you just read stated that by helping prevent seasonal influenza, you can help create a WONDERFUL future.
14. The message you just read stated that by helping prevent seasonal influenza, you would only make the future A TINY BIT BETTER.
15. The message you just read stated that it is VERY LIKELY that we can prevent seasonal influenza.
16. The message you just read stated that it is VERY UNLIKELY that we can prevent seasonal influenza.
17. The message you just read stated that BILLIONS of people are taking action to prevent the flu.
18. The message you just read stated that VERY FEW people are taking action to prevent the flu.

Note. Items were measured on a dichotomous scale with 1 = *No* and 2 = *Yes*.

APPENDIX N:
Message Clarity Measures

Study 1 Pilot

Open-Ended Questions

1. What information is missing that made it hard for you to understand the message?
2. What information is included that made it hard for you to understand the message?
3. What suggestions do you have to improve the message?

Closed-Ended Questions

The information in the message is...

1. Well-explained/Unclear **R**
2. Supported/Unsupported **R**
3. Technical/Straightforward
4. Understandable/Confusing **R**
5. Helpful/Not Helpful **R**

Note. Items were measured on a five-point scale with the above anchors at 1 and 5, respectively.

R = reverse-coded item.

Study 1 and Study 2

The information in the message is ...

1. Clear, Somewhat clear, Neither, Somewhat unclear, Unclear **R**
2. Easy to read, Somewhat easy to read, Neither, Somewhat hard to read, Hard to read **R**
3. Complicated, Somewhat complicated, Neither, Somewhat Straightforward,
Straightforward
4. Well-explained, Somewhat well-explained, Neither, Somewhat confusing, Confusing **R**
5. Hard to understand, Somewhat hard to understand, Neither, Somewhat easy to
understand, Easy to Understand

Note. Items were measured on a five-point scale with each word or phrase given a number starting at 1 and ending at 5. **R** = reverse-coded item.

APPENDIX O:
Message Attention Measure

Study 1 Pilot

1. I paid close attention to the message.
2. What the message said was very important.
3. I carefully read the message.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

Study 1 and Study 2

1. I paid close attention to the message.
2. I focused on what the message said.
3. I carefully read the message.
4. I concentrated when I read the message.
5. I thoroughly read the message.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX P:
Interest Measure

Study 1 Pilot

Learning about ways to protect the climate is...

1. Boring/interesting
2. Exciting/unexciting **R**
3. Appealing/unappealing **R**
4. Fascinating/mundane **R**
5. Worthless/valuable
6. Involving/uninvolving **R**

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

Study 1 and Study 2 Climate Change

Learning about ways to protect the climate is...

1. Very Boring, Boring, Neither, Interesting, Very Interesting
2. Very Exciting, Exciting, Neither, Unexciting, Very Unexciting **R**
3. Very Appealing, Appealing, Neither, Unappealing, Very Unappealing **R**
4. Very Fascinating, Fascinating, Neither, Mundane, Very Mundane **R**
5. Very Involving, Involving, Neither, Uninvolving, Very Uninvolving **R**

Study 2 Seasonal Influenza

Learning about ways to prevent seasonal influenza is...

1. Very Boring, Boring, Neither, Interesting, Very Interesting
2. Very Exciting, Exciting, Neither, Unexciting, Very Unexciting **R**
3. Very Appealing, Appealing, Neither, Unappealing, Very Unappealing **R**
4. Very Fascinating, Fascinating, Neither, Mundane, Very Mundane **R**
5. Very Involving, Involving, Neither, Uninvolving, Very Uninvolving **R**

Note. Items were measured on a five-point scale with each word or phrase given a number starting at 1 and ending at 5. **R** = reverse-coded item.

APPENDIX Q:
Perceived Barriers Measure

Study 1 Pilot

Protecting the climate...

1. takes too much time.
2. costs too much.
3. will decrease my quality of life.
4. is inconvenient.
5. is a waste of effort

Study 1

Protecting the climate...

1. takes too much time.
2. costs too much.
3. will decrease my quality of life.
4. is inconvenient.
5. takes too much effort

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

Study 2 Climate Change

Unplugging my cell phone charger when I am not using it...

1. takes too much time.
2. costs too much.
3. will decrease my quality of life.
4. is inconvenient.
5. takes too much effort

The same five items were repeated for the following stems:

- B. Bringing reusable bags to the grocery store is...
- C. Using a reusable water bottle instead of plastic bottles is...
- D. Turning off my computer when I am not using it is...

Study 2 Seasonal Influenza

Washing my hands often with soap and water...

1. takes too much time.
2. costs too much.
3. will decrease my quality of life.
4. is inconvenient.
5. takes too much effort

The same five items were repeated for the following stems:

- B. Using an alcohol-based hand sanitizer...
- C. Covering my cough or sneeze with a tissue or my upper arm...
- D. Getting the flu shot ...

APPENDIX R:
Behavior Intention Measure

Study 1 Pilot and Study 1

In the next month, I intend to...

1. Unplug my cell phone charger when I am not using it.
2. Bring reusable bags to the grocery store.
3. Use a reusable water bottle instead of plastic bottles.
4. Turn off my computer when I am not using it.
5. Have replaced regular light bulbs with compact fluorescent light bulbs.
6. Drive less by walking, carpooling, riding a bike, or taking mass transit.
7. Wash my clothes in cold water instead of warm or hot water.
8. Adjust my thermostat by 2 degrees to save energy.
9. Use less hot water by taking short showers.
10. Use less hot water by taking fewer showers.
11. Buy recycled paper.

Study 2 Climate Change

In the next month, I intend to...

1. Unplug my cell phone charger when I am not using it.
2. Bring reusable bags to the grocery store.
3. Use a reusable water bottle instead of plastic bottles.
4. Turn off my computer when I am not using it.

Study 2 Seasonal Influenza

In the next month, I intend to...

1. Cough into my upper arm or a disposable tissue whenever I cough.
2. Wash my hands or use an alcohol-based hand sanitizer after coughing or sneezing.
3. Sneeze into my upper arm or a disposable tissue whenever I sneeze.
4. Use alcohol-based hand sanitizer when I can't wash my hands.
5. Wash my hands frequently to prevent the spread of the flu.
6. Get the seasonal influenza vaccine (not the H1N1 vaccine).
7. Get the H1N1 flu vaccine (not the seasonal influenza vaccine).

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX S:
Environmental Identity Measure

Study 1 Pilot

1. I consider myself to be pro-environment. #
2. I consider myself to be an environmentalist. #
3. Thinking specifically about the environmental movement, do you think of yourself as...
 - 1 = an active participant in the environmental movement;
 - 2 = sympathetic toward the movement, but not active;
 - 3 = neutral; or
 - 4 = unsympathetic toward the environmental movement
 - 5 = an active opponent of the environmental movement
4. Thinking specifically about the climate protection movement (i.e., people who want to slow down climate change), do you think of yourself as...
 - 1 = an active participant in the movement;
 - 2 = sympathetic toward the movement, but not active;
 - 3 = neutral; or
 - 4 = unsympathetic toward the movement?
 - 5 = an active opponent of the climate protection movement

Note. # = Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

Study 1 and Study 2

1. I consider myself to be pro-environment. #
2. I consider myself to be an environmentalist. #
3. I consider myself to be “green” #
4. Thinking specifically about the environmental movement, do you think of yourself as...
 - 1 = an active participant in the environmental movement;
 - 2 = sympathetic toward the movement, but not active;
 - 3 = neutral; or
 - 4 = unsympathetic toward the environmental movement
 - 5 = an active opponent of the environmental movement
5. Thinking specifically about the climate protection movement (i.e., people who want to slow down climate change), do you think of yourself as...
 - 1 = an active participant in the movement;
 - 2 = sympathetic toward the movement, but not active;
 - 3 = neutral; or
 - 4 = unsympathetic toward the movement?
 - 5 = an active opponent of the climate protection movement

Note. # = Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX T:
Demographic Measures

Study 1 Pilot, Study 1, and Study 2

1. Please enter your age in the text box provided.
2. What year are you in school?
1 = Freshman, 2 = Sophomore, 3 = Junior, 4 = Senior, 5 = Super Senior, 6 = Other
3. What is your sex/gender?
1 = Male, 2 = Female, 3 = Transgender
4. What is your race/ethnicity: (check all that apply)
1 = Caucasian/White, 2 = African American/Black, 3 = Asian/Pacific Islander, 4 = Native Hawaiian or Alaskan, 5 = Hispanic/Latino/a, 6 = Multiracial/multiethnic, 7 = Other
5. Did you primarily grow up in a place that was...
1 = Urban, 2 = Suburban, 3 = Small Town, 4 = Rural
6. Financially I am able to buy the things I need.
1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, and 5 = Strongly Agree.
7. Financially I am able to buy many of the things I want.
1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, and 5 = Strongly Agree.

APPENDIX U:

Study 2 Messages

Strong Hope Appeal – Climate Change

The climate affects your well-being in many ways.

The climate affects your health and finances. Poor air quality affects your health. A bad climate increases your chances of getting diseases. A bad climate also affects your finances. A bad climate will cost you money. You will pay more for heating and cooling. Food and energy prices will be much higher. You will be healthier and wealthier in a good climate. Protecting the climate is VERY important for your well-being.

Protecting the climate saves you a lot of money.

You can make simple changes to protect the climate. You can use less energy, use less hot water, and make less trash. These changes are free or cheap. These small changes will directly save you at least \$500 per year. In four years at Penn State, you will save \$2000! That is a lot of money.

Protecting the climate will make the future much better.

Protecting our climate will bring a wonderful future. Our air will be much cleaner. Our weather will be much less extreme. Our summers will be beautiful and mild. We will experience many fewer diseases and will live much longer. Growing food will be easier and more productive. By helping protect the climate, you can help create a wonderful future.

It is very likely that we can make the climate better.

All over the world, people like you are taking action. They are using less energy, using less hot water, and making less trash. Billions of people are taking action to protect the climate. You can join the effort and make it even more likely that we will make the climate better.

Want to help stop climate change? Take action with these four steps.

- ✓ **Turn off your computer when you are not using it.** When your computer is on and you are not using it, it uses energy that emits carbon dioxide. By turning off your computer when you are not using it, you will keep this carbon dioxide from going into the air.
- ✓ **Unplug your cell phone charger when you are not using it.** Your cell phone charger uses energy whenever it is plugged in, even when it is not attached to your phone. Cell phone chargers, DVD players, and other 'always on' electronics make up 5 percent of all home energy use. These devices put 18 million tons of carbon dioxide into the air every year. If you unplug your cell phone charger, you will keep this carbon dioxide from going into the air.

- ✓ **Use a reusable water bottle.** Making and shipping the disposable plastic water bottles burns fossil fuels and emits carbon dioxide. The plastic water bottles used in one year in the U.S. use more than 17 million barrels of oil. Making these bottles emits more than 2.5 million tons of carbon dioxide. Trucking the bottles to stores emits even more. By using a reusable water bottle, you can stop these greenhouse gases from going into the air. You can buy a reusable water bottle at a grocery or sporting store for five to ten dollars.
- ✓ **Bring reusable bags to the grocery store.** Making and shipping plastic bags burns fossil fuels and emits carbon dioxide. People in the U.S. use 380 billion plastic bags, sacks, and wraps each year. Making these plastic bags takes 12 million barrels of oil. It also emits millions of tons of carbon dioxide. Trucking these plastic bags to stores emits even more. By using reusable grocery bags, you can stop these greenhouse gases from going into the air. You can buy reusable bags at grocery stores for about one dollar.

Sources: Center for Disease Control and Prevention National Center for Environmental Health, Climatecrisis.net, Intergovernmental Panel on Climate Change, United Nations Environmental Programme, U.S. Department of Energy, and U.S. Environmental Protection Agency.

Weak Hope Appeal – Climate Change

The climate does not affect your well-being very much.

The climate may affect other people's health and well-being, but it will not affect yours very much. Poor air quality may affect people's health. A bad climate may also increase their chances of getting diseases. But, the climate will not affect your health greatly. A bad climate will not cost you much money. Any increases in energy or food prices will be very small. Thus, a bad climate will not affect your health or wealth very much. Protecting the climate is NOT VERY important for your well-being.

Protecting the climate saves you only a little money.

You can make simple changes to protect the climate. You can use less energy, use less hot water, and make less trash. These changes are free or cheap. These small changes might indirectly save you up to \$22 per year. In four years at Penn State, you could save \$88. That is not very much money.

Protecting the climate will have little effect on the future.

Protecting the climate may make the future slightly better. The air might be a little bit cleaner. The weather could be slightly less extreme. Summers might be slightly less hot. There could be fewer diseases and death. Growing food might be a very little bit easier and slightly more productive. By helping protect the climate change, you would only make the future a tiny bit better.

It is very unlikely that we can make the climate better.

All over the world, people would need to use less energy, use less hot water, and make less trash. Very few people are taking action to protect the climate. You can join the effort and make it slightly more likely that we will make the climate better.

Want to help stop climate change? Take action with these four steps.

- ✓ **Turn off your computer when you are not using it.** When your computer is on and you are not using it, it uses energy and emits carbon dioxide. By turning off your computer when you are not using it, you will keep this carbon dioxide from going into the air.
- ✓ **Unplug your cell phone charger when you are not using it.** Your cell phone charger uses energy whenever it is plugged in, even when it is not attached to your phone. Cell phone chargers, DVD players, and other 'always on' electronics make up 5 percent of all home energy use. These devices put 18 million tons of carbon dioxide into the air every year. If you unplug your cell phone charger, you will keep this carbon dioxide from going into the air.
- ✓ **Use a reusable water bottle.** Making and shipping disposable plastic bottles burns fossil fuels and emits carbon dioxide. The plastic water bottles used in one year in the U.S. use more than 17 million barrels of oil. Making these bottles emits more than 2.5 million tons of carbon dioxide. Trucking the bottles to stores emits even more. By using a reusable water bottle, you can stop these greenhouse gases from going into the air. You can buy a reusable water bottle at a grocery or sporting store for five to ten dollars.

- ✓ **Bring reusable bags to the grocery store.** Making and shipping plastic bags burns fossil fuels and emits carbon dioxide. People in the U.S. use 380 billion plastic bags, sacks, and wraps each year. Making these plastic bags takes 12 million barrels of oil. It also emits millions of tons of carbon dioxide. Trucking these plastic bags to stores emits even more. By using reusable grocery bags, you can stop these greenhouse gases from going into the air. You can buy reusable bags at grocery stores for about one dollar.

Sources: Center for Disease Control and Prevention National Center for Environmental Health, Climatecrisis.net, Intergovernmental Panel on Climate Change, United Nations Environmental Programme, U.S. Department of Energy, and U.S. Environmental Protection Agency.

Strong Hope Appeal – Seasonal Influenza

Seasonal influenza is a serious illness.

The flu greatly affects your health. You may get a fever, extreme fatigue, cough, sore throat, and muscle aches. The flu hurts your quality of life. The flu will keep you from your studies. It will also keep you from having fun with your friends. The flu also affects the people around you. These people may have chronic conditions like asthma or diabetes. Chronic conditions make these people much more likely to have serious complications from the flu. Preventing the flu is VERY important for you and the people around you.

Preventing the flu greatly improves your quality of life.

You can make simple changes to prevent seasonal influenza. You can get the flu shot, wash your hands, and cover your cough. These behaviors are free or cheap. These small changes will directly save you lots of time. They will also greatly improve your quality of life. You will have much more time to see friends and study.

Preventing the flu will make the future much better.

Preventing the flu will bring a much better future. We will be healthier. We will have a much higher quality of life. Our friends and family will be healthier. Many fewer people will be hospitalized and die from the flu. Overall, we will live much longer. By helping prevent seasonal influenza, you can help create a wonderful future.

It is very likely that we can prevent seasonal influenza.

All over the world, people like you are taking action. They are getting the flu shot, washing their hands, and covering their cough. Billions of people are taking action to prevent the flu. You can join the effort and make it even more likely that we will prevent seasonal influenza.

Want to help prevent seasonal influenza? Take action with these four steps.

- ✓ **Wash your hands often with soap and water.** Influenza spreads from sick people to their hands and other surfaces that you may touch. By washing your hands frequently, you will reduce your chance of catching the flu from others. You will also reduce your chance of spreading the flu to others.
- ✓ **If soap and water is not available, use an alcohol-based hand sanitizer.** Alcohol-based hand sanitizers, like Purell or Germ-X, kill 99% of most common germs that may cause illness. To use a hand sanitizer, put some of the sanitizer in the palm of one hand and rub the product over all surfaces of your hands and fingers until your hands are dry. Sanitizers are fast acting and reduce the amount of influenza virus on your hands. You can buy hand sanitizers at grocery stores or pharmacies for one to three dollars. The sanitizers are portable and will fit in your bag. By carrying a hand sanitizer and using it frequently, you will help reduce the spread of seasonal influenza.

- ✓ **Cover your cough or sneeze.** Influenza is spread by coughing or sneezing. Hands that have been coughed or sneezed on also spread the flu. Whenever you cough or sneeze, you can spread the influenza virus. By coughing or sneezing into a disposable tissue or covering your mouth with your upper arm, you can reduce the spread of seasonal influenza.
- ✓ **Get the flu shot.** The seasonal flu vaccine protects against the three flu viruses that research suggests will be the most common. About 2 weeks after you get the flu shot, your body will develop antibodies that provide protection against influenza virus infection. You can get the flu shot at one of the seasonal flu vaccine clinics being held on campus or by going to the health center. The flu shot costs about \$28 and can reduce the spread of seasonal influenza.

Source: Center for Disease Control and Prevention.

Weak Hope Appeal – Seasonal Influenza

Seasonal influenza is usually a mild illness.

The flu only affects your health a little. You may get a fever, cough, or sore throat. The flu will NOT hurt your quality of life very much. For only a day or two, you might be too sick to study or see friends. Any effects of the flu on other people also are likely to be minor. The flu probably will not affect their health or quality of life too much. Preventing the flu is NOT very important for you and the people around you.

Preventing the flu only slightly improves your quality of life.

You can make simple changes to prevent seasonal influenza. You can get the flu shot, wash your hands, and cover your cough. These behaviors are free or cheap. These small changes might indirectly save you a little time. They may also slightly improve your quality of life. You will have a little more time to see friends and study.

Preventing the flu will have little effect on the future.

Preventing the flu may make the future slightly better. We might be a little bit healthier. We might have a slightly better quality of life. Our friends and family could be a little healthier. Maybe a few less people will be hospitalized and die from the flu. Overall, preventing the flu will have little effect on the future. By helping prevent seasonal influenza, you would only make the future a tiny bit better.

It is very unlikely that we can prevent seasonal influenza.

All over the world, people would need to take action. They would need to get the flu shot, wash their hands frequently, and always cover their cough. Very few people are taking action to prevent the flu. You can join the effort and make it slightly more likely that we will prevent seasonal influenza.

Want to help prevent seasonal influenza? Take action with these four steps.

- ✓ **Wash your hands often with soap and water.** Influenza spreads from sick people to their hands and other surfaces that you may touch. By washing your hands frequently, you will reduce your chance of catching the flu from others. You will also reduce your chance of spreading the flu to others.
- ✓ **If soap and water is not available, use an alcohol-based hand sanitizer.** Alcohol-based hand sanitizers, like Purell or Germ-X, kill 99% of most common germs that may cause illness. To use a hand sanitizer, put some of the sanitizer in the palm of one hand and rub the product over all surfaces of your hands and fingers until your hands are dry. Sanitizers are fast acting and reduce the amount of influenza virus on your hands. You can buy hand sanitizers at grocery stores or pharmacies for one to three dollars. The sanitizers are portable and will fit in your bag. By carrying a hand sanitizer and using it frequently, you will help reduce the spread of seasonal influenza.

- ✓ **Cover your cough or sneeze.** Influenza is spread by coughing or sneezing. Hands that have been coughed or sneezed on also spread the flu. Whenever you cough or sneeze, you can spread the influenza virus. By coughing or sneezing into a disposable tissue or covering your mouth with your upper arm, you can reduce the spread of seasonal influenza.
- ✓ **Get the flu shot.** The seasonal flu vaccine protects against the three flu viruses that research suggests will be the most common. About 2 weeks after you get the flu shot, your body will develop antibodies that provide protection against influenza virus infection. You can get the flu shot at one of the seasonal flu vaccine clinics being held on campus or by going to the health center. The flu shot costs about \$28 and can reduce the spread of seasonal influenza.

Source: Center for Disease Control and Prevention.

Attention Control

When you are seeking a job, you will likely need to interview for the job. This message will help you prepare for that interview. You should know what you have to offer, what the employer is like, and what kind of position you want. You should be able to give employers relevant details in a friendly manner.

Make a good first impression. You should arrive at least 10 minutes early for the interview. You should do your best to look polished. You should dress professionally, avoid perfume or cologne, and wear only simple jewelry. Make sure you look confident. When you meet the employer, give him or her a firm handshake, make good eye contact, and smile!

Remember the purpose of the interview. Employers want to know about your background, strengths, and level of interest in the job. They want to know if you meet their needs. You need to learn about the job and workplace so that you can decide if they meet your needs.

Know what the interviewers want. Interviewers have three major criteria in mind when interviewing candidates:

1. Can you do the job? (Skills)
2. Will you do the job? (Interest/motivation)
3. Are you a good fit with the organization? (Personal qualities)

Think about potential questions and answers in advance. Employers usually ask questions to help them gain a feel for who you are and what makes you unique. They may ask about your motivation level, your background and strong points, and your interest in the position. They may also ask about aspects of your personality that may affect how you perform on the job. Employers may ask you to expand on the information presented on your resume. They may also focus on the qualities and skills that you can bring to the job.

Points to remember. Below are some tips to help you have a good interview.

1. The recruiter liked your resume. Go into your interview remembering that he or she already likes you.
2. The interview is a two-way conversation. Try to relax and enjoy the opportunity.
3. Be specific about your skills.
4. Be honest.
5. Think about your answers ahead of time.
6. Be prepared to describe why you are interested in the employer. You should give specific details about the kind of position that you want.
7. Sell yourself. State your strengths, skills, and accomplishments so that the recruiter can see you as a good candidate.
8. Your best assets in any interview are genuine self-confidence and confidence in your ability to perform well at the job. Confidence indicates to the employer that you are the person they need for the position.
9. Do not forget to assess the company to see if you would like to work for them.
10. You should end the interview by thanking the interviewer. Then you should follow-up with a personal thank you note within 24 hours of the interview.

Source: Adapted from *Planning for Life After Graduation: The Penn State Graduate Student Career Guide 2009-2010* from The Pennsylvania State University Career Services.

APPENDIX V:
Subjective Knowledge Measure

Study 2 Climate Change

1. I am very knowledgeable about the causes of climate change.
2. I am very knowledgeable about climate change.
3. I am very knowledgeable about the effects of climate change.
4. I am very knowledgeable about how to prevent climate change.
5. I am very knowledgeable about the symptoms of climate change.

Study 2 Seasonal Influenza

1. I am very knowledgeable about the causes of seasonal influenza.
2. I am very knowledgeable about seasonal influenza.
3. I am very knowledgeable about the effects of seasonal influenza.
4. I am very knowledgeable about how to prevent seasonal influenza.
5. I am very knowledgeable about the symptoms of seasonal influenza.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX W:

Perceived Self-Efficacy Measure

Study 2 Climate Change

1. It is very hard for me to use reusable grocery bags. **R**
2. I can very easily use reusable grocery bags.
3. I am very confident in my ability to use reusable grocery bags.
4. It is very difficult for me to use reusable grocery bags. **R**
5. It is very hard for me to turn off my computer when I am not using it. **R**
6. I can very easily turn off my computer when I am not using it.
7. I am very confident in my ability to turn off my computer when I am not using it.
8. It is very difficult for me to turn off my computer when I am not using it. **R**
9. It is very hard for me to unplug my cell phone charger when I am not using it. **R**
10. I can very easily unplug my cell phone charger when I am not using it.
11. I am very confident in my ability to unplug my cell phone charger when I am not using it.
12. It is very difficult for me to unplug my cell phone charger when I am not using it. **R**
13. It is very hard for me to use a reusable water bottle. **R**
14. I can very easily use a reusable water bottle.
15. I am very confident in my ability to use a reusable water bottle.
16. It is very difficult for me to use a reusable water bottle. **R**

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

Study 2 Seasonal Influenza

1. It is very hard for me to wash my hands often with soap and water. **R**
2. I can very easily wash my hands often with soap and water.
3. I am very confident in my ability to wash my hands often with soap and water.
4. It is very difficult for me to wash my hands often with soap and water. **R**
5. It is very hard for me to use an alcohol-based hand sanitizer. **R**
6. I can very easily use an alcohol-based hand sanitizer.
7. I am very confident in my ability to use an alcohol-based hand sanitizer.
8. It is very difficult for me to use an alcohol-based hand sanitizer. **R**
9. It is very hard for me to cover my cough or sneeze with a tissue or my upper arm. **R**
10. I can very easily cover my cough or sneeze with a tissue or my upper arm.
11. I am very confident in my ability to cover my cough or sneeze with a tissue or my upper arm.
12. It is very difficult for me to cover my cough or sneeze with a tissue or my upper arm. **R**
13. It is very hard for me to get the seasonal flu shot. **R**
14. I can very easily get the seasonal flu shot.
15. I am very confident in my ability to get the seasonal flu shot.
16. It is very difficult for me to get the seasonal flu shot. **R**

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

APPENDIX X:

Perceived Response Efficacy Measure

Study 2 Climate Change

1. Turning off my computer when I am not using it is a very effective way to protect the climate.
2. Turning off my computer when I am not using is very helpful in protecting the climate.
3. Turning off my computer when I am not using it is an excellent way to help protect the climate.
4. Unplugging my cell phone charger when I am not using it is a very effective way to protect the climate.
5. Unplugging my cell phone charger when I am not using it is very helpful in protecting the climate.
6. Unplugging my cell phone charger when I am not using it is an excellent way to help protect the climate.
7. Using a reusable grocery bag is a very effective way to protect the climate.
8. Using a reusable grocery bag is very helpful in protecting the climate.
9. Using a reusable grocery bag is an excellent way to protect the climate.
10. Using a reusable water bottle is a very effective way to protect the climate.
11. Using a reusable water bottle is very helpful in protecting the climate.
12. Using a reusable water bottle is an excellent way to help protect the climate.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

Study 2 Seasonal Influenza

1. Washing my hands often with soap and water is a very effective way to prevent seasonal influenza.
2. Washing my hands often with soap and water is very helpful in preventing seasonal influenza.
3. Washing my hands often with soap and water is an excellent way to help prevent seasonal influenza.
4. Using an alcohol-based hand sanitizer is a very effective way to prevent seasonal influenza.
5. Using an alcohol-based hand sanitizer is very helpful in preventing seasonal influenza.
6. Using an alcohol-based hand sanitizer is an excellent way to help prevent seasonal influenza.
7. Covering my cough or sneeze with a tissue or my upper arm is a very effective way to prevent seasonal influenza.
8. Covering my cough or sneeze with a tissue or my upper arm is very helpful in preventing seasonal influenza.
9. Covering my cough or sneeze with a tissue or my upper arm is an excellent way to help prevent seasonal influenza.
10. Getting the flu shot is a very effective way to prevent seasonal influenza.
11. Getting the flu shot is very helpful in preventing seasonal influenza.
12. Getting the flu shot is an excellent way to help prevent seasonal influenza.

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*.

APPENDIX Y:**Attitudes Toward the Behaviors Measure***Study 2 Climate Change*

Unplugging my cell phone charger when I am not using it is...

1. Very Good
2. Very Bad **R**
3. Very Beneficial
4. Very Undesirable **R**
5. Very Desirable

The same five items were repeated for the following stems:

- B. Bringing reusable bags to the grocery store is...
- C. Using a reusable water bottle instead of plastic bottles is...
- D. Turning off my computer when I am not using it is...

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

Study 2 Seasonal Influenza

Washing my hands often with soap and water...

1. Very Good
2. Very Bad **R**
3. Very Beneficial
4. Very Undesirable **R**
5. Very Desirable

The same five items were repeated for the following stems:

- B. Using an alcohol-based hand sanitizer...
- C. Covering my cough or sneeze with a tissue or my upper arm...
- D. Getting the flu shot ...

Note. Items were measured on a five-point scale with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Disagree nor Agree*, 4 = *Agree*, and 5 = *Strongly Agree*. **R** = reverse-coded item.

VITA

Amy Elaine Chadwick

Education

Ph.D., Communication Arts and Sciences, August 2010
Graduate Minor in Geography, August 2010
The Pennsylvania State University, University Park, PA

M.A., Health Communication, May 1999
Emerson College-Tufts University School of Medicine Program in Health Communication,
Boston, MA

B.S., Communication, June 1997
Cornell University, Ithaca, NY

Fellowships and Research Positions

National Science Foundation Graduate Research Fellow, 2007-2010
Research Assistant, Center for Climate Change Communication, 2007-2008, George Mason
University
Center for Health and Risk Communication Fellow, 2006-2009, The Pennsylvania State
University
University Graduate Fellow, 2005-2006, The Pennsylvania State University

Peer-Reviewed Publications

- Parrott, R., Volkman, J. E., Lengerich, E. J., Ghetian, C. B., **Chadwick, A. E.**, & Hopfer, S. (in press). Community involvement: Use of geographic information systems for comprehensive cancer control. *Health Communication*.
- Maibach, E. W., **Chadwick, A.**, McBride, A. D., Chuck, M. G., Ebi, K. L., Balbus, J. M. (2008). Climate change and local public health in the United States: Preparedness, programs and perceptions of local public health department directors. *PLoS ONE* 3(7): e2838. doi:10.1371/journal.pone.0002838
- Hopfer, S., **Chadwick, A. E.**, Parrott, R. L., Ghetian, C. B., Lengerich, E. J. (2008). Assessment of training needs and preferences for geographic information systems (GIS) mapping in state comprehensive cancer-control programs. *Health Promotion and Practice*, published online April 1, as doi:10.1177/1524839907309047.
- Chervin, D., Philliber, S., Brindis, C., **Chadwick, A.**, Revels, M., Kamin, S., Wike, R., Kramer, J., Bartelli, D., Schmidt, C., Peterson, S., & Valderrama, T. (2005). Community capacity building in CDC's Community Coalition Partnership Programs for the Prevention of Teen Pregnancy. *Journal of Adolescent Health*, 37, S11-S19.
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