A Storied Perspective on Climate Change:

The Effects of Narrative Transportation and Mortality Salience on Pro-Environmental Behavior

By
Devan Daly
University of Colorado at Boulder

A thesis submitted to the
University of Colorado at Boulder
in partial fulfillment
of the requirements to receive
Honors designation in
Environmental Studies
May 2020

Thesis Advisors:

Dale Miller, Environmental Studies, Committee Chair
Leaf Van Boven, Psychology and Neuroscience
Peter Newton, Environmental Studies

Abstract

With the effects of climate change threatening both human life and the environment, it has become increasingly necessary to encourage modifications in both individual and community-wide behaviors. This presents a unique challenge for climate change communicators, particularly in light of noted gaps between individuals' environmental attitudes and behavior. In this thesis, I sought to examine how current tactics of communicating about climate change to the public using anxiety-inducing rhetoric influence pro-environmental behavior by situating environmental communication within the psychological framework of Terror Management Theory and the concept of mortality salience, or the awareness of ones' own mortality. Further, I explored the potential for communicating information through a narrative, or story, as compared to an informational format to examine whether story-telling may be an effective tool for environmental communicators.

Within an experimental study combining the variables of narrative transportation and mortality salience, I predicted that mortality salience would have a negative effect on pro-environmental behavior while communicating in a narrative would override this response by separating the reader from their own reality and encouraging them to model behaviors presented in the text. Results from the study revealed that mortality salience negatively impacted the effectiveness of the environmental texts in promoting pro-environmental behavior. In particular, results showed a significant negative effect on pro-environmental behavior in the narrative text condition. However, when this existentially threatening variable was not included, the narrative condition had the highest level of pro-environmental behavior. Based on these findings, I suggest that climate change communicators avoid the use of fear-inducing language and communicate in a narrative format that depicts positive emotions and examples of pro-environmental behavior.

Figures and Tables

Table of Contents

Preface

Being interested in communication, I have noted with interest the prominence of apocalyptic presentations of climate change in the media. It sometimes feels impossible to check the news without being bombarded with anxiety-inducing descriptions of impending environmental doom and proclamations that the end is nigh. Given that many of these messages are seemingly presented in an attempt to garner public attention and action, I began to wonder what the actual effects on audiences were. Does this type of language encourage individuals to want to mitigate climate change or does it simply frighten them into inaction?

As a long-time reader of dystopian fiction, I have been personally moved by portrayals of frightening visions of the future when encountered in a novel. Thinking of this in the context of environmental communication, I became curious as to whether there was a difference in receptiveness to doom-and-gloom rhetoric if it is portrayed in a fictional versus an informative context. I wondered if there was something unique about a story that might allow readers to be more receptive to frightening ideas than they would be if they heard the same type of information on their nightly news program.

These questions eventually led me down the path of exploring the psychology of environmental communication and pro-environmental behavior in relation to the interaction between narratives and existential anxiety. Given the increasing importance of communicating scientific information to the public, and inherently frightening climate science in particular, it is my hope that this thesis may serve as a means of showing what approaches are (or are not) effective when communicating about fear-inducing environmental topics with the goal of encouraging environmentally-conscious behavior.

Acknowledgements

I would like to express my sincere gratitude for the on-going assistance of my committee members: Dale Miller, Leaf Van Boven, and Peter Newton. I thank Jennifer Cole for her patience and assistance in all steps of the experimental study design and analysis. For inspiration and materials used in the experimental study, I would like to acknowledge Morris et al.'s 2019 study "Stories vs. facts: triggering emotion and action-taking on climate change." Thank you to all students who completed the survey.

Special thanks to my father, Johnson Daly, for shaping my environmental values and encouraging my academic success from day one. For their constant emotional support and occasional welcome distraction, I additionally give thanks to the world's greatest cats: Basil and Professor.

I dedicate this thesis to the memory of my mother, Laura Daly, whose unwavering confidence and support continue to be sources of strength throughout my academic journey.

Section 1: Introduction

In this thesis, I aim to examine how climate change communication impacts audiences and influences individuals' pro-environmental behavior. To address this topic, I discuss psychological underpinnings of responses to climate change as well as environmental communication mechanisms and how these may impact individuals' motivation to participate in mitigating behaviors. Additionally, I conducted an experimental study that expands upon current research in climate communication and the psychological framework of Terror Management Theory (TMT) to measure the effects of both narrative story structure and mortality awareness on participants' motivation for taking pro-environmental action.

Significance

Wolfe & Tubi (2019) recently argued in favor of incorporating TMT and mortality awareness into climate change research. The authors note current gaps in understanding of human responses to climate change that this framework could shed light on, including transformational action, collective behavior modification, and the employment of self-esteem enhancing mechanisms to encourage change (Wolfe & Tubi, 2019). It is my hope that by incorporating TMT into current research about environmental communication, this thesis will expand upon existing knowledge and offer new insights into effective methods of communicating about climate change and other environmental issues with the goal of engaging the public and increasing pro-environmental behavior on an individual level.

Research Questions

The research questions guiding this thesis are:

1. What is the effect of the awareness of ones' own mortality, or mortality salience, triggered by anxiety-inducing environmental communication on pro-environmental behavior?
2. What role might stories play in communicating climate change information to the public and can the positive influences of stories on readers override the barriers that result in response to the existential threat of climate change?

These questions were combined within the experimental study, for which the research question is: How do mortality salience and narrative transportation impact individuals' pro-environmental behavior?

Section 2: Background

In this section, I present an overview of the literature pertaining to responses to climate change, the importance of measuring pro-environmental behavior, the psychological framework of Terror Management Theory, narrative transportation, and climate fiction. These topics provide background to contextualize the experimental study and the effects of fear-inducing climate change communication.

Climate Change & The Attitude-Behavior Gap

Climate change is a topic that continues to gain increasing attention from the public, media, and policymakers across the globe. Over the past decade in the United States there has been a growing trend in individuals reporting that they are concerned about climate change (Gustafson, Leiserowitz, & Maibach, 2019). Scientific reports have come out to show frightening statistics indicating that drastic changes must be made in the upcoming decades to reduce the impacts of greenhouse gas emissions on major areas that affect human life, such as health, land use, and sea level rise (U.S. Global Change Research Program, 2018). Many of these impacts are already being seen around the globe, such as in cases of island communities being impacted by sea level rise or being displaced by increasing occurrences of natural disasters such as hurricanes (U.S. Global Change Research Program, 2018).

Despite the effects of climate change becoming more apparent through concrete examples of individuals and communities being impacted by climate events, and despite reports of growing concern over the impacts of climate change among the American public, there is a notable gap between the growing awareness or concern over climate change and the action being taken to combat it (Doherty & Clayton, 2011; Gifford, 2011). This gap can be seen on both a

national and international scale in terms of policy decisions, such as those to reduce carbon emissions, as well as on an individual level in modifying personal behaviors to be more environmentally-friendly (Gifford, 2011). Research has been conducted in a number of fields to better understand this so-called attitude-behavior gap, including studies in environmental communication and psychology. Results from these studies have indicated that engaging individuals to take action to combat climate change necessarily requires going beyond providing scientific information under the assumption that increasing knowledge of the issue alone is sufficient to motivate behavioral changes (Dickinson et al., 2013; Kahan et al., 2012; Martinez-Conde & Macknik, 2017).

Instead, many researchers suggest that climate change is largely a social issue and one that consequently faces unique challenges by confronting aspects of individuals' identity such as personal value and belief systems and perceptions of the world (Fritsche et al., 2018; Fritsche & Hoppe, 2019; Pearson, Schuldt & Romero-Canyas, 2016). Kahan et al. (2012) conducted a study to experimentally examine the relationship between scientific literacy and concern over climate change. The findings of this study showed that individuals with high scientific literacy were *not* the most concerned about the risks of climate change; rather, individuals' perceptions of climate change risk more directly correlated to the beliefs of the cultures and groups with which they identified (Kahan et al., 2012). Due to cultural and psychological aspects of climate change risk perception, current methods of attempting to communicate climate information to the general public may have the paradoxical effect of triggering defense mechanisms that cause individuals to deny climate change altogether or to simply lack the motivation to modify their behavior (Akil & Bouillé, 2018; Feinberg & Willer, 2010; Gifford, 2011).

It has been suggested that climate change may be met with psychological barriers which may in turn contribute to the gap between knowledge and action (Doherty & Clayton, 2011; Gifford, 2011). Gifford (2011) categorized seven broad categories of psychological barriers in response to climate change, namely: limited cognition, ignorance, environmental numbness, uncertainty, judgmental discounting, optimism bias, and perceived behavioral control/self-efficacy. Gifford (2011) argues that any of these barriers may inhibit motivation to act toward mitigating climate change even if an individual is concerned about climate change's impacts (p. 297). Due to the potential for gaps between an individual's level of environmental concern and motivation to take action, environmental psychology studies often distinguish between values or ideals and actual behavior (though the two may be linked). Thus, an important measurement is *pro-environmental behavior* which can broadly be defined as behavior that serves to improve the environment or to decrease potential negative impacts on the environment.

Pro-Environmental Behavior

In his essay "Toward a Coherent Theory of Environmentally Significant Behavior," Stern (2000) describes what he terms *environmentally significant behavior* as having two major forms: the first are behaviors that are defined by "impact," such as their effect on resource availability, and the second are behaviors that are defined by "intent," or those that are based in the desire to change the environment— most often in positive ways (p. 407). Stern (2000) notes that the prevalence of intent-based behaviors implies that intent is something separate from impact (p. 407). In other words, there may often be a gap between an individual's desire to affect a certain change and their realization of that change in practice. Stern (2000) additionally argues that environmentally significant behaviors can manifest in four main arenas: environmental activism, non-activist behavior in the public sphere (e.g. supporting policies), private-sphere

environmentalism (e.g. purchasing choices), and environmental actions on an organization-level (e.g. engineering products to be more environmentally-friendly).

Pro-environmental behavior is complicated by the fact that the actions taken by an individual may not be directly benefitting that individual, but rather other people or the environment (de Groot & Steg, 2008, p. 61). This makes it a particularly value-based form of behavior, and De Groot and Steg (2008) outline three main values that should be considered when studying pro-environmental behavior: egoistic, altruisitic, and biospheric values (p. 62). De Groot and Steg (2008) argue that pro-environmental behavior may be enacted on the basis of egoistic values, such as opting for public transportation because it is cheaper than driving a car, but that actions taken based on these values are not as stable for longer term pro-environmental behavior as altruistic or biospheric values due to the potential lack of benefit to the individual themselves. They expand upon this to state that attempts to promote environmentally-friendly behaviors should therefore attempt to appeal to altruistic and biospheric values to ensure they are more sustainable (de Groot & Steg, 2008, p. 61).

Terror Management Theory

Further understanding of the psychological barriers inhibiting pro-environmental behavior can be found by examining the psychological framework of Terror Management Theory (TMT). TMT is a theory of social behavior which addresses the distress that arises out of the experience of humans simultaneously existing as both animals with biological drives to survive and as intelligent creatures with the capacity to understand that life inevitably ends (Solomon, Greenberg, & Pyszczynski, 1991, p. 95).

TMT proposes that one response to the anxiety and fear produced by the awareness of human mortality (referred to as *mortality salience* or MS) is the creation of a sense of meaning and permanence through the building of culture (Solomon, Greenberg, & Pyszczynski, 1991, p. 97). Having a shared cultural worldview not only provides order to a seemingly chaotic and frightening universe, but also may provide a sense of immortality that can directly counter the anxiety-inducing effects of mortality salience (Solomon, Greenberg, & Pyszczynski, 1991, p. 96). This immortality can be achieved in a literal sense through adhering to religious or spiritual guidelines that include a continued existence of the person in some form after death or in a more metaphorical sense by leaving behind a legacy that outlasts their physical form (Pyszczynski, Greenberg, & Solomon, 2000, p. 157).

Additionally, TMT recognizes the influence of self-esteem and its association with security. Pyszczynski et al. (2000) explain that this association is first formed in childhood. Caregivers initially give unconditional affection and love; however, as the child gets older, the caregiver increasingly begins to provide more approval and affection when the child adheres to the societal standards of behavior, thus associating increased positive affirmation and self-esteem with acting according to the accepted cultural worldview (Pyszczynski, Greenberg, & Solomon, 2000, p. 157). By the time an individual reaches adulthood, this may manifest in an association between a sense of security and the culturally-constructed worldview which is then sought to soothe anxieties and fears surrounding mortality awareness (Pyszczynski, Greenberg & Solomon, 2000, p. 157). Brook (2005) similarly notes that an individual basing their self-esteem in a certain area, such as academics or environmentalism, may attempt to increase their self-esteem by succeeding within the framework of that area (p. 2). Thus, individuals attempting to

combat the anxiety of mortality salience may either entrench themselves within the framework that enhances their self-esteem or that which reinforces their culturally-created worldview.

In keeping with this theory, experiments have shown that individuals are more likely to seek to maintain their self-esteem and cultural worldview in light of being reminded of their own mortality (Pyszczynski, Greenberg & Solomon, 2000). The desire to adhere to cultural worldviews and to enhance self-esteem have additionally been shown to have different impacts when awareness of death is apparent on a conscious level as compared to existing outside of immediate awareness. Studies by Pyszczynski et al. (2000) revealed that conscious ("proximal") awareness of death leads to attempts to address the problem in a direct way while non-conscious ("distal") awareness of mortality contributes more strongly to the desire to live in accordance with the standards of the cultural worldview and to seek means of enhancing self-esteem (Pyszczynski, Greenberg & Solomon, 2000, p. 159).

Mortality Salience and Views Toward Nature

Studies have applied the concepts described by Terror Management Theory to examine the impacts of mortality salience on environmental beliefs and behaviors. Many of these studies have specifically focused on how mortality salience influences views on the relationship between humans and nature (Beatson & Halloran, 2007; Fritsche & Hoppe, 2019; Greenberg et al., 2001; Koole & Van den Berg, 2005). In many ways, humans can be considered separate from the rest of the natural world, particularly in light of the large-scale modifications humans have made to the environment. This notion of separation is a predominant view in many Western cultures (Fritsche & Hoppe, 2019, p. 157). Further, researchers have argued that the natural world may trigger many intrinsic human fears about mortality by exemplifying both a chaotic and unpredictable vision of the world and by directly providing reminders of death through aspects

such as the changing of the seasons and life cycles of non-human species (Fritsche & Hoppe, 2019; Koole & Van den Berg, 2005). Thus, nature may be considered a direct contrast to the safety net of culture that humans have surrounded themselves with in an attempt to ward off the anxiety of mortality awareness. This negative association with nature in turn functions as a tool of separation and creates a divide where humans desire to view themselves as not only separate but above the rest of the natural system (Fritsche & Hoppe, 2019, p. 157).

Experimentally, it has been shown that mortality salience can affect a number of attitudes related to the environment and these attitudes exemplify the desire for humans to distance themselves from the natural world in the face of existential threat. Some findings from studies involving exposure to mortality salience include: negative attitudes toward non-human animals (Beatson & Halloran, 2007), disgust toward physical processes that associate humans with "creatureliness" (Beatson & Halloran, 2007; Goldenberg et al., 2001), preference for cultivated landscapes over untamed wilderness (Koole & Van den Berg, 2005), increase in materialistic consumption choices (Akil & Bouillé, 2018), and a decrease in biocentric motivation to protect the environment (Fritsche & Häfner, 2011).

While mortality salience may have negative impacts on pro-environmental behavior or views on the relationship and obligations of humans to nature in general, research has also shown that individuals who derive self-esteem from pro-environmental behavior alternatively experience an increase in concern and motivation to take action when mortality salience is triggered (Vess & Arndt, 2008). Fritsche et al. (2010) conducted a study which showed an increase in pro-environmental behavior in response to mortality salience when pro-environmental norms were made salient, where norms refer to "rules and standards that are understood by members of a group, and that guide and/or constrain social behavior without the

force of laws" (p. 67). Thus, it is possible that mortality salience and the anxiety caused by existential threats may in fact lead to positive outcomes in terms of pro-environmental behavior in certain contexts, such as where environmentalism is perceived to be a norm, and among individuals who derive self-esteem from environmental behavior.

Mortality Salience & Climate Change

While a number of studies have been applied the TMT framework to issues of human-nature relationships and pro-environmental behavior, fewer studies have focused specifically on climate change (Wolfe & Tubi, 2019). In a 2019 paper, Wolfe and Tubi argue that mortality salience is a necessary element to study in the context of climate change due to the psychological impact climate effects will have on individuals coupled with the need to potentially adjust personal values in the face of immediate threats (p. 2). This research is additionally relevant given that current forms of climate communication often emphasize apocalyptic or horror-like scenarios of future catastrophe, which may unintentionally induce mortality salience for audiences.

The effects of existentially-threatening climate change rhetoric were shown in a study conducted by Akil and Bouillé (2018), who tested the impact of "anxiogenic" climate change clips, which were pulled from various films that emphasized the theme of death to serve as a means of inducing mortality salience, as compared to an "informative" collection of videos that did not induce mortality salience. Their results showed that participants who were exposed to the anxiogenic condition were more likely to make consumption choices based on their cultural worldview and means of deriving of self-esteem (Akil & Bouillé, 2018, p. 15). These consumption decisions were in turn shown to largely correspond to materialistic rather than

environmental choices, reflecting a cultural attitude that is common among many Western societies (Akil & Bouillé, 2018, p.17).

An earlier study conducted by Feinberg and Willer (2010) similarly showed that participants responded negatively to "dire" climate change messages if their worldview included the belief that the world is generally a just and orderly place (p. 35). Feinberg and Willer (2010) found that dire climate change rhetoric increased skepticism about global warming as a human-caused event while positive rhetoric decreased skepticism, regardless of whether a participant was categorized as having "just-world beliefs" or not (p. 35). The researchers argue that climate change communication emphasizing potentially dire and catastrophic scenarios has counter-productive impacts on audiences unless it is presented with a potential solution (Feinberg & Willer, 2010, p. 37).

Climate Change Communication

With rising concern over climate change impacts and an awareness of the gap between understanding and action, climate change communication research has begun to emphasize the importance of communicating scientific information in novel ways to bridge this gap and engage audiences more productively (Dickinson et al., 2013; Liao, Ho, & Yang, 2015; Martinez-Conde & Macknik, 2017). Dickinson et al. (2013) note the importance of relating climate change to audiences' prior experiences and attachments as well as employing analogies that provide a vision of what the future would look like if climate change effects are not mitigated by human action in the present (p. 146). Further, the importance of "framing" climate communication in certain ways has increasingly been considered an important aspect of public engagement and outreach (Dickinson et al., 2013; Martinez-Conde & Macknik, 2017). Martinez-Conde and Macknik (2017) argue that scientists should look to the arts and humanities for inspiration and

communicate findings in a way that generates an emotional response and engages the imagination of audiences (p. 3). This is consistent with Gifford's (2011) assertion that many psychological barriers to climate change action are emotionally-based and therefore emotions should be factored into public outreach efforts.

Climate Change Fiction

One unique method of communicating about climate change and engaging audience's emotions is through stories. Moezzi et al. (2017) have noted the ability of stories to elaborate on climate change and energy research findings that may otherwise lack specific insights by being overly focused on presenting data in a purely quantitative way (p. 5). This technique is further seen in the rise of the genre of climate fiction or "cli-fi" (Craps, 2018; Johns-Putra, 2016). In many of the novels and stories associated with this genre, climate change is approached from a dystopian or post-apocalyptic angle (Craps, 2018; Hambrick, 2011; Johns-Putra, 2016). Hambrick (2011) argues that apocalyptic or post-apocalyptic climate change stories initially stemmed from the success of Rachel Carson's *Silent Spring*, which many consider to be the catalyst for the modern environmental movement and which authors have subsequently tried to replicate (p. 1). While some critics have claimed that apocalyptic climate fiction is detrimental or even a form of "environmental hysteria" (Hambrick, 2011, p. 1), others argue for its validity as a form of learning tool (Craps, 2018; Hambrick, 2011; Johns-Putra, 2016; Patrick, 2006).

Fictional climate stories may arguably serve as precautionary tales that urge readers to recognize the importance of taking action in the present to prevent the portrayed apocalyptic future from being realized (Hambrick, 2011; O'Neill, 2018; Patrick, 2006). Additionally, fictional climate change stories may serve as a mechanism to understand future scenarios that are unlike anything humans at present have experienced (O'Neill, 2018). O'Neill (2018) explains

that fiction can serve as a form of mental experimentation that mirrors modeling experiments done by environmental scientists with consideration for future scenarios rather than what can be tangibly measured in the present (p. 6). Johns-Putra (2016) similarly suggests that post-apocalyptic stories may serve as a learning tool for how to live in the wake of climate change (p. 277). Arguably one of the genres that most coincides with climate fiction is science fiction (Raven, 2017; Streeby, 2018) and science fiction in particular may be used as a tool for testing hypothetical scenarios to make predictions and even plans for the future, in part by incorporating potential technologies that do not exist in the present (Raven, 2017, p. 164).

Narrative Transportation

Psychological research has elaborated on the relationship between stories and behavior through studies measuring the role of *narrative transportation* and its impact on audiences. Narrative transportation was first described by Gerrig (1993) and elaborated upon by Green (1996) and describes the effect of a reader being so absorbed in a text that they become detached from their own reality and "real world facts" (Green, 1996, p. ii). During narrative transportation, a reader may additionally experience emotions from the story that may contribute to a change in real-world beliefs (Green, 1996). Green and Brock (2000) further showed experimentally that readers who experienced high levels of narrative transportation had a higher likelihood of expressing beliefs consistent with those displayed in the story after reading than those who read informational or otherwise non-transportation-inducing texts (Green & Brock, 2000, p. 701).

Along with impacting beliefs, narrative transportation has also been shown to influence empathy and behavior. Johnson (2011) conducted a study which showed that subjects who read texts coded for high levels of narrative transportation expressed higher levels of empathy for characters in the text and this empathy additionally promoted pro-social behaviors in the reader's

actual life (p. 152). Johnson (2011) further noted that a character in the story had themselves modeled pro-social behavior, which may have impacted participants' own engagement in the behavior in the real world (p. 152). This suggests that narratives that induce a high level of transportation coupled with the modeling of specific behaviors may have real-world consequences in terms of behavior modification.

The idea that narrative transportation can impact real-world behavior was examined in the context of climate change and pro-environmental behavior in a study conducted by Morris et al. (2019) in which the authors tested the hypothesis that information on climate change structured in the form of a story would lead to higher levels of pro-environmental behavior as compared to the same information being presented in an informational text (Morris et al., 2019, p. 22). The results of the study revealed that not only did the narrative condition result in higher examples of pro-environmental behavior, but subjects in the informational condition performed fewer pro-environmental behaviors than those of the control group, indicating that informational texts may not only be less effective but actually detrimental in attempting to increase pro-environmental behavior (Morris et al., 2019, p. 25).

While studies have examined the impacts of mortality salience and narratives in environmental communications independently, to my knowledge no studies exist that incorporate both variables. Because mortality salience may be unintentionally induced for audiences when they are exposed to climate change communication, I was interested in incorporating the variable of MS into an existing study framework that has addressed the effect of narrative transportation in environmental communication. Through this study, I sought to better understand how different presentations of environmental communication encourage or inhibit pro-environmental behavior

as well as how mortality salience and narrative transportation interact and whether the increase in pro-social behavior caused by narrative transportation might override the potentially counterproductive effects of anxiety-inducing climate rhetoric due to MS.

Section 3: Methodology

In this section, I provide background information to contextualize the experimental study and details of the study methodology including information about subjects, materials, and data analysis techniques. This study was approved under IRB protocol number 20-0018.

Background

This study is an expansion upon the research conducted by Morris et al. (2019, study 1), who measured participants' pro-environmental behavior after reading a text with either a narrative or informational structure. The results of this study showed a causal relationship between the narrative text and higher levels of pro-environmental behavior while the informational text had lower levels of pro-environmental behavior as compared to both the narrative and control conditions (Morris et al., 2019). This study was conducted in a laboratory setting with measures of pro-environmental behavior being observed in-person, including: turning the lights off when exiting the room, choosing between a plastic or glass cup when offered a beverage, and recycling papers used in an unrelated task (Morris et al., 2019). Due to logistical restrictions, including a lack of funding, I chose to modify this structure to create a study that was conducted through an online format using scales of intended pro-environmental behavior consistent with other studies conducted through survey or online forms. Further, my study includes the additional variable of mortality salience (MS) to induce the response that an individual may have to reading anxiety-inducing environmental rhetoric.

Research Question

The research question guiding this study was: How do mortality salience and narrative transportation impact individuals' pro-environmental values and intended behavior?

Subjects

Participants for this study were drawn from the University of Colorado Boulder Introduction to Psychology (PSYC 1001) course and were compensated with a course research credit for participation. The minimum sample size was determined in relation to Morris et al.'s study (n = 158). A total of 218 completed survey responses were collected. Demographic information of subjects is provided in the following table.

Table 1: Demographic information of survey respondents. The majority of respondents were female (66%), white (72%), Democrat (49%), middle class (58%), and grew up in suburban hometowns (66%).

Gender	
Female	66%
Male	33%
Other	1%
Political Party	
Democrat	49%
Independent	17%
Republican	16%
No preference	16%
Other	3%
Race/Ethnicity	
White	72%
Asian	13%
Hispanic	10%
Other	3%
African American	2%
Native American	1%
Hometown	
Suburban	66%
Urban	26%
Rural	8%
Socioeconomic Class	
Middle Class	58%
Upper Class	26%
Working Class	13%
Lower Class	3%

Materials & Methods

The study was conducted through an online survey distributed through Qualtrics where subjects were randomly assigned to one of the following six conditions using the Qualtrics randomization function:

1. Narrative text + mortality salience
2. Informational text + mortality salience
3. Control text + mortality salience
4. Narrative text + control questions
5. Informational text + control questions
6. Control text + control questions

Subjects were initially presented with a short questionnaire assessing their environmental identity (Appendix A). This measure was repeated after exposure to the manipulation to serve as a means of comparing baseline levels of environmental identity to the resulting pro-environmental behavior measures. After the initial questionnaire, subjects were presented with the first manipulation. Those in the mortality salience (MS) condition were presented with two open-ended questions designed to trigger that effect while subjects in the non-MS conditions were presented with two neutral open-ended questions (Appendix A). Responses to these open-ended questions were not analyzed as part of the data.

Subjects were then presented with the second manipulation: either the informational, narrative, or control reading excerpt (Appendix A). Informational and narrative texts were taken directly from the Morris et al. (2019) study in which they were coded for levels of narrative transportation. These texts included examples of pro-environmental behavior while the control excerpt contained neutral, non-environmental historical information. All excerpts were the same length (507 words). A 45-second timer was built into the excerpt page within the survey before

subjects could progress to the next page and a reading check question was presented on the following page to better ensure that participants had read the text before moving on to the following questions.

After reading the excerpts, participants were presented with a number of scales and questionnaires, namely: The New Ecological Paradigm, Environmental Identity, and Environmental Concern scales as well as scales designed to measure perceptions of waste reduction norms, perceptions of cultural environmental values, and belief in climate change (Appendix A). Responses to these questions were analyzed for differences between subjects in each condition. Utilizing these questions allowed me to assess the impact of the manipulations on cultural norms, environmental values, and environmental concern. Finally, participants were presented with questions designed to measure the dependent variable of pro-environmental behavior along with demographic and debriefing questions.

Scale Measurements & Justification for Use

This survey was designed using a combination of pre-existing and self-created scales and questionnaires. Self-created scales were prepared with the assistance of Jennifer Cole and Leaf Van Boven. The survey measurement materials included:

1. New Ecological Paradigm Scale-Revised (Dunlap & Van Liere, 1978; Dunlap et al., 2000)

The New Ecological Paradigm (NEP) scale has been a standard in environmental experiments since its creation and is a measure of an individual's environmental values in terms of subscribing to a "pro-ecological worldview" (Dunlap & Van Leire, 1978). According to a study by Ogunbode (2013), the New Ecological Paradigm is considered "the most widely accepted [scale] with documented validity and reliability" for measuring ecological values. This

study uses the revised version of the scale which was updated by the researchers to modify outdated language, provide a more nuanced assessment of ecological worldviews, and present an equal number of pro-NEP and anti-NEP statements (Dunlap et al., 2000)

2. Environmental Concern (Thøgersen, 1999)

The Environmental Concern scale was designed to measure an individual's level of concern for the state of the environment as well as how much impact their own personal consumption choices can have. This concern scale was used by Morris et al. (2019) and addresses personal purchasing choices and waste reduction which are directly related to the informational and narrative texts which center around Zero Waste practices. Thus, this scale serves as a means of gauging whether the manipulations have an effect of increasing or decreasing environmental concern in these areas as compared to the control condition.

3. Environmental Identity (Whitmarsh & O'Neill, 2010)

The Environmental Identity scale was created by Whitmarsh and O'Neill (2010) to concisely assess how much of an individual's identity is tied to environmental practices. This scale was used as a means of measuring whether the independent variables impact environmental identity differently between conditions, and particularly if the narrative condition increases identification with being pro-environmental as compared to the control condition.

4. Mortality Salience questions (Greenberg et al., 1997)

The two open-ended mortality salience questions are the standard used in Terror Management Theory experiments to induce MS and have been used in many studies including those conducted by Greenberg et al. (1997), Pyszczynski et al. (2000), and Akil & Bouillé (2018). Studies have shown that MS causes individuals to more strongly cling to values and

cultural norms when the awareness is *distal*, or not at the forefront of consciousness (Pyszczynski et al., 2000), so these questions were presented before the reading excerpt in all conditions to provide additional time between these responses and the pro-environmental behavior measures.

The two mortality salience questions (Greenberg et al., 1997) were:

I. In a few sentences, describe what you believe will happen when you physically die.
II. What emotions do you feel when you think about your death?

5. Norms and pro-environmental behavior measures

Additional questions were created for the survey by the researchers to measure perceived cultural norms of waste reduction, which is the topic of the informational and narrative reading excerpts. These questions serve to assess whether individuals are adhering to what they view to be their culture's norms as is the prediction of Terror Management Theory in response to mortality salience (Greenberg et al., 1997).

Pro-environmental behavior measures were also created for the survey and designed to measure behavior and decision-making in a realistic way through the online format without incorporating deception. Given the limitations of measuring behavior in an online format, these questions are a measure of intent rather than actual behaviors. Intended behaviors have been noted to be a useful measure in mortality salience research because they may more directly link to individual's beliefs and perceptions whereas an actual behavior can have various mediating influences unrelated to the mortality salience effect (Fritsche & Häfner, 2011).

The questions for pro-environmental behavior used in the survey were:

I. How interested are you in receiving further information after the study about participating in each of the following activities?
   - Subscribing to an environmental newsletter
   - Signing a petition in favor of the Energy Innovation and Carbon Dividend Act
   - Being contacted about volunteer opportunities with the Environmental Center on campus
   - Donating to an environmental organization such as the Natural Resources Defense Council (NRDC)

II. How likely are you to make an effort to do each of the following actions in your daily life?
   - Eat less meat
   - Recycle
   - Use public transportation
   - Buy local or organic produce
   - Fly less often
   - Reduce waste

III. How willing are you to sign a petition to support the following?
   - Limiting carbon dioxide emissions to mitigate climate change
   - Limiting plastic waste and other types of waste

Data Analysis

Data was analyzed in R using a multiple regression with contrast-coded predictors representing the 2 (mortality salience or control) x 3 (narrative, informational or control excerpt) analysis of variance (ANOVA). The mortality salience condition was coded as mortality questions (+0.5) or control questions (-0.5). The excerpt conditions were contrast coded as control excerpt (-2/3) compared to the two environmental excerpts (+1/3) and narrative (+0.5) compared to the informational excerpt (-0.5) and control excerpt (0). Simple effects were analyzed by coding dummy variables (e.g. the narrative condition was coded as (1) and the other two conditions were coded as (0) to represent the narrative condition).

Section 4: Results

In this section, I provide figures and results of statistical tests run in R. The total number of survey responses collected was 218. Statistically significant results were found within the environmental behavior, policy support, and environmental concern measures and marginally significant results are reported in the summary of key findings section. These results are further elaborated upon in the Discussion section. See Appendix A for specific questions corresponding to the described measures.

Figures and Statistical Results by Measure

Measure 1: Environmental Behavior

Environmental behavior is a combination of two sets of questions pertaining to environmental behavior that were averaged for analysis ($\alpha = .82$). The first set of questions gauged the subject's interest in receiving further information about participating in various environmental activities after the study. The second set of questions gauges how likely a subject is to modify their daily behavior to be more environmentally-friendly (e.g. by recycling, using public transit).

Table 2: Means across conditions for environmental behavior measure. Response scale between 1 (low) to 7 (high). Numbers closer to 7 reflect a higher level of pro-environmental behavior.

Environmental Behavior		
	Mortality Salience	**Control**
Control	4.82	4.83
Informational	4.61	5.01
Narrative	4.44	5.14

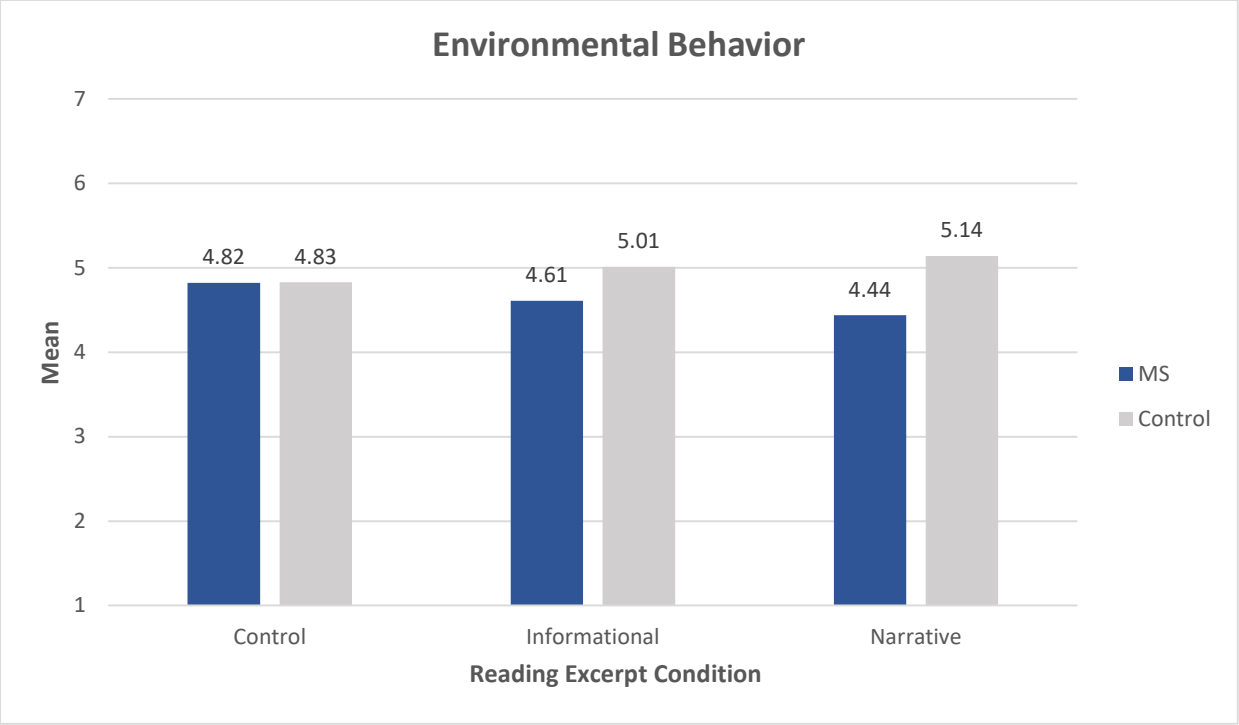

Figure 1*:* Graph of means across conditions for environmental behavior measure.

There was a main effect of mortality salience (b = -0.37 , F(189) = 5.71, p = .018) such that environmental behavior was lower in the MS condition (M = 4.63, SD = 1.08) than in the control condition (M = 5, SD = 1.03). There were no main effects of the excerpt condition. There was a marginally significant interaction between MS and the predictor comparing the control excerpt condition to the two environmental excerpt conditions (b = -0.55 , F(189) = 2.82, p = .095).

A comparison of the environmental behavior measure between the narrative condition and other excerpt conditions was significant such that that mortality salience had a higher effect in the narrative condition than the other two conditions (b = 4.79, F(188) = 1.85, p < .001). A significant effect of mortality salience on behavior within the narrative condition (M = 4.44, SD = 1.18, b = -0.70, F(188) = 6.85, p = .01) reflected that mortality salience had a greater negative

effect within the narrative condition than in the control (M = 4.82, SD = 0.94, b = <0.01, F(188) = <0.01, p = .988) and informational condition (M = 4.61, SD = 1.15, b = -0.41, F(188) = 2.25, p = .136).

Measure 2: Policy Support

Policy support is a measure of subjects' reported willingness to sign a petition to support two policies: one to limit CO2 emissions to mitigate climate change and one to limit plastic and other waste (α = .85). Responses were averaged for the two questions.

Table 3: Means across conditions for the policy support measure. 7-point response scale from "extremely unwilling" to "extremely willing."

Policy Support		
	Mortality Salience	**Control**
Control	5.85	5.79
Informational	5.6	5.96
Narrative	5.37	6.14

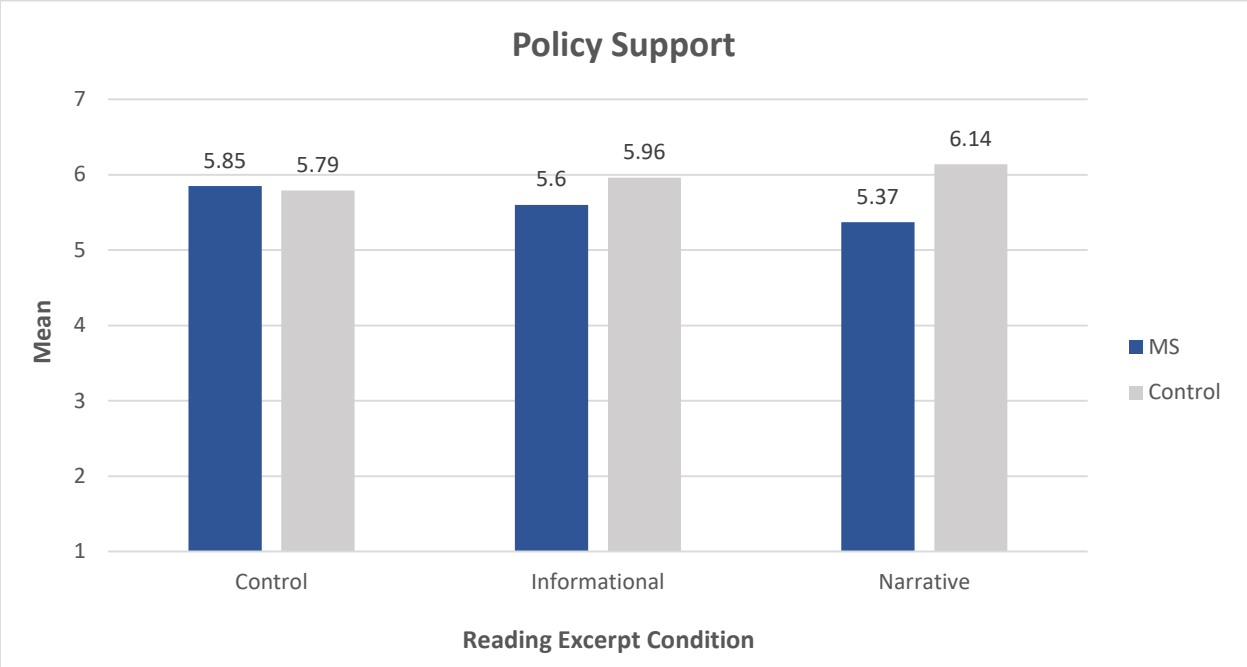

Figure 2*:* Graph of means across conditions for policy support measure.

There was a marginally significant main effect of mortality salience (b = -0.36, F(189) = 3.35, p = .069) such that policy support was lower in the MS condition (M = 5.62, SD = 1.37) than in the non-MS condition (M = 5.98, SD = 1.28). There were no main effects of the excerpt condition.

A comparison of the policy support measure between the narrative condition and the other excerpt conditions was significant such that that mortality salience had a higher effect in the narrative condition than the other two conditions (b = 5.75, F(188) = 1.33, p < .001). A significant effect of mortality salience on policy support within the narrative condition (M = 5.36, SD = 1.37, b = -0.78, F(188) = 5.31, p = .022) reflected that mortality salience had a greater negative effect within the narrative condition than in the control (M = 5.6, SD = 1.24, b = 0.07, F(188) = 0.04, p = .837) and informational condition (M = 5.86, SD = 1.49, b = -.37, F(188) = 1.14, p = .288).

Measure 3: Environmental Concern

Environmental concern is a measure of subjects' level of concern for the general state of the environment as well as the impact their own personal consumption choices can have and whether they choose to modify their purchasing behaviors, e.g. by buying eco-friendly products (Thøgersen, 1999).

Table 4: Means across conditions for environmental concern measure. 7-point scale from "strongly disagree" to "strongly agree." Numbers closer to 7 correspond to higher levels of reported environmental concern.

Environmental Concern		
	Mortality Salience	**Control**
Control	5.27	5.50
Informational	5.13	5.53
Narrative	4.95	5.68

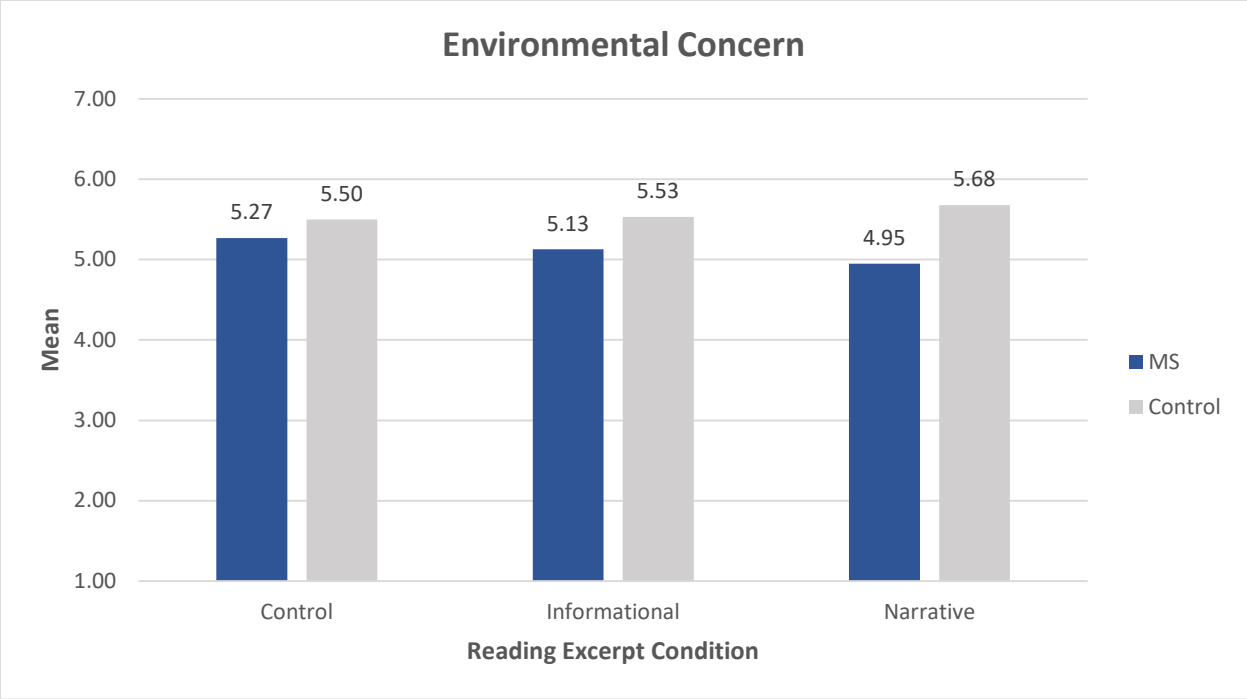

Figure 3*:* Graph of means across conditions for environmental concern measure.

There was a main effect of mortality salience (b = -0.46, F(189) = 10.84, p = .001) such that environmental concern was lower in the MS condition (M = 5.12, SD = 0.96) than in the non-MS condition (M = 5.58, SD = 0.94). There were no main effects of the excerpt condition.

A comparison of the environmental concern measure between the narrative condition and the informational and control conditions was significant such that that mortality salience had a higher effect in the narrative condition than the other two conditions (b = 5.75, F(188) = 1.33, p < .001). A significant effect of mortality salience on environmental concern within the narrative condition (M = 4.95, SD = 0.98, b = -0.73, F(188) = 9.27, p = .003) reflected that mortality salience had a greater negative effect within the narrative condition than in the control (M = 5.27, SD = 0.99, b = -.024, F(188) = 1.02, p = .313) and informational condition (M = 5.13, SD = 0.9, b = -0.04, F(188) = 2.71, p = .101).

Measure 4: Environmental Values (NEP Scale)

The New Ecological Paradigm (NEP) scale measures pro-ecological and pro-environmental values (Dunlap et al., 2000). Half of the questions in the scale reflect pro-environmental values while half reflect an anthropocentric value system. These responses were reverse-scored so that a high response to the anthropocentric questions was equivalent to a low level of environmental values.

Table 5*:* Means across conditions for environmental values measured using the New Ecological Paradigm scale. 7-point response scale from "strongly disagree" to "strongly agree."

Environmental Values (NEP)		
	Mortality Salience	**Control**
Control	5.07	5.37
Informational	5.01	5.33
Narrative	5.15	5.15

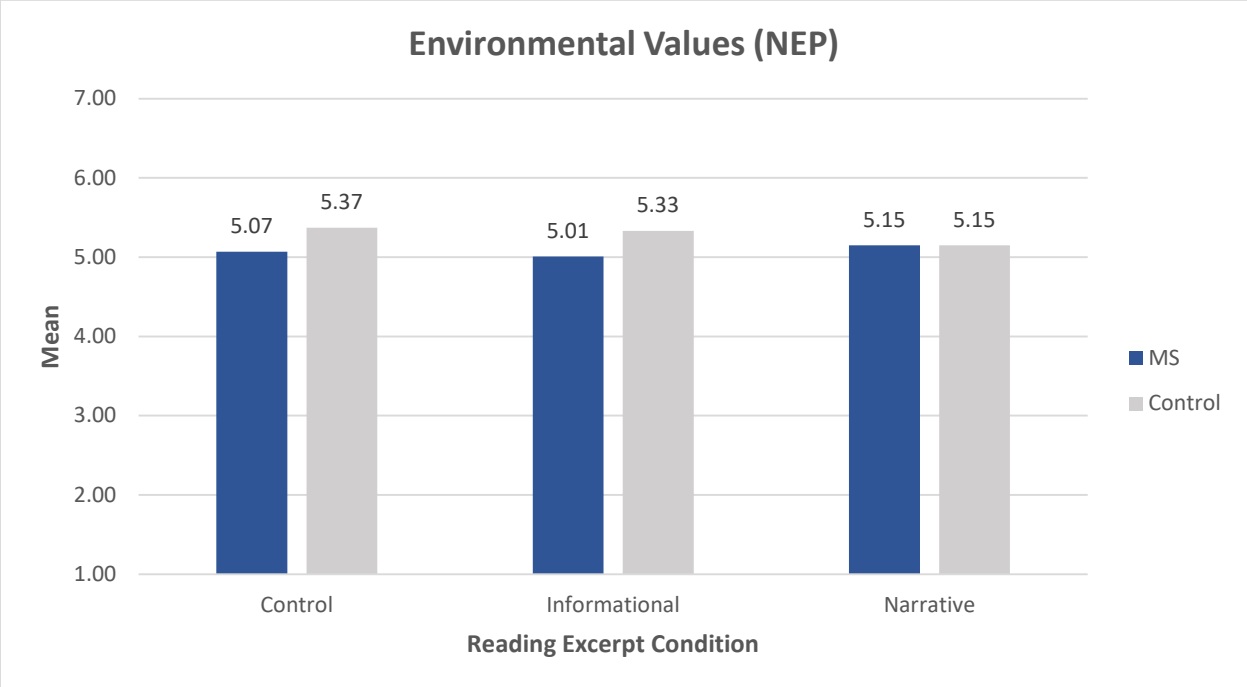

Figure 4: Graph of means across conditions for environmental value measure using the New Ecological Paradigm scale.

There was a marginally significant main effect of mortality salience (*b* = -0.21, F(189) = 3.49, *p* = .063) such that environmental values were lower in the MS condition (M = 5.07, SD = 0.76) than in the non-MS condition (M = 5.27, SD = 0.75). There were no main effects of the excerpt condition.

Measure 5: Climate Change Belief

Climate change belief is a measure of subjects' belief in climate change occurring, being a risk, being the result of human activities, and being able to be mitigated by reducing greenhouse gases (α = .89).

Table 6: Means across conditions for belief in climate change. 7-point scale from "strongly disagree" to "strongly agree."

Belief in Climate Change		
	Mortality Salience	**Control**
Control	6.38	6.37
Informational	5.97	6.42
Narrative	6.08	6.38

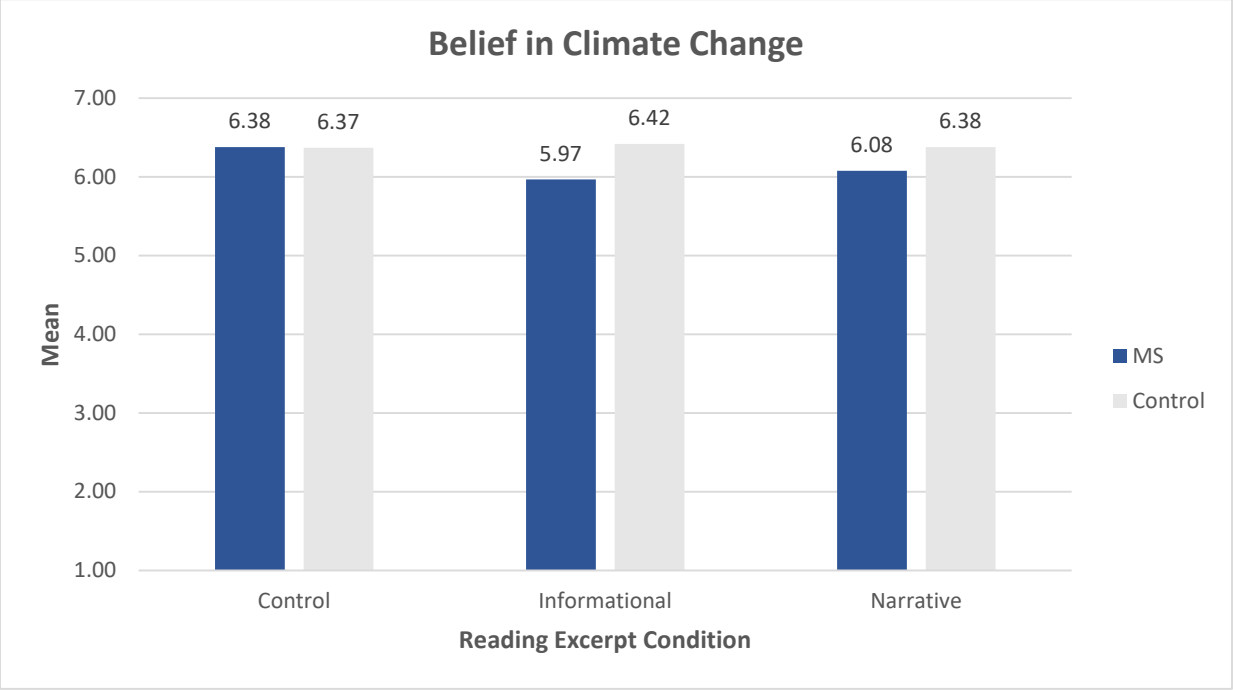

***Figure 5*:** Graphs of means across conditions for belief in climate change measure.

There was a marginally significant main effect of mortality salience (*b* = -0.24, F(189) = 3.52, *p* = .062) such that belief in climate change was lower in the MS condition (M = 6.14, SD = 1.03) than in the non-MS condition (M = 6.39, SD = 0.74). There were no main effects of the excerpt condition.

Measure 6: Perceptions of Cultural Values

Perceptions of cultural values is a measure of the degree to which the subject perceives their culture to value Zero Waste practices and behaviors that protect the environment and mitigate climate change (α = .71).

Table 7: Means across conditions for perceptions of cultural values measures. 5-point scale from "no value" to "high value."

Perceptions of Cultural Environmental Values		
	Mortality Salience	**Control**
Control	3.03	2.69
Informational	2.96	3.14
Narrative	2.92	3.14

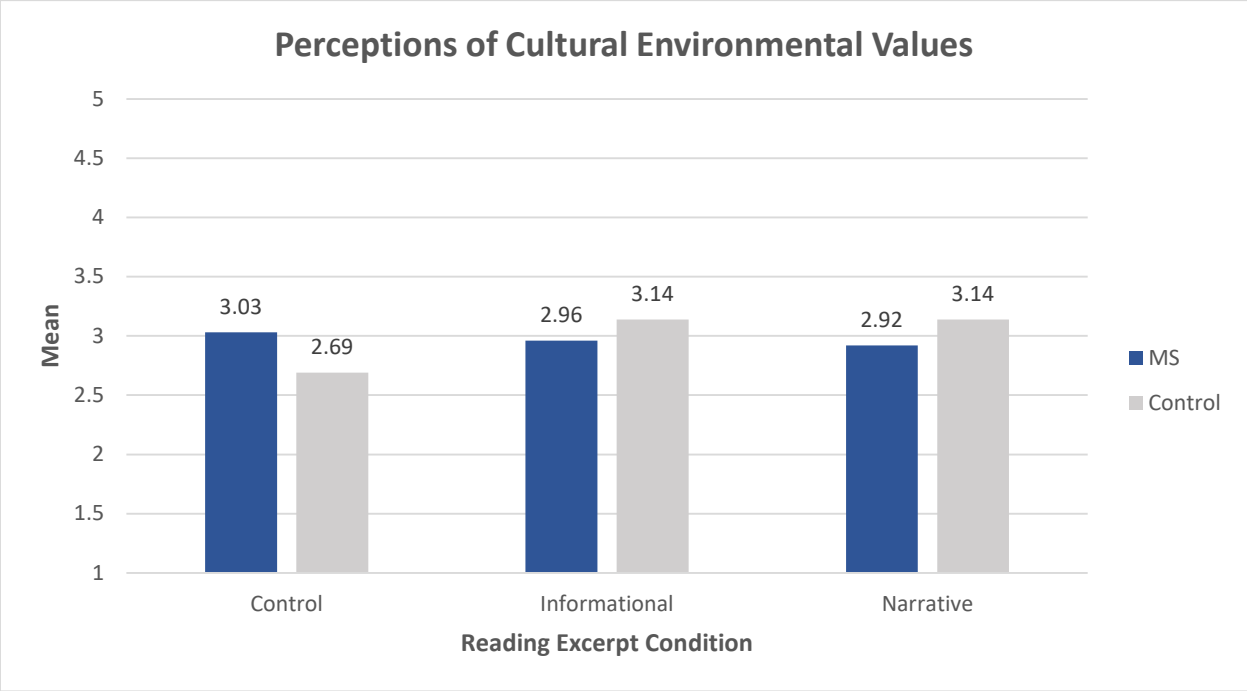

***Figure 6*:** Graphs of means across conditions for cultural environmental values measure.

There were no main effects of mortality salience or excerpt conditions on perceptions of cultural environmental values. There was a significant interaction between MS and the predictor comparing the control excerpt condition to the two environmental excerpt conditions (b = -0.02, F(189) = 0.04, p = .84).

Measure 7: Perceptions of Zero Waste Norms

Perceptions of Zero Waste norms measures the degree to which the subject perceives individuals around them to be actively attempting to reduce waste and adhering to Zero Waste Practices (α = .45).

Table 8: Means across conditions for perceptions of individual zero waste norms measure. 5-point scale from low to high.

Perceptions of Zero Waste Norms		
	Mortality Salience	**Control**
Control	3.13	2.89
Informational	2.94	2.87
Narrative	2.73	2.96

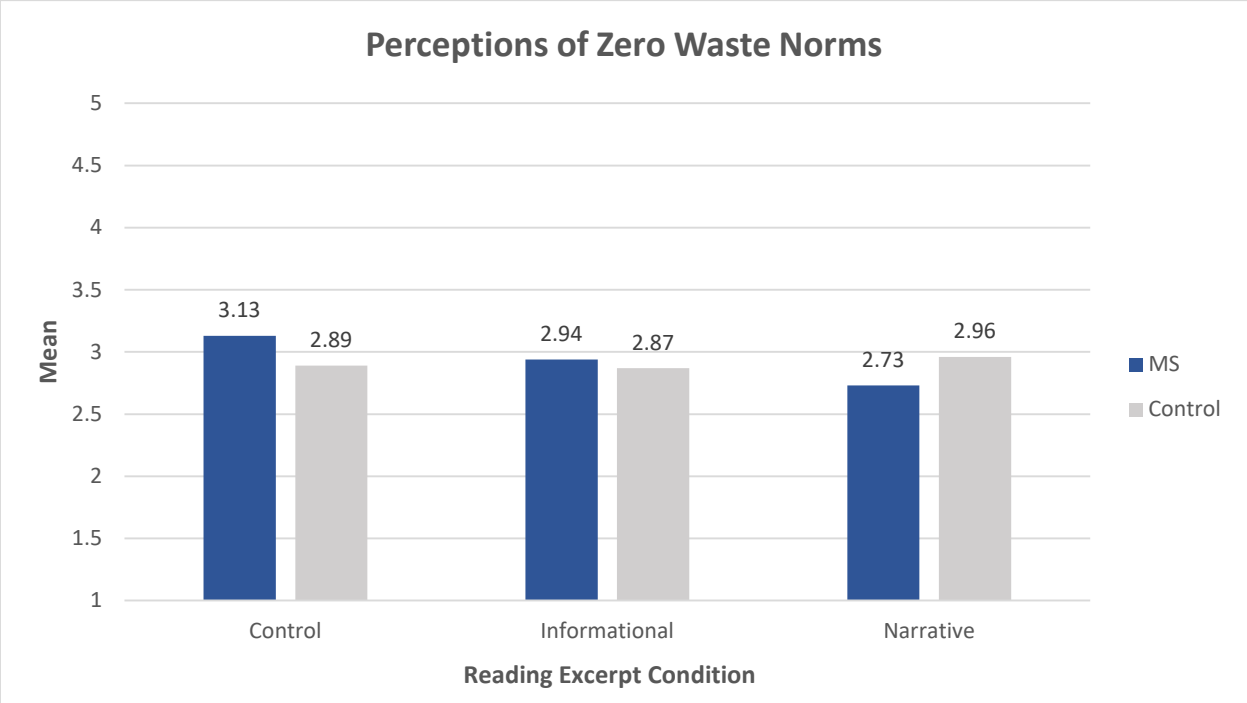

***Figure 7*:** Graph of means across conditions for perceptions of Zero Waste norms measure.

There were no main effects of mortality salience or the excerpt conditions on perceptions of Zero Waste values.

Measure 8: Environmental Identity

Environmental identity is a measure of subjects' reported sense that environmentalism is part of their identity (Whitmarsh & O'Neill, 2010).

***Table 9*:** Means across conditions for environmental identity measure. 7-point scale from "strongly disagree" to "strongly agree."

Environmental Identity		
	Mortality Salience	**Control**
Control	5.26	5.55
Informational	5.07	5.42
Narrative	5.12	5.53

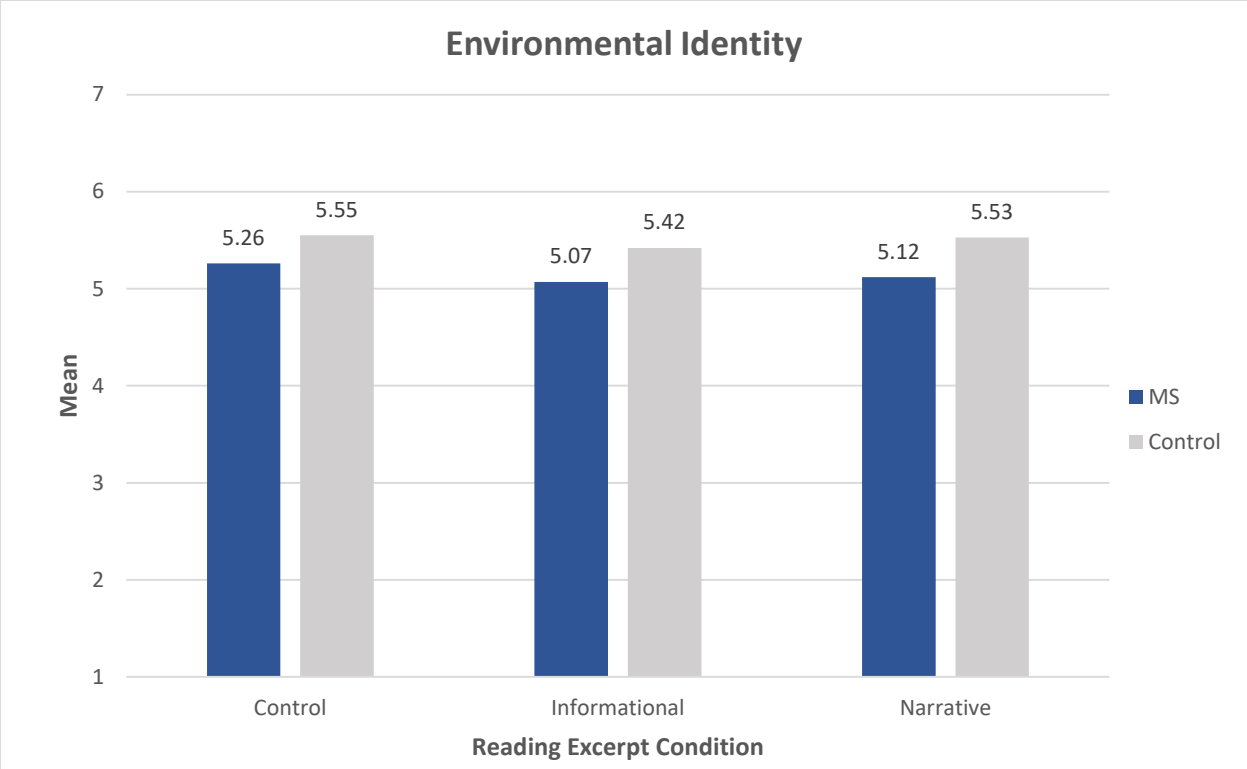

***Figure 8*:** Graph of means across conditions for environmental identity measure.

There was a main effect of mortality salience (b = -0.35, F(189) = 6.96, p = .009) such that environmental identity was lower in the MS condition (M = 5.15, SD = 0.9) than in the non-MS condition (M = 5.5, SD = 0.91). There were no main effects of the excerpt condition.

Summary of Key Findings

Statistical analyses show a significant negative effect of mortality salience in the narrative condition for measures of behavior (p = .01), policy support (p = .022), and environmental concern (p = .003). MS further had a marginally significant negative effect in the narrative condition for measures of perceptions of individual waste norms (p = .08) and environmental identity (p = .074).

Marginally significant negative effects of MS were likewise seen in the informational condition for measures of environmental values (p = .099) and climate change belief (p = .053). Marginally significant positive effects of MS were seen in the control condition for perceptions of cultural values (p = .062) and perceptions of individual waste norms (p = .074).

Section 5: Discussion

In this section, I review the findings presented in the Results section, theorize as to what may have contributed to these results, and discuss their implications. While multiple environmental elements were measured within the survey, I will primarily focus on the main dependent variable of pro-environmental behavior as this was the dependent variable in the study conducted by Morris et al. (2019) and is additionally the primary focus of this thesis. I break down the measures between the conditions without mortality salience and those with mortality salience and discuss the differences within and between the conditions. I additionally discuss limitations of this study and suggestions for future research.

Non-Mortality Salience Condition

Results within the non-MS narrative condition are consistent with the findings of Morris et al. (2019). Namely, the narrative condition had higher overall measures of environmental behavior as compared to both the informational and control condition. Interestingly, these results differ from Morris et. al's (2019) finding that the informational condition had a lower measure of environmental behavior than the control condition. This may be due to the specific language of the control excerpt used by Morris et al. (2019) which was not provided by the researchers in their supplemental materials and is consequently unknown. The control excerpt used in this study discussed historical information about the United States and did not include any environmental topics (Appendix A).

Although there was only a small difference in means between the non-MS control (M = 4.83), informational (M = 5.01), and narrative (M = 5.14) conditions, the existence of a difference may suggest that texts specifically aimed at promoting environmental behavior can

have a positive impact on behavior. Additionally, the difference between the narrative and informational texts indicate that communicating about environmental damage and potential solutions in an emotionally-engaging story format may have a higher impact on behavior than when that same information is communicated in an informational style. This is in line with the results of Morris et al. (2019) as well as studies of narrative transportation that have shown an increase pro-social behavior when that behavior is depicted in a story (Johnson, 2012). Further, this provides additional evidence that stories can be an effective tool at communicating scientific information in a way that connects individuals to an issue and may thus encourage a bridging of the attitude-behavior gap.

Mortality Salience Condition

The most surprising finding of this study was that all of the statistically significant negative effects of mortality salience were within the narrative condition. I had initially predicted that the effect of high narrative transportation would override the effects of MS. This prediction was based upon the findings of Green and Brock (2001) and Johnson (2012) which showed that narrative transportation separates readers from their own reality and allows them to be more receptive to mirroring behaviors exemplified in a text. In theory, this would provide a degree of separation sufficient to remove the reader from the typical MS response of seeking behaviors that tie to their cultural worldview or sense of self-esteem. Additionally, the narrative excerpt provides examples of pro-environmental behaviors which would theoretically make environmental norms more salient and present examples of behavior for the subjects to model. In the results, this would have been seen as a consistent level of pro-environmental behavior between the MS and non-MS narrative conditions. However, I instead found that mortality

salience had a significant negative effect on environmental behavior in the narrative condition as compared to the narrative non-MS condition.

Because this is a previously unstudied interaction, it is unclear as to why mortality salience would have a stronger negative effect in the narrative condition as compared to both the informational and control conditions. However, one potential explanation for this interaction may be the content of the narrative story itself. Toward the beginning of the story, the narrator describes overwhelming feelings of "hopelessness, guilt and worry." Mortality salience has been shown to increase similar negative emotions, such as fear and anxiety (Lambert et al., 2014). By expressing these negative emotions at the outset of the story, the narrative condition may have inadvertently increased the effect of mortality salience and inhibited individuals from experiencing the positive effects of narrative transportation. If this was in fact the primary contributing factor, this would indicate the need for environmental communicators working with anxiety-inducing topics that may induce MS, such as climate change, to use positive language and descriptions of emotions to avoid heightening the fear response.

Additionally, when MS was introduced to the two environmental excerpt conditions (informational and narrative), means were reduced to below the levels seen in the control excerpt condition for the majority of measures. This indicates a potential relationship between the environmental content of the excerpts and the reported environmental measures that is negatively influenced by the presence of MS, which aligns with research that suggests that environmental issues may in and of themselves trigger MS by reminding individuals of their existence as a biological being (Beatson & Halloran, 2010; Vess & Arndt, 2008**)** as well as alluding to potential for ecological degradation contributing to negative effects on human livelihood and welfare (Akil & Bouillé, 2018; Fritsche & Hoppe, 2019). Within this study, no relationship was found

between the pre-measure of environmental identity compared to the post-measure; however, future studies may wish to incorporate additional metrics to assess individuals' personal and cultural worldview prior to the manipulations to examine whether adhering to less environmentally-friendly behaviors is consistent with this worldview and thus increased in response to MS.

There were two instances of marginally significant *positive* effects of MS in the control excerpt condition: within the perceptions of cultural values and perceptions of Zero Waste norms measures. These measures asked subjects to report their perception of how much their culture values the environment as well as how present Zero Waste norms and behaviors are for individuals they know as well as society more broadly. One potential explanation for this difference in the control condition compared to the two environmentally-themed excerpt conditions is that the combination of MS with pro-environmental texts contributed to a perspective that the environment is not currently being valued enough, which is exemplified through the content of those excerpts which describe negative environmental impacts of plastic pollution. However, the control excerpt does not touch on these topics and thus may not have a negative effect on perceptions of environmental and waste-reducing values.

Limitations of Study

One of the primary limitations of this study was that it was conducted through a self-reported online survey. In-person lab sessions were conducted for a total of 19 participants and, in observing their survey-taking behavior, I noted that several individuals completed the survey well under the estimated time of 30 minutes. Additionally, a timer was set on the reading excerpt page for 45 seconds which was determined to be half the amount of time the average college student would take to read this type of excerpt. This was intended to encourage participants to

stay on the page and read the excerpt without the aggravation and potential discouragement of having too long a timer. However, in in-person observations, two individuals inquired as to why there was no option to progress in the survey immediately after the reading excerpt became available thus making it apparent that they were planning on clicking through without reading the excerpt. Reading check questions were included in the survey and show that a large proportion of participants could generally describe the overall themes of the reading excerpts, so it is hard to gauge how much this may have influenced the results for subjects who took the survey online.

An additional limitation of the study was that all responses were collected from a single subject pool of University of Colorado Boulder students. As shown in the reported demographics, there was little variation in age, socioeconomic status, race/ethnicity, education level, or other demographic measures. This indicates that these results are likely not representative of a greater population and that results may be have been affected by these factors. However, having little variation within the sample may have also been beneficial in isolating the effects of the variables.

Suggestions for Future Research

In carrying this and other research forward, it would be beneficial to conduct a similar experiment within a larger and more diverse sample population. Given that mortality salience is mediated by self-esteem and cultural worldviews, it would be interesting to assess whether there are larger scale patterns that can be seen across groups as well as within specific groups such as self-identifying environmentalists. Additionally, further research is suggested to test the theory that the negative emotions within the narrative condition contributed to the strong negative effect of mortality salience within that condition. This could be in the form of a study which

incorporates mortality salience and compares narrative texts that have descriptions of either positive or negative emotions. Identifying the mechanism that caused this specific interaction could provide insights that would benefit environmental communicators who are attempting to encourage pro-environmental behavior.

Section 6: Conclusion

Research in the areas of environmental psychology and communication have shown that individuals may respond in counter-productive ways to attempts to motivate pro-environmental behavior and action-taking to mitigate the effects of climate change, regardless of their level of scientific understanding, concern, or amount of factual information provided. This presents a unique challenge for climate change communicators who seek to encourage pro-environmental behavior. Current trends in climate change communication emphasize the potential for negative future scenarios caused by climate change and often involve anxiety-inducing rhetoric and themes, such as the end of humanity as a species. This type of communication can inadvertently trigger the effect of mortality salience, or an awareness of ones' own mortality, which has been shown to result in specific defense mechanisms that may lead to behaviors that are not environmentally-friendly. In this thesis, I explored the impacts of mortality salience and whether its negative effects on pro-environmental behavior might be mediated by communicating information in a narrative, or story, form.

Results from an experimental study indicated that the effect of mortality salience can have a detrimental effect on pro-environmental behavior when environmental topics are communicated in both a narrative and informational format. Given that mortality salience is likely to be triggered by negative climate change rhetoric, this relationship suggests that further research in this area could be beneficial for communications experts, scientists, and others who communicate scientific findings to the public with the goal of encouraging pro-environmental behavior. Further, findings from the experimental study suggest that communicating about inherently frightening or negative environmental issues using rhetoric that further enhances negative emotions may be especially detrimental to encouraging pro-environmental behavior.

Thus, this thesis concludes that the current use of anxiety-inducing climate change rhetoric is counterproductive to its goals and suggests that communicators instead utilize narratives which emphasize positive emotions and examples of pro-environmental behavior.

Bibliography

Akil, H., Robert-Demontrond, P., & Bouillé, J. (2018). Exploitation of mortality salience in communication on climate change. *Recherche et Applications En Marketing*, *33*(1), 2–29. https://doi.org/10.1177/2051570717745839

Albrecht, G., Sartore, G. M., Connor, L., Higginbotham, N., Freeman, S., Kelly, B., … Pollard, G. (2007). Solastalgia: The distress caused by environmental change. *Australasian Psychiatry*, *15*(SUPPL. 1), 95–98. https://doi.org/10.1080/10398560701701288

Beatson, R. M. & Halloran, M. J. (2010). Humans rule! The effects of creatureliness reminders, mortality salience and self-esteem on attitudes toward animals. *British Journal of Social Psychology, 46*(3), 619-32. https://doi.org/10.1348/014466606X147753

Brook, A. T. (2005). *Effects of Contingencies of Self-Worth on Self-Regulation of Behavior* (University of Michigan). https://doi.org/10.1016/j.jaci.2012.05.050

Craps, S., & Crownshaw, R. (2018). Introduction: The rising tide of climate change fiction. *Studies in the Novel*, Vol. 50, pp. 1–8. https://doi.org/10.1353/sdn.2018.0000

Dickinson, J. L., Crain, R., Yalowitz, S., & Cherry, T. M. (2013). How Framing Climate Change Influences Citizen Scientists' Intentions to Do Something About It. *The Journal of Environmental Education*, *44*(3), 145–158. https://doi.org/10.1080/00958964.2012.742032

Doherty, T. J., & Clayton, S. (2011). The Psychological Impacts of Global Climate Change. *American Psychologist*, *66*(4), 265–276. https://doi.org/10.1037/a0023141

Dunlap, R. E., & Van Liere, K. D. (1978). The "new environmental paradigm". *Journal of Environmental Education, 9,* 10-19. doi: 10.3200/JOEE.40.1.19-28

Dunlap, R., Van Liere, K., Mertig, A., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56*(3), 425-442.

Feinberg, M., & Willer, R. (2011). Apocalypse soon? Dire messages reduce belief in global warming by contradicting just-world beliefs. *Psychological Science*, *22*(1), 34–38. https://doi.org/10.1177/0956797610391911

Fritsche, I., Jonas, E., Kayser, D. N., & Koranyi, N. (2009). Existential threat and compliance with pro-environmental norms. *Journal of Environmental Psychology*, *30*, 67–79. https://doi.org/10.1016/j.jenvp.2009.08.007

Fritsche, I., & Häfner, K. (2011). The Malicious Effects of Existential Threat on Motivation to Protect the Natural Environment and the Role of Environmental Identity as a Moderator. *Environment and Behavior*, *44*(4), 570–590. https://doi.org/10.1177/0013916510397759

Fristche, I., Barth, M., Jugert, P., & Masson, T. (2017). A social identity model of pro-environmental action (SIMPEA). *Psychological Review, 125*(2), 245-269. doi: 10.1037/rev0000090

Fritsche, I., & Hoppe, A. (2019). We Supernaturals. In *Handbook of Terror Management Theory*. https://doi.org/10.1016/b978-0-12-811844-3.00006-8

Gifford, R. (2011). The Dragons of Inaction: Psychological Barriers That Limit Climate Change Mitigation and Adaptation. *American Psychologist*, *66*(4), 290–302. https://doi.org/10.1037/a0023566

Goldenberg, J., Pyszczynski, T., Greenberg, J., Solomon, S. & Kluck, B., & Cornwell, R. (2001). I Am Not an Animal: Mortality Salience, Disgust, and the Denial of Human Creatureliness. *Journal of Experimental Psychology*, *130*, 427-435. doi: 10.1037/0096-3445.130.3.427.

Green, M. C. (1996). Mechanisms of Narrative-Based Belief Change. Retrieved from http://rave.ohiolink.edu/etdc/view?acc_num=osu1235579429

Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror Management Theory of Self-Esteem and Cultural Worldviews: Empirical Assessments and Conceptual Refinements. *Advances in Experimental Social Psychology*, *29*(C), 61–139. https://doi.org/10.1016/S0065-2601(08)60016-7

Gustafson, A., Leiserowitz, A., & Maibach, E. (2019). Americans are Increasingly "Alarmed" About Global Warming. *Yale Program on Climate Change Communication.* Retrieved from https://climatecommunication.yale.edu/publications/americans-are-increasingly-alarmed-about-global-warming/

Hambrick, K. M. (2011). The End of Apocalypse: The Rhetoric of Apocalypse in Contemporary Environmental Discourse (University of Nevada, Reno). Retrieved from ProQuest.

Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review*, *10*(2), 88–110. https://doi.org/10.1207/s15327957pspr1002_1

Janda, K. B., & Topouzi, M. (2015). Telling tales: Using stories to remake energy policy. *Building Research and Information*, *43*(4), 516–533. https://doi.org/10.1080/09613218.2015.1020217

Johnson, D. R. (2012). Transportation into a story increases empathy, prosocial behavior, and perceptual bias toward fearful expressions. *Personality and Individual Differences*, *52*(2), 150–155. https://doi.org/10.1016/j.paid.2011.10.005

Johns-Putra, A. (2016). Climate change in literature and literary studies: From cli-fi, climate change theater and ecopoetry to ecocriticism and climate change criticism. *Wiley Interdisciplinary Reviews: Climate Change*, *7*(2), 266-282. doi: 10.1002/wcc.385

Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, *2*(10), 732–735. https://doi.org/10.1038/nclimate1547

Kahan, D. M. (2015). Climate-science communication and the measurement problem. *Political Psychology*, *36*(S1), 1–43. https://doi.org/10.1111/pops.12244

Kaiser, F. G. (1998). A general measure of ecological behavior. *Journal of Applied Social Psychology*, *28*(5), 395–422. https://doi.org/10.1111/j.1559-1816.1998.tb01712.x

Kearney, A. R. (1994). Understanding global change: A cognitive perspective on communicating through stories. *Climatic Change*, *27*(4), 419–441. https://doi.org/10.1007/BF01096270

Koole, S. L., & van den Berg, A. E. (2005). Lost in the wilderness: Terror management, action orientation, and evaluations of nature. *Journal of Personality and Social Psychology, 88*, 1014-1028. https://doi.org/10.1037/0022-3514.88.6.1014

Lambert, A. J., Eadeh, F. R., Peak, S. A., Scherer, L. D., Schott, J. P., & Slochower, J. M. (2014). Toward a greater understanding of the emotional dynamics of the mortality salience manipulation: Revisiting the "affect-free" claim of terror management research. *Journal of Personality and Social Psychology, 106*(5), 655-678. doi: 10.1037/a0036353

Landau, M. J., Johns, M., Greenberg, J., Pyszczynski, T., Martens, A., Goldenberg, J. L., & Solomon, S. (2004). *A Function of Form: Terror Management and Structuring the Social World*. https://doi.org/10.1037/0022-3514.87.2.190

Lange, F., & Dewitte, S. (2019). Measuring pro-environmental behavior: Review and recommendations. *Journal of Environmental Psychology*, *63*(April), 92–100. https://doi.org/10.1016/j.jenvp.2019.04.009

Martinez-Conde, S., & Macknik, S. L. (2017). Finding the plot in science storytelling in hopes of enhancing science communication. *PNAS*, *114*(31), 8127–8129. https://doi.org/10.1073/pnas.171

Moezzi, M., Janda, K. B., & Rotmann, S. (2017). Using stories, narratives, and storytelling in energy and climate change research. *Energy Research and Social Science*, *31*, 1–10. https://doi.

Morrell, J. J. (n.d.). The Dialectic of Climate Change: Apocalypse, Utopia and the Environmental Imagination.

Morris, B. S., Chrysochou, P., Christensen, J. D., Orquin, J. L., Barraza, J., Zak, P. J., & Mitkidis, P. (2019). Stories vs. facts: triggering emotion and action-taking on climate change. *Climatic Change*, *154*(1–2), 19–36. https://doi.org/10.1007/s10584-019-02425-6

Moss, R. H., Jacobs, K., Moser, S., & Buizer, J. (2016). Assessing decision support systems and levels of confidence to narrow the climate information "usability gap." *Climatic Change, 135*, 143–155. https://doi.org/10.1007/s10584-015-1549-1

Ogunbdoe, C. A. (2013). The NEP scale: Measuring ecological attitudes/worldviews in an African context. *Environmental Development and Sustainability, 15*, 1477-1494. doi: 10.1007/s10668-013-9446-0

O'Neill, K. (2018). The sheep look forward: Counterfactuals, dystopias, and ecological science fiction as a social science enterprise. *Elementa, 6*. https://doi.org/10.1525/elementa.303

Patrick, A. M. (2006). *Apocalyptic or Precautionary? Revisioning Texts in Environmental Literature*. https://doi.org/10.1192/bjp.112.483.211-a

Pearson, A. R., Schuldt, J. P., Romero-Canyas, R. (2016). Social Climate Science: A New Vista for Psychological Science. *Perspectives on Psychological Science, 11*(5), 632-650. doi: 10.1177/1745691616639726

Pyszczynski, T., Greenberg, J., & Solomon, S. (2000). Proximal and Distal Defense: A New Perspective on Unconscious Motivation Author(s). In *Psychological Science* (Vol. 9).

Raven, P. G. (2017). Telling tomorrows: Science fiction as an energy futures research tool. *Energy Research and Social Science*, *31*, 164–169. https://doi.org/10.1016/j.erss.2017.05.034

Stern, P. C. (2000). Toward a Coherent Theory of Environmentally Significant Behavior. *Journal of Social Issues*, *56*(3), 407–424. https://doi.org/10.1007/BF00640994

Streeby, S. (2019). Climate Change as a World Problem: Shaping Change in the Wake of Disaster. In *Imagining the Future of Climate Change* (pp. 101–126). https://doi.org/10.1525/9780520967557-005

Thøgersen, J. (1999). Spillover processes in the development of a sustainable consumption pattern. *Journal of Economic Psychology*, *20*(1), 53-81. https://doi.org/10.1016/S0167-4870(98)00043-9

Trexler, A., & Johns-Putra, A. (2011). Climate change in literature and literary criticism. *Wiley Interdisciplinary Reviews: Climate Change*, *2*(2), 185–200. https://doi.org/10.1002/wcc.105

U.S. Global Change Research Program. (2018). Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II: Report-in-Brief. *Fourth National Climate Assessment*, *II*, 186. Retrieved from https://nca2018.globalchange.gov/chapter/24/

Vess, M., & Arndt, J. (2008). The nature of death and the death of nature: The impact of mortality salience on environmental concern. *Journal of Research in Personality*, *42*(5), 1376–1380. https://doi.org/10.1016/j.jrp.2008.04.007

Wolfe, S. E., & Tubi, A. (2019). Terror Management Theory and mortality awareness: A missing link in climate response studies? *Wiley Interdisciplinary Reviews: Climate Change*, *(10).* https://doi.org/10.1002/wcc.566

Appendix A: Survey Materials

New Ecological Paradigm Scale-Revised (Dunlap et al., 2000)

Answered on a 7-point scale from strongly disagree to strongly agree:

1. We are approaching the limit of the number of people the Earth can support.
2. Humans have the right to modify the natural environment to suit their needs.
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will ensure that we do not make Earth unlivable.
5. Humans are seriously abusing the environment.
6. The Earth has plenty of natural resources if we just learn how to develop them.
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. Despite our special abilities, humans are still subject to the laws of nature.
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.
11. The Earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature.
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it.
15. If things continue on their present course, we will soon experience a major ecological catastrophe.

Environmental Concern Scale (Thøgersen et al., 2010)

Answered on a 7-point scale from strongly disagree to agree:

1. I am concerned about the development of the global environment
2. I feel it is a moral obligation to use environmentally-friendly products
3. I often buy eco-friendly products for the sake of the environment
4. It concerns me that people do not care enough about the environment
5. I have changed from one brand to another for the sake of the environment
6. Small changes can add up to a big difference in the condition of the environment
7. I can think of at least one change I could make to my daily lifestyle for the sake of the environment. (Please list what this change could be)
8. I am committed to reducing the amount of waste I generate

Mortality Salience Questions (Greenberg et al., 1997)

1. In a few sentences, describe what you believe will happen when you physically die.
2. What emotions do you feel when you think about your death?

Control Short-Answer Questions

1. In a few sentences, describe what happened yesterday.
2. What do you think about the outfit you are wearing?

Narrative Writing Excerpt (Morris et al., 2019)

Anne wished this *was* all just a bad dream. She startled awake, heart pounding. In the nightmare, the vast ocean was filled with plastic of every kind: flimsy plastic bags, drinking straws, coffee cup lids, and millions of the small, colored bottle caps. There she stood in a tiny boat, rocked by waves and trying desperately not to fall into the debris.

As she splashed water on her face later that morning, feelings of hopelessness, guilt and worry overwhelmed her. The sad truth was that her nightmare *was* actually coming true. The ocean *was* being filled with plastic. And it didn't just fill the oceans, it was in landfills, littering the sides of roads, and even floating around in her own body.

In an attempt to distract herself, Anne opened her laptop and scanned through Facebook while sipping a cup of steaming hot coffee. The words, "Bea Johnson: zero waste" caught her eye. There was a video. She clicked. The camera showed a sleek, immaculate home. Anne stared at the kitchen pantry, stocked with glass jars full of rice, beans, flour and sugar. She watched as Bea Johnson walked through a supermarket with a shopping cart stocked with reusable glass jars and cloth bags. She saw Bea chatting with the man behind the deli counter as he stuffs cheese wedges into glass jars she brought from home. She watched, stunned, as Bea shook a liter sized glass jar containing all the trash generated by her family of four *in an entire year.* Bea talked about how her low waste lifestyle has created a simplified and more meaningful way of being in the world.

In that moment, Anne's life changed forever. *I could do that,* she thought. *I will try to make less trash.* That was more than a year ago and Anne has taken big steps towards her goal.

It was hard at first. Most of the things she usually bought – meats, fruits and vegetables -- were wrapped in plastic. There were very few stores that offered bulk items. Carrying clanking glass jars around on your bicycle made you sound like a drunk, or so her friends teased. And there were very few shop owners who understood what she was trying to accomplish. She laughs about the first time she tried to buy feta from a small cheese shop and tried to explain to the guy behind the counter that she wanted her cheese in her own glass jar. The exchange ended with him placing her jar full of cheese in a plastic bag and handing it to her. Red faced and embarrassed, she didn't bother trying to give the bag back.

What began as an experiment has now become a way of life. Little by little, Anne has changed her shopping habits to make less waste. Even the cheese guy knows how to package her feta these days. And although Anne does still sometimes worry about the future of the environment, she no longer feels guilty or hopeless because she has become part of the solution.

Informational Writing Excerpt (Morris et al., 2019)

275 million metric tons of plastic waste is generated globally each year. 73.9 million tons of this plastic are spread throughout the world's oceans. The ocean is filled with plastic of every kind including bags, food wrappers, bottles, drinking straws, and bottle caps.

2 billion people within 48 kilometers of the coast create 100 metric tons of plastic waste. Plastic particles often contain pollutants that can enter into the food chain. Floating toxic micro-plastics are often toxic and ingested by marine life which in turn is consumed by humans. In the EU alone, 100 billion plastic bags are used every year. That is an average of 200 plastic bags used by every EU citizen. 89% of plastic bags are used only once.

The growing global population is faced with limited environmental resources. To relieve the pressures placed on finite resources, it has become even more important to prevent waste. Zero Waste is a philosophy that promotes not only reuse and recycling, but, more importantly, prevention and product designs that consider the entire product life cycle. Zero Waste designs strive for reduced materials use, use of recycled materials, use of more benign materials, longer product lives, reparability, and ease of disassembly at end of life. It supports sustainability by protecting the environment, reducing costs, and producing additional jobs in the management and handling of wastes back into the industrial cycle. As a strategy it may be applied to businesses, communities, industrial sectors, schools and homes.

At the individual level, Zero Waste is a growing movement of people who attempt to reduce the amount of waste they generate. Many people are joining this movement in an attempt to reduce and conserve materials. There are 5 steps to Zero Waste: refuse, reduce, re-use, recycle and rot (compost.)

Refuse means to buy only what you need and to buy things that last a long time. Reduce means to say 'no' to waste by not even letting trash enter into one's life. This includes excessive packaging, disposable and single-use items, or things that contain hazardous chemicals.

At first, reducing waste can be hard. Few stores offer items in bulk. Many foods such as meat, fruits and vegetables are heavily packaged and wrapped in plastic. Rather than buying packaged foods, people living a Zero Waste lifestyle take glass jars and cloth bags to the supermarket to be filled with various items. For example, glass jars taken to the store can be used to store items such as rice, beans, flour and sugar. Zero Waster's even request that foods such as cheese and meat be put into glass jars rather than in the usual plastic wrapping.

Re-use means finding new ways of re-purposing old things. Recycling helps preserve the value of the items that would be lost if they were thrown in the trash. Rot is composting biodegradable waste that cannot be re-used or recycled. There are so many ways to reduce waste and the results can be surprising. Many find the Zero Waste lifestyle to be a meaningful way of improving the environment.

Control Excerpt (Devan Daly)

The United States' direct involvement in foreign affairs dramatically increased from the 1890s through World War II. The justification for foreign involvement was typically multi-layered, often combining elements of economic benefit, political superiority, and a sense of moral duty. The spread of U.S. power and foreign interference had many impacts on American life and its social, economic, and political spheres. From the Progressive Era through World War II, the United States quickly transitioned from a largely isolationist nation to a prominent player in global events.

The increase in the United States' foreign involvement in the early 1900s was characterized by a desire to increase economic productivity and open new trade routes. The depression of 1890 largely contributed to the decision to expand into the global market. The federal government of this time upheld the ideology of the Monroe Doctrine of 1823, which claimed that the Western Hemisphere was the United States' dominion and that all other nations must respect its authority in the region. This gave the United States the unique advantage of being able to expand into various islands and small nations in the region in part to make use of their lands for agricultural production.

The United States' growing business investments in the Western Hemisphere, along with its self-granted status as guardian of the region, contributed to its eventual involvement in the Spanish-American War. In 1895, Cuban revolutionaries attempted to fight for independence from Spain and were met with horrific violence. The United States' interest in involving itself in the crisis extended beyond the desire to aid the Cuban people, however. The conflict proved to be bad for business when the Cuban sugar cane industry began declining, damaging what had previously been a good source of income for the United States. The Spanish presence was also seen as an infringement of the Monroe Doctrine.

The United States became involved and was ultimately victorious, gaining the former Spanish territories of Guam, Cuba, Puerto Rico, and the Philippines. In Cuba, the United States provided a constitution which granted, among other perks, the ability to intervene militarily under the guise of helping the Cubans remain independent. Through these practices the United States acted as an informal imperialist power by keeping Cuba under its economic and political control while seemingly acting in the country's best interest.

The Monroe Doctrine continued to cast a powerful influence on United States' foreign policy when Theodore Roosevelt came into the presidency. Roosevelt was a firm believer in the United States' right to control in the Western Hemisphere. In 1904, he enacted the Roosevelt Corollary which served as an amendment to the Monroe Doctrine and claimed the United States had the additional authority to "act as an international police power in the Western Hemisphere."

Roosevelt also sought to increase the status of the U.S. as a global power and further increased involvement in both European and Asian affairs. This continued the on-going trend of shifting toward more global involvement which would expand to never-before-seen levels in the United States' involvement in World War I.

Norms and Waste Reduction

To what extent do you think the average person attempts to reduce their waste in their daily life?

- Not at all
- Seldom
- Occasionally
- To a considerable degree
- Always or almost always

How many of the people around you do you think make an attempt to reduce their waste or adhere to Zero Waste?

- None at all
- A few
- About half
- Many
- Almost everyone or everyone

To what extent do you think the number of people around you who make an attempt to reduce their waste or adhere to Zero Waste is *increasing* or *decreasing* over time?

- Strongly decreasing
- Moderately decreasing
- Slightly decreasing
- Staying the same
- Slightly increasing
- Moderately increasing
- Strongly increasing

To what extent do you think your culture values Zero Waste practices?

- Strongly does not value
- Does not value
- Somewhat does not value
- Neither values nor does not value
- Somewhat values
- Values
- Strongly values

To what extent do you think your culture values behaviors that protect the environment and mitigate climate change in general?

- Strongly does not value

- Does not value
- Somewhat does not value
- Neither values nor does not value
- Somewhat values
- Values
- Strongly values

Environmental Identity (Whitmarsh & O'Neill, 2010)
Answered on a 7-point scale from strongly disagree to strongly agree:

1. I think of myself as an environmentally-friendly consumer
2. I think of myself as someone who is very concerned with environmental issues
3. I would be embarrassed to be seen as having an environmentally-friendly lifestyle
4. I would not want my family or friends to think of me as someone who is concerned about environmental issues
5. I am an environmentalist
6. I am concerned with environmental issues

Belief in Climate Change

Global warming refers to the recent and ongoing rise in global average temperature near the Earth's surface. Increasing concentrations of greenhouse gasses is the primary cause of global warming. Global warming, in turn, is causing climate patterns to change. Climate change includes major changes in temperature, precipitation, wind patterns, or other effects that occur over several decades or longer. Please indicate how much you agree with the following statements.
Answered on a 7-point scale from strongly disagree to strongly agree:

1. Climate change is happening.
2. Climate change poses a risk to human health, safety, and prosperity.
3. Human activity is largely responsible for recent climate change.
4. Reducing greenhouse gas emissions will reduce global warming and climate change.

Dependent Variable Measures (Pro-Environmental Behavior)

How interested are you in receiving further information after the study about participating in each of the following activities?
Answered on a 7-point scale from not at all interested to highly interested:

- Subscribing to an environmental newsletter
- Signing a petition in favor of the Energy Innovation and Carbon Dividend Act

- Being contacted about volunteer opportunities with the Environmental Center on campus
- Donating to an environmental organization such as the Natural Resources Defense Council (NRDC)

How likely are you to make an effort to do each of the following actions in your daily life? Answered on a 7-point scale from extremely unlikely to extremely likely:

- Eat less meat
- Recycle
- Use public transportation
- Buy local or organic produce
- Fly less often
- Reduce waste

How willing are you to sign a petition to support the following?
Answered on a 7-point scale from strongly against to strongly support:

- Limiting carbon dioxide emissions to mitigate climate change
- Limiting plastic waste and other types of waste

If you were entered into a lottery to win $200 to donate to one of the following charities, which charity would you make the donation to?

- Natural Resources Defense Council (NRDC)
- Salvation Army
- World Wildlife Fund (WWF)
- Make-A-Wish Foundation
- Nature Conservancy
- YMCA

Demographic Questions

1. What is your gender?
    - Female
    - Male
    - Other: _____

2. How old are you? (Leave blank if you prefer not to say.)

3. What is your primary language (i.e. the one you speak most of the time)?

- English
- Spanish
- Mandarin
- Hindi
- Arabic
- Portuguese
- Bengali
- Russian
- Japanese
- Other: _____

4. Which racial or ethnic group best describes you?

- Asian, Asian-American
- Black, African-American
- Hispanic, Latino-American
- Native American
- Native Pacific Islander
- White, Caucasian-American
- Other: _____

5. Which of the following best describes the area you live in? If you are a student, please select the option that best describes your hometown.
   - Urban
   - Suburban
   - Rural

6. Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or what?
   - Republican
   - Democrat
   - Independent
   - Other: _____
   - No preference

7. (Displayed to participants who selected Democrat) Would you call yourself a strong Democrat or a not very strong Democrat?
   - Strong Democrat
   - Not very strong Democrat

8. (Displayed to participants who selected Republican) Would you call yourself a strong Democrat or a not very strong Republican?
    - Strong Republican
    - Not very strong Republican

9. (Displayed to participants who selected Independent, Other, or No preference) Do you think of yourself as closer to the Republican Party or closer to the Democratic Party?
    - Closer to the Democratic party
    - Closer to the Republican party
    - Neither

10. How important is your political party identification to how you see yourself?
    - Not at all important
    - Slightly important
    - Moderately important
    - Very important

11. Please indicate your current household income in U.S. dollars.

    - Prefer Not to Say
    - Under $10,000
    - $10,000 - $19,999
    - $20,000 - $29,999
    - $30,000 - $39,999
    - $40,000 - $49,999
    - $50,000 - $74,999
    - $75,000 - $99,999
    - $100,000 - $149,999
    - $150,000 or More

12. Please indicate the highest level of education you have completed.

    - Elementary/Grammar School
    - Middle School
    - High School or Equivalent
    - Vocational/Technical School (2 years)
    - Some College

- College or University (4 years)
- Master's Degree (MS, MA, MBA, etc.)
- Doctoral Degree (PhD)
- Professional Degree (MD, JD, etc.)
- Other: _____

13. For each of the items below, please indicate which option best describes you: (1) Politically, I consider myself… (2) On economic issues, I consider myself… (3) On social issues, I consider myself…
    a. Very liberal
    b. Liberal
    c. Somewhat liberal
    d. Moderate
    e. Somewhat conservative
    f. Conservative
    g. Very conservative

14. How would you describe your social class? Are you in the lower class, the working class, the middle class, or the upper class?
    a. Lower class
    b. Working class
    c. Middle class
    d. Upper class

15. Would you say that you are in the lower part of the [lower/working/middle/upper] class, you are about average [lower/working/middle/upper] class, or you are in the upper part of the [lower/working/middle/upper] class?
    a. Lower
    b. Average
    c. Upper

Debriefing Questions

1. The study is over. Do you have any questions about today's experiment?
2. Was the experiment clear in its overall purpose? Did the procedure make sense?
3. Do you have any personal feelings and/or reactions to the study?
4. Today's experiment was designed to help us test some specific hypotheses about human behavior. Do you have any idea what those hypotheses were? If you had to guess, what would you say were the hypotheses we were testing today?
5. Did you find any aspect of the procedure odd, upsetting or disturbing?
6. Did you wonder at any point whether there was more than meets the eye to any of the procedures that we had you complete today? That is, do you think that there might have been

any information that we held back from explaining from you about the experiment until now?

7. If you had any suspicions, do you think they affected your behavior during the study?