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# Climate change message framing, death anxiety, and conspiracy beliefs impact on individual emotions, cognitions, and future behavioral intentions

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Climate Change Message Framing, Death Anxiety, and Conspiracy Beliefs Impact on Individual  
Emotions, Cognitions, and Future Behavioral Intentions

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An Honors College Project Presented to  
the Faculty of the Undergraduate  
College of Health and Behavioral Sciences  
James Madison University

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by Shanna E. Castellucci

April 2023

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Accepted by the faculty of the Department of Psychology, James Madison University, in partial fulfillment of the requirements for the Honors College.

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PUBLIC PRESENTATION

This work is accepted for presentation, in part or in full, at the Department of Psychology Symposium on April 24, 2023.

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### **Acknowledgements**

I would like to thank all of the faculty members who helped me during the process of this thesis. I would like to thank Dr. Monica Reis-Bergan first. Thank you for believing in me and for your patience with me throughout this thesis. I admire you, and I am extremely grateful that I had this opportunity to learn from you and work together. Dr. Jaime Kurtz and Dr. Daniel Holt, thank you both for serving on my committee. Thank you for your feedback and support you provided me with during this thesis process. I appreciate you both taking the time and effort to engage in this process with me.

### **Abstract**

Prospect theory highlighted that individuals are more sensitive to loss frames than gain frames. However, previous literature involving message framing, emotion, and behaviors found that gain frames have more of an impact on whether an individual will engage in desired behaviors. The purpose of this experiment was to analyze the relationships between message framing, death anxiety, conspiracy beliefs, and future behavioral intentions. Participants were randomly assigned to the framing condition: either in the loss frame group or in the gain frame group. There were three hypotheses tested in this study. The first predicted that individuals receiving the loss frame would report higher death anxiety than individuals receiving the gain frame. This hypothesis was not supported. The second hypothesis predicted that individuals who received the loss frame would engage more in conspiracy beliefs than those who received the gain frame. This hypothesis was also not supported. The third hypothesis predicted that individuals who received the gain frame would report more future behavioral intentions aimed at protecting the environment than individuals receiving the loss frame, and this hypothesis was supported. This experiment supported previous literature, displaying that gain frames are more impactful than loss frames on behaviors. Future research building on this experiment would benefit from having a control group involving a topic other than climate change.

*Keywords:* climate change, message framing, death anxiety, conspiracy beliefs, future behavioral intentions

## **Climate Change Message Framing, Death Anxiety, and Conspiracy Beliefs Impact on Individual Emotions, Cognitions, and Future Behavioral Intentions**

### **Introduction**

Modern society is home to increasing advances in technology. As a result of this, most of the information people receive is on the internet as opposed to older forms of news media such as paper newspapers (Shearer, n.d.). The internet is full of both accurate information and misinformation that people sometimes struggle to sift through. Climate change is one of these categories where there exists a plethora of misinformation. Though there is scientific evidence indicating that climate change is currently happening and worsening, many people adopt climate change conspiracy beliefs that are found on the internet. These conspiracy beliefs range from a disbelief in all climate change science or that humans are at fault for it (Boykoff, 2016) to people who actively advocate that climate change is a lie (Boykoff, 2016). There are certain factors that could influence why people choose to engage in conspiracy beliefs as opposed to science-based information. Message framing is one aspect that can greatly influence public reactions to information as it is closely linked with emotional responses (Nabi et al., 2020). Additionally, a strong emotional response that can be elicited depending on the kind of message frame is death anxiety. Death anxiety refers to the feelings one experiences when confronted with the inescapability of death (Curşeu et al., 2021). This study will look at how climate change message framing specifically affects death anxiety and conspiracy beliefs in individuals. Additionally, this study will examine how these interactions will impact an individual's future behavioral intentions.

### **Climate Change**

Climate change, also known as global warming, has become an increasingly major topic of interest. Climate change is defined as a change in the usual weather or climate, in this case it is the change in climate and weather seen globally on Earth (Stillman & Green, 2017). There are many visible examples of climate change: an increase in extreme weather patterns, higher levels of rainfall, more droughts and wildfires, shrinking ice caps, rising sea levels, and an increase in global and ocean temperatures (Jackson). Though the Earth's climate has experienced some mild changes in the past as a result of natural occurrences such as small shifts in the orbit of the Earth around the sun, the changes scientists are discussing now are attributed entirely to humanity's influence (Jackson). Humans are responsible for the increased levels in greenhouse gasses found in the atmosphere which is causing the warmer global temperatures and changes in the weather and climate on Earth (Jackson).

While scientists aim to convey the urgency of this climate change situation to the general public, the attempted translation has been met with a plethora of reactions. Many of these reactions can be attributed to the way in which the scientists frame climate change information while informing the public. The current study will observe the impact these varying kinds of message frames have on people's emotions, cognitions, and behavioral intentions.

### **Prospect Theory**

Originally developed by Kahneman and Tversky in 1979, prospect theory explains how people will make decisions in conditions of uncertainty (Nabi et al., 2020). Kahneman and Tversky (1979) created prospect theory in direct response to the expected utility model that they felt did an insufficient job of interpreting how people make decisions when risk involved (Kahneman & Tversky, 1979). The expected utility model was the first real theory regarding



analyzing decisions when there were conditions of risk, and it was widely accepted; however, the expected utility model dealt with risk in terms of economic behavior only (Kahneman & Tversky, 1979). There are typically three components to the expected utility model: the potential situations that could occur given the impending choice which are called outcomes, the aspects that are not in the individual's control which are called states, and aspects that the individual can both control and do on themselves which are called acts (Briggs, 2019). An example of these components Briggs (2019) provides would be when someone is deciding whether or not to bring an umbrella with them. The acts in this scenario would be either to bring the umbrella or to not bring the umbrella (Briggs, 2019). The states in this situation would be either it rains or it does not rain (Briggs, 2019). There are four outcomes that could occur in this example according to Briggs (2019). The first outcome would be that it rains and the individual decides against bringing the umbrella, so they end up soaking wet. The second outcome would be that it rains and the individual did decide to bring the umbrella with them, so they remain dry under the umbrella. The third outcome would be that the individual decides to bring the umbrella, but it does not end up raining; now the person is hampered with carrying around a useless umbrella. The fourth and final outcome would be that the individual decided against bringing the umbrella, and it does not rain. They are now free from carrying an umbrella and remain dry (Briggs, 2019). The expected utility model then helps the individual make a decision when there are uncertain outcomes because it provides a way for the individual to discern which choice yields the highest expected utility (Briggs, 2019). Moreover, the act that allows for the highest expected utility will be the best choice for the individual to make (Briggs, 2019). The expected utility model is often depicted as an equation or a matrix in order to help the reader see what their options are (Briggs,

2019). While there are complex opportunities to use the expected utility model in situations that are not monetary in nature, that is not what it was created to do.

Prospect theory is born as a result and emphasizes the way in which individuals assess losses (Nickerson, 2022). Moreover, prospect theory explains individual behavior in situations where the decision must be made in a condition of uncertainty (Nickerson, 2022). Prospect theory discovered a few different characteristics about people when making a decision involving risk which is a situation where there is the possibility for unknown or unfavorable outcomes. Firstly, people tend to be more affected by decisions where there is a chance of a loss occurring over situations where there is a chance of gains because they are more afraid of a negative outcome (Nickerson, 2022; Levy, 1992). An example Nickerson (2022) uses is when people are being asked if they want to buy phone insurance. When they are told that the insurance will protect their phone if it is either broken or stolen, they are more willing to purchase the insurance despite the fact that realistically the possibility of either or those things happening is low (Nickerson, 2022). Additionally, this illustrates how individuals prefer to keep assets and items that are already in their possession over risking losing them (Levy, 1992). Furthermore, prospect theory builds the foundation for message framing since message frames are often described as either being a negative (loss) frame or a positive (gain) frame. As established previously, individuals are typically more sensitive to losses which relates to a negative message frame or a loss message frame.

### **Message Framing**

Message framing is a vital factor in influencing the general public. Messages can be framed as either a gain frame or a loss frame. A gain frame is when the message is portrayed as

having some type of benefits (Smith & Petty, 1996) and emphasizes exactly what kinds of benefits would be involved (Nabi et al., 2020). Additionally, a loss frame emphasizes the cost of not following what the message is explaining (Smith & Petty, 1996) and emphasizes what these costs would be in the choice being displayed in the message (Nabi et al., 2020). Some specific examples of message framing come from the health sphere and include messages about using sunscreen to prevent skin cancer (Kiviniemi & Ellis, 2014), using condoms during sex to prevent the spread of HIV and AIDS (Solomon & DeJong, 1989), and the antismoking campaigns of the 1990s (Goldman & Glantz, 1998). In addition to these examples, this study conducted by Armbruster et al. (2022) focused specifically on the impact of loss frame messages in comparison to gain frame messaging and non-loss frame messaging. This study established that the loss frame messages produced more of a willingness to pay for a fictional policy that would reduce Carbon emissions in Canada, and participants indicated experiencing more positive attitudes in favor of this policy in comparison to the gain frame group and the non-loss frame group (Armbruster et al., 2022).

Contrastingly, in the meta-analysis Nabi et al. (2020) provided, they indicated that they found a difference in responses to gain frames when looking at science and health message framing. They found from previous research that when there was scientific information presented in a gain frame, it yielded a more positive outcome in responses from people while there was no difference between responses with a gain and loss frame in the health sphere (Nabi et al., 2020). Additionally, Nabi et al. (2020) found support for the notion that a gain message frame is associated with more positive emotions while a loss frame is associated with more negative emotions.

### **Framing and Emotion**

Furthermore, message framing can elicit different emotional responses in individuals. Moreover, there is an emphasis on how emotion is connected to instances where persuasion is key: it links the more emotional, persuasive results with message framing itself (Nabi et al., 2020). The type of message frames portrayed varies the type of emotion elicited. Gain framed messages highlight the more positive outcomes that could happen in the future that are tied to positive emotions like happiness (Nabi et al., 2020). Loss framed messages highlight the negative outcomes that could happen if one either chooses to do something or refuses to do something which is tied to more negative emotions like anxiety (Nabi et al., 2020).

### *Death Anxiety*

Terror management theory-- or TMT-- establishes that as a result of humans having an advanced cognition, there is a recognition many have that death is an unavoidable outcome of the human experience (Pyszczynski et al., 2021). Moreover, this realization that death is inevitable produces extreme anxiety on an existential level in a vast majority of people (Pyszczynski et al., 2021). This specific type of anxiety that is directly related to the inevitability of death is called death anxiety, and it is a specific kind of negative emotion attached to loss message frames. People attempt to cope with these strong feelings of fear through focusing on their close relationships in addition to their self-esteem while also having confidence in their cultural worldviews (Pyszczynski et al., 2021). Research in terror management theory suggests that when someone is faced with mortality salience or the realization that death is inescapable (Curşeu et al., 2021), they will attempt to manage that fear through the aforementioned strategies. Moreover, the more an individual is presented with mortality salience and experiences the fear of death that comes with it, the harder they will work to mitigate these negative emotions through these coping mechanisms.

Death anxiety is described as involving negative emotions such as worry and sadness which are elicited through information that reminds them of their own mortality (Curşeu et al., 2021). This mortality salience contributes to death anxiety, and one can experience these feelings of fear and anxiety especially as a result of loss message frames because these frames emphasize those adverse emotions (Curşeu et al., 2021). Furthermore, at times where there is an increased exposure to death in one's daily life, there will be a higher number of those exhibiting death anxiety (Curşeu et al., 2021). A study that further examines this concept of death anxiety was conducted by Rahimah et al. (2018) where individuals were asked about their attitudes toward purchasing green products while analyzing death anxiety as one contributing factor. Additionally, their study found that death anxiety is directly correlated with the concern an individual has with the environment and their pro-environmental behaviors (Rahimah et al., 2018). This link between death anxiety and climate change behaviors was deeper analyzed by Semenza et al. (2011) where they found that there are two reactions to the severity of climate change: adaptation and mitigation. The strategy of adaptation refers to the proactive and environmentally conscious behaviors that individuals can exhibit if death anxiety is not present, and they are able to cope with the severity of climate change in a more positive manner (Semenza et al., 2011). The strategy of mitigation refers to the denial illustrated when an individual experiences death anxiety and attempts to alleviate these feelings by completely denying the stressor (Semenza et al., 2011).

A study done in order to surmise whether a gain or a loss frame would influence tourists into buying or being more willing to buy pro-environmental products was done in 2021 by Chi et al. They conducted an experiment where they had participants either receive a gain framed message regarding climate change or a loss framed message regarding climate change (Chi et al.,

2021). The participants were then asked about purchasing environmentally friendly products, their desire to purchase these products, and whether they would engage in carbon offsetting behaviors which yielded a surprising discovery. In these experiments, Chi et al. (2021) discovered that gain-framed messages yielded a greater number of individuals purchasing environmentally friendly products or an inclination to purchase these products while loss-framed messages yielded a lower number of individuals interested in these responses. This goes against much of the literature on prospect theory and framing that suggests how prospect theory highlights that people should be more sensitive and more willing to go along with certain messages when they are framed as a loss since their fear of losing something is greater than their desire to benefit from a situation (Nickerson, 2022). Chi et al. (2021) mentioned in their discussion section that this result could be attributed to some kind of cognitive factor triggered by the reaction to receiving a loss-framed message that did not happen when the participants received a gain-framed message. This kind of cognitive component could be the result of death anxiety management and/or an engagement in climate change conspiracy beliefs as a way to cope with their fear of climate change.

### **Climate Change Conspiracy Beliefs**

With the growing discussion of climate change as a whole, there has been an emergence of climate change conspiracy beliefs. These conspiracy beliefs are often a result of reactions to misinformation about climate change called, “skepticism, contrarianism, and denial,” (Treen et al., 2020, p. 1). Climate change skeptics are people who do not believe in the scientific information regarding climate change or that humans are responsible for the current climate change (Boykoff, 2016). This is closely tied to the concept of climate change denial where individuals do not believe that climate change is real, they do not believe that humans are the

cause of it, and they do not believe that it is as dangerous or as serious as scientists say (McKinnon, 2016). These individuals will also disseminate their beliefs on the internet (McKinnon, 2016). Climate change contrarians are a bit different as these individuals are openly and loudly against the information being spread online about climate change since they believe it is all false; additionally, these individuals will attack not only climate change science but climate change scientists as well (Boykoff, 2016). In addition to these reactions to climate change, the misinformation regarding climate change can also be attributed as a reason why some individuals choose not to support the strategies proposed to help reduce the damage being done to the climate (Treen et al., 2020).

In addition to the belief that climate change does not exist, Tyagi & Carley (2021) identified five primary climate change beliefs about the origin of the change. The first climate change conspiracy theory has to do with chem trails where individuals believe that the trails following jet engines consist of either a chemical or biological component that is responsible for the Earth's changing climate. The second climate change conspiracy theory discusses that sunspots-- caused by a lower sun surface temperature-- are responsible for the change in climate. The third is that there exists manmade Directed Energy Weapons (DEWs) that consist of an energy beam that is extremely focused on a particular target and the use of these DEWs is responsible for the change in Earth's climate. The fourth conspiracy belief describes how governmental experiments such as geo-engineering are responsible for climate change. Lastly, the fifth climate change conspiracy belief is that there exists an unknown planet in our solar system that is responsible for climate change.

### **Current Study**

This study aims to answer the question about how manipulating a message frame in the context of climate change will affect an individual's emotions, cognitions, and future behavioral intentions. Previous literature has not explored the impact of message frames on conspiracy beliefs. Therefore, hypotheses related to this concept are exploratory. First, I expect individuals receiving the loss frames to report higher death anxiety than individuals receiving the gain frame. Second, I expect individuals receiving the loss frame to report more endorsement of conspiracy beliefs than individuals who receive the gain frame (Chi et al., 2021). Thirdly, although research is mixed, I hypothesize based on past studies Nabi et al. (2020) compiled science and in Chi et al.'s study (2021) that individuals receiving gain frames will report more behavioral intentions aimed at protecting the environment than individuals with loss frames. Fourth, this study will explore whether the belief in conspiracy theories acts as a buffer. If the loss frame results in more emotion, then according to Armbruster et al. (2022) they should have the most impact on behavior intentions. However, if the conspiracy beliefs buffer the negative emotions elicited, then this could explain why gain message frames sometimes yield a higher number of future behavioral intentions aimed at protecting the environment, as seen in studies such as Chi et al. (2021).

## **Methods**

### **Participants**

Ninety-five undergraduate students at James Madison University enrolled in general psychology courses, PSYC 101 and/or PSYC 160 participated in this experiment. This sample size was made up of 70 women, 22 men, two individuals who identified as transgender/transsexual/gender-nonconforming, and one who did not identify as any of the given



gender identities. The majority of the participants were Caucasian/white—74 individuals or about 78%. There were five individuals who stated that they were African-American, two who identified as Asian/Asian American, three who were Latino/Latina/Hispanic, and one who was Middle Eastern. The remaining participants identified that they were biracial/multiracial—ten individuals. The majority of these participants were aged 18-19 with about 84% stating that they were one of these ages at the time of the experiment. The remaining 16% stated that they were 20 years-old or above at the time of the experiment.

### **Procedures**

This experiment had one independent variable which was whether the participants received a gain or a loss message frame. This experiment had three dependent variables that were measured. These dependent variables were the participants' death anxiety levels, conspiracy beliefs, and future behavioral intentions. The participants were randomly selected as to whether they received the gain frame messaging (see Appendix B) or the loss frame messaging (see Appendix C). Based on previous literature regarding message framing from Spence & Pidgeon (2010) and Shome & Marx (2009), the message frames both discussed future outcomes based on current behavior which was an important factor in creating message frames according to Shome & Marx (2009) specifically. The gain frames discussed actions that could mitigate future harmful environmental outcomes while loss frames focused on not doing the specific actions would fail to mitigate future harmful environmental outcomes which would further damage the environment (Spence & Pigeon, 2010). Following the participants reading and signing the informed consent form, the experiment first began with participants being instructed to read a statement informing them of how serious and damaging climate change is (Appendix A). They were then presented with the assigned message frame (the loss frame and the gain frame). The

message frame was presented as a PowerPoint with transitions for each textbox. Each textbox contained one message so as the PowerPoint progressed to the next slide, there would be another message added to the PowerPoint slide until there was a total of six messages. The order in which the statements were presented in the PowerPoint was intentional. The PowerPoint concluded with each of the messages in a different font and color to ensure that the participant could read and differentiate between each message on the slide. The color and font changes were only done to allow the participant an easier time to read through all six messages. See Appendix B and Appendix C for the final messages for the gain and loss frames.

The manipulation check was given to the participants as an open-ended question to establish that they interpreted the message frame correctly based on which one they were randomly assigned to receive following the completion of the PowerPoint. Participants were then instructed to complete a four-to-five-minute filler task that involved the completion of a word search that is included in Appendix D. Next, participants were instructed to respond to the Death Anxiety Scale. Following this, participants were then required to answer the Conspiracy Beliefs Scale (Appendix E). The last scale the participants were required to take asked participants how likely they were to engage in future climate change behaviors listed on the scale (Appendix F). Finally, participants were given a series of questions regarding their demographic information (see Appendix G) before being debriefed following the end of the experiment.

## **Measures**

### ***Death Anxiety***

The participants' death anxiety was measured using Templer's (1970) Death Anxiety Scale (DAS) This scale required the participants to answer each individual statement on the 15-

item scale as either true—T—or false—F (Templer, 1970). A sample item from this scale was, “I am very much afraid to die,” (Templer, 1970, p. 167). The answers for this scale were summed, and the reliability of this scale was  $\alpha = .73$ . The scores for this scale could range from zero to 15.

### ***Conspiracy Beliefs***

The participants’ conspiracy beliefs were measured based on five of Tyagi & Carley’s (2021) major climate change conspiracies. Participants were asked to answer each statement using a seven-point Likert scale (see Appendix E) ranging from Strongly Disagree (1) to Strongly Agree (7). The answers for this scale were summed, and the reliability of this scale was  $\alpha = .73$ . The scores for this scale could range from five to 35.

### ***Behavioral Intentions***

The participants’ 16 behavior intentions were measured based on their responses to each statement using a seven-point Likert scale ranging from Very Unlikely (1) to Very Likely (7) (see Appendix F) based on how likely the participant was to engage in these future behaviors. This scale was created based on information pooled from previous climate change studies including Armel et al. (2011), Cialdini & Jacobson (2021), and Parece et al. (2013). Additionally, an article titled *9 Ways College Students Can Be More Environmentally Friendly* (2013) assisted in providing examples of beneficial climate change behaviors in college students. A sample item from this scale was, “10. I will choose to get electronic textbooks (e-textbooks) instead of paperback textbooks for my classes,” (Appendix F). The answers for this scale were summed. The scores for this scale could range from 16 to 112.

### ***Demographics***

Participants were asked at the end of the experiment some demographic questions about their race, gender, and age (Appendix G).

## Results

### Manipulation Check

Participants were asked to answer the question in an open-ended format. None of the participants wrote something that would suggest that they received a frame different than the one presented. Analyses were conducted using the assigned condition.

### Hypotheses

The means and standard deviations for the whole sample are reported in Table 1. See Table 2 for the correlations between the primary dependent variables. See Table 3 for means and standard deviations by framing condition. The first hypothesis was not supported. Individuals that received the loss frame did not report higher death anxiety than participants that received the gain frame ( $t(93) = -0.36; p = .72$ ). See Figure 1 for the death anxiety means and confidence intervals by framing condition. Moreover, hypothesis two was not supported. Conspiracy beliefs were not endorsed more by participants in the loss frame compared to participants in the gain frame ( $t(93) = 1.23; p = .22$ ). See Figure 2 for means and confidence intervals of conspiracy beliefs endorsement by framing condition. The third hypothesis was supported in that participants receiving the gain frame reported significantly more behavioral intentions to protect the environment compared to participants that received the loss frame ( $t(93) = 2.15; p < .05$ ). See Figure 3 for means and confidence intervals of future behavioral intentions to protect the environment by framing condition. Since the message manipulation did not yield significant

differences in death anxiety and conspiracy beliefs, the buffering hypothesis was not supported or analyzed.

### *Exploratory Analyses*

In the process of exploring the data, I found that men and women reported significant differences in death anxiety ( $t(93) = -3.54; p < .001$ ). Women scored higher in the death anxiety ( $M = 8.79; SD = 3.02$ ) than men ( $M = 6.23; SD = 2.72$ ). Since there were significantly more women (70) in the sample than men (22), the primary hypotheses were explored examining women only. No significant differences were found when looking at the independent variable: message frame. However, in the sample containing only women death anxiety was positively associated with conspiracy beliefs ( $r = .29, p < .05$ ) and negatively associated with behavioral intentions to protect the environment ( $r = -.24, p < .05$ ). Endorsement of conspiracy beliefs was not significantly associated with behavioral intentions ( $r = 0.04, p = .73$ ).

### **Discussion**

There were three hypothesized main effects. First, it was predicted that participants who received the loss frame would have reported higher death anxiety levels than those who received the gain frame. This hypothesis was not supported. There were no differences found in death anxiety levels between those who received the gain frame and those who received the loss frame. The second main effect was that participants who received the loss frame would have reported more endorsement of conspiracy beliefs than participants who received the gain frame. There were no differences found in endorsement of conspiracy beliefs between the groups. However, the third hypothesis was supported. Consistent with research conducted by Chi et al. (2021), the

current study found that participants who received the gain frames reported more behavioral intentions aimed at protecting the environment than participants who received the loss frame.

### **Limitations**

There were a few limitations that could have impacted this experiment. The first few limitations pertain directly to the messages used in each of the two groups: the gain group and the loss group. One possible limitation was the strength of the messages used: there were no messages in either the gain or the loss message frames that were particularly strong. The messages presented did mention the consequences of specific behaviors, but the messages did not strongly explain what exactly the outcome of engaging in or not engaging in those behaviors would be. Perhaps if the messages were stronger then this would have made a difference in the experiment. Another possible limitation is that the messages used in both the gain group and the loss group discussed a plethora of consequences. Additionally, many of the messages listed the potential consequences of engaging in or not engaging in certain behaviors. Perhaps had the messages focused on only a few consequences instead of the many that were listed in the experiment, then this would have affected the outcome of the experiment in a different manner. Something else that could have been a limitation was that the messages themselves in both groups were long. The messages were wordy in nature and perhaps this would have caused issues for the participant to fully appreciate the messages. Another potential limitation is that the messages were presented in a timed manner which might have not allowed the participant to fully grasp the messages portrayed on the slides. As a result, the participants could have felt rushed or lost focus if they read quicker than the slides changed—though none of the participants in this experiment wrote a response to the manipulation check that indicated that this occurred. If the participants were allowed to progress at their own pace instead of waiting for the timed

change between slides, then perhaps this would have impacted the outcome of this experiment differently. The last potential limitation could have been that at the time of running this experiment, climate change was prevalent in the news. There had been much talk of climate change recently—especially given the bouts of extreme weather in relation to climate change that had been occurring in the United States. This news involving climate change was all over the media—especially social media which many individuals engage in. This then could have impacted the participants who were involved in this experiment. These were the potential limitations that could have affected this experiment with the majority of the limitations having to do with the messages that were presented to the participants.

### **Strengths**

There were a couple strengths to conducting this experiment. First, the experiment was conducted with participants individually with a computer in a distraction free environment. This would have ensured that the participants' full attention was towards the experiment due to the lack of distractions in the room that would have otherwise pulled the participants' attention away. Another strength was that his experiment sorted the participants into each group—the gain group and the loss group—through random assignment. This would account for any individual differences that could have impacted the experiment, and this made sure that the groups were evenly distributed. The experiments were also all ran during the same season and around the same times of day. This was a strength because it would have ensured that seasonal changes could not have affected the experiment and allowed for more control. One final strength was that the length of the experiment was favorable as participants were engaged and expressed appreciation towards the experience following the conclusion of the experiment. All of these various components were beneficial to the experiment.

## **Implications**

There were some implications discovered as result of this experiment. One such implication is that this experiment has produced another piece of research evidence that suggests that gain frames are associated with climate promoting behaviors. The mechanism proposed for why loss frames do not work, namely death anxiety and conspiracy beliefs, was not supported. Future research could explore what happens to make gain frames impactful. Another unpredicted finding from this experiment was the difference discovered in death anxiety between men and women. Among the women, death anxiety, conspiracy beliefs, and future climate change behavioral intentions were all related. Although the aim of this study was to frame climate change in either a loss or gain frame, perhaps merely the mention of climate change as a topic elicited a particular reaction. This current study could have benefitted from having a control gain and loss frame on a neutral topic that was not associated with climate change at all.

This experiment looked at three different hypotheses and an exploratory analysis on whether conspiracy beliefs act as buffer for death anxiety. While only the third hypothesis-- which stated that those receiving the gain frame would report more future behavioral intentions aimed at protecting the environment—was supported, the knowledge and data gleaned from this experiment is important. Despite the possible limitations, this experiment has many implications as well. This study supported past research findings conducted by Chi et al. in 2021 about how the gain condition is associated with more future behavioral intentions pertaining to protecting the environment. This experiment also leads to a future research question to explore: does the topic of climate change itself already elicit negative emotions regardless of message framing? Perhaps certain topics like climate change may already elicit specific emotions such as death anxiety simply because of the content of the topic—message framing might not matter because



of this. In conclusion, though there were some possible limitations present in this experiment, there were also many strengths. These both allow for future researchers to build on this experiment and develop others to address the future research questions inspired by the implications found in this study.

**Table 1***Descriptive Statistics of the Whole Sample.*

	M	SD	Range
Death Anxiety	8.24	3.16	1 - 15
Conspiracy	19.20	4.57	5 – 29
Beliefs			
Future Behavioral	89.01	11.41	57 – 109
Intentions to			
Protect the			
Environment			

**Table 2***Correlations Between the Primary Dependent Variables.*

	Death Anxiety	Conspiracy Beliefs
Conspiracy Beliefs	.27**	
Future Behavioral Intentions to Protect the Environment	-.10	.12

---

Note: N = 95; \*\*p<.01

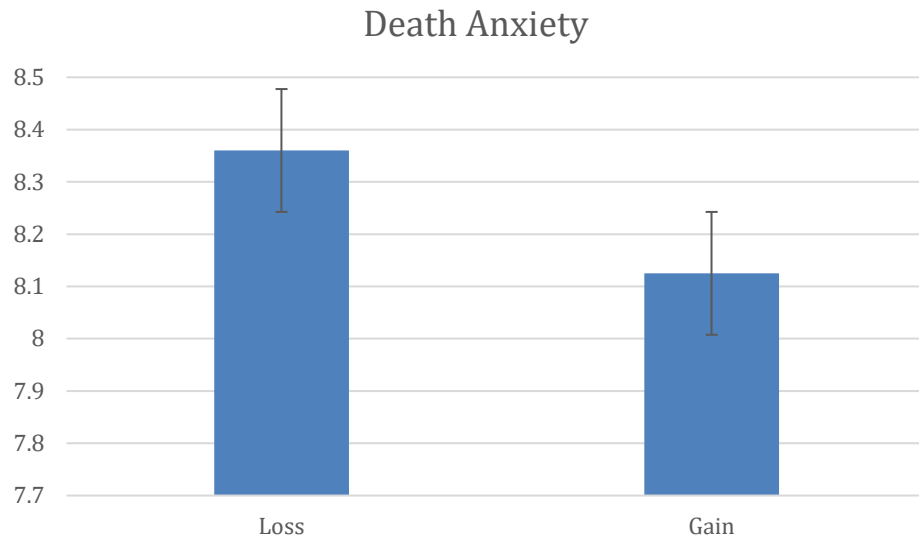
**Table 3***Means and Standard Deviations by Framing Condition.*

	Loss Frame		Gain Frame	
	M	SD	M	SD
Death Anxiety	8.36	3.30	8.13	3.06
Conspiracy	18.62	5.02	19.77	4.05
Beliefs				
Future Behavioral	86.51*	12.36	91.46*	9.93
Intentions to				
Protect the				
Environment				

\* $p < .05$

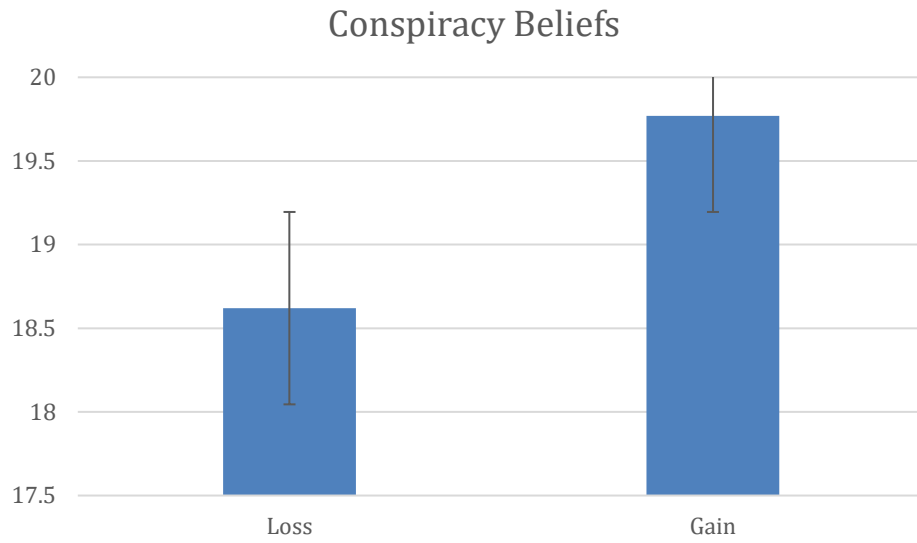
**Figure 1**

*Death Anxiety Means and Confidence Intervals by Framing Condition.*



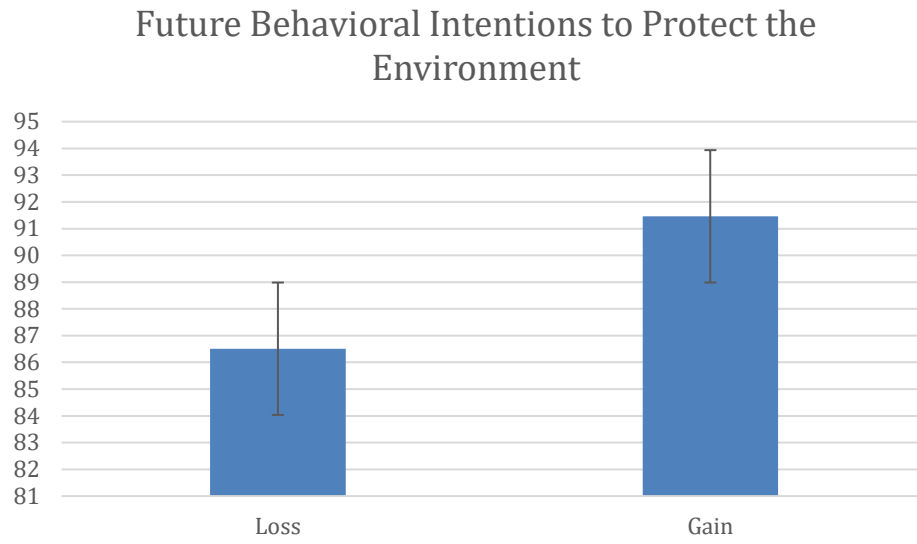
**Figure 2**

*Conspiracy Beliefs Means and Confidence Intervals by Framing Condition.*



**Figure 3**

*Future Behavioral Intentions to Protect the Environment Means and Confidence Intervals by Framing Condition.*



## **Appendix A**

Statement read before viewing message frames:

Climate change results in unpredictable weather patterns and human death from natural disasters such as tornadoes, hurricanes, floods, droughts, acid rain, wildfires, and both extreme heat and freezing temperatures.



## Appendix B

Gain frame messages:

1. If I unplug all of my electronics and turn off the lights when I leave the room, and if I turn off my laptop/computer overnight, I can prevent a rise in Carbon Dioxide (CO<sub>2</sub>) levels in the atmosphere and prevent the potential for acid rain in certain places as a result of using lower amounts of energy.

6. If I properly recycle appropriate materials and do not litter, I can prevent harmful gasses from being released into the atmosphere and can protect plants and animals.



5. If I buy a reusable water bottle, buy a reusable coffee cup, and use less plastic bags when shopping, I can prevent plastic from ending up in a landfill where the toxic chemicals from plastic breaking down would infect the animals' food and water while also keeping plastic out of the oceans where it would kill sea creatures.

2. Through taking shorter showers and shutting the water off when I am shaving or brushing my teeth, I can decrease the potential for droughts which would keep ecosystems safe and prevent the death of plants, animals, and humans because their access to water-- a necessity for life- would not be threatened.

3. Choosing the electronic textbook (e-textbook) version instead of paper textbooks for my classes, I can prevent deforestation which will help decrease the amount of floods and the levels of greenhouse gasses trapped in the atmosphere such as Carbon Dioxide (CO<sub>2</sub>) which will help protect the lives of humans, plants, and animals.

4. When doing my laundry, I will make sure to use cold water in the washing machine, I will only wash full loads of laundry, and I will not overfill the dryer, so I can prevent the further waste of water and excessive energy usage which will help limit the number of droughts and decrease levels of Carbon Dioxide (CO<sub>2</sub>) in the atmosphere.

## Appendix C

Loss frame messages:

1. If I do not unplug all of my electronics and turn off the lights when I leave the room, and if I do not turn off my laptop/computer overnight, I will be contributing to a rise in Carbon Dioxide (CO<sub>2</sub>) levels trapped in the atmosphere which can then lead to acid rain in certain areas resulting from this excessive energy usage.

2. Through taking long showers and leaving the water running when I am shaving or brushing my teeth, I will be contributing to droughts from wasting water which would damage ecosystems and can kill plants, animals, and humans because of the inability to access water-- a vital need for survival.

6. If I do not properly recycle appropriate materials and litter, I will be contributing to harmful gasses being released into the atmosphere which can kill plants and animals.

3. In choosing the paper textbooks for my classes instead of the electronic textbook (etextbook) version, I will be contributing to deforestation which increases the amount of floods and the levels of greenhouse gasses trapped in the atmosphere such as Carbon Dioxide (CO<sub>2</sub>) which could threaten the lives of humans, plants, and animals.

5. Buying bottled water, using disposable coffee cups, and using plastic bags when shopping will contribute to the toxic chemicals from plastic breaking down in landfills that infect water sources and food for animals while also ending up in the sea where plastic kills sea creatures.

4. When doing my laundry, if I do not make sure to use cold water in the washing machine, I do not only wash full loads of laundry, and I overfill the dryer, then I will be contributing to the further waste of water and excessive energy usage which would lead to droughts and higher levels of Carbon Dioxide (CO<sub>2</sub>) in the atmosphere.



## Appendix D

Word Search Puzzle

Participants will have about **4-5 minutes** to complete this word search. **Please circle as many words as you can in the puzzle below.**

Ball	Basket	Binder
Board	Chair	Disk
Door	General	Olive
Paper	Pillow	Silver

E	P	O	O	H	P	S	R	M	S	W	Q	R	H	V
O	U	A	L	F	I	U	P	I	E	T	M	E	W	P
N	A	A	I	L	K	N	R	U	A	A	S	P	D	Z
P	H	P	V	B	A	S	K	E	T	H	H	A	I	V
L	W	E	E	Q	K	L	T	T	D	J	C	P	S	F
T	R	G	X	S	W	W	A	S	L	N	T	J	K	M
Y	O	S	H	O	M	M	Y	K	C	U	I	U	J	D
L	G	G	L	K	J	Z	K	K	F	Q	R	B	O	I
M	V	L	G	R	K	H	R	O	O	D	E	X	T	N
S	I	B	G	I	M	Z	H	X	V	M	B	P	T	R
P	H	V	O	V	D	P	F	W	X	L	O	B	K	V
L	X	B	A	A	F	G	O	T	S	A	A	O	Y	E
P	E	J	L	A	R	E	N	E	G	L	K	W	T	Q
J	B	D	Q	J	W	D	K	X	L	E	D	E	Y	S
Q	G	V	O	H	C	G	K	L	A	Y	W	M	L	X

**Appendix E**

Tyagi & Carley (2021) Climate Change Conspiracies that participants will be asked to please indicate how much they agree or disagree with each statement below ranging from **Strongly Disagree (1)** to **Strongly Agree (7)**:

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

1. \_\_\_\_\_ The condensation trails from the jet engines of an aircraft consist of chemical or biological agents that are responsible for climate change.
2. \_\_\_\_\_ Sunspots are a temporary phenomenon of reduced surface temperature of the sun that are responsible for climate change.
3. \_\_\_\_\_ There is a human-made directed energy weapon (DEW) that focuses a highly focused beam of energy on its target, and the usage of this DEW is responsible for climate change.
4. \_\_\_\_\_ Governmental experiments involving geo-engineering are responsible for climate change.
5. \_\_\_\_\_ The existence of an unknown ninth planet in our solar system with a vast orbit is responsible for climate change.

### Appendix F

This is the Behavioral Intentions Scale where participants will be asked to please respond to each statement below on the likelihood of each statement ranging from **Very Unlikely (1)** to **Very Likely (7)**:

1	2	3	4	5	6	7
Very Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Very Likely
1.	_____	I will take shorter showers.				
2.	_____	I will turn off the water while I am brushing my teeth or shaving.				
3.	_____	I will use cold water when doing my laundry.				
4.	_____	I will only wash full loads of laundry.				
5.	_____	I will not overfill the dryer when doing my laundry.				
6.	_____	I will unplug all of my electronics when I am no longer using them.				
7.	_____	I will turn off all the lights when I leave my room.				
8.	_____	I will turn off my laptop/computer every night before I go to bed.				
9.	_____	I will use stairs instead of elevators whenever possible.				
10.	_____	I will choose to get electronic textbooks (e-textbooks) instead of paperback textbooks for my classes.				
11.	_____	I will use less plastic bags when I go shopping.				
12.	_____	I will use reusable water bottles instead of buying bottled water.				
13.	_____	I will use reusable coffee mugs when I get coffee.				
14.	_____	I will properly recycle every time I use recyclable materials.				
15.	_____	I will not litter.				

16. \_\_\_\_\_ I will buy my produce locally.

**Appendix G****Please answer the following questions:**

1. Which option(s) most closely represent your race/ethnicity? Check all that apply.

- African-American
- Asian/Asian American
- Latino/Latina/Hispanic
- Native American
- Middle Eastern
- Caucasian/White
- Biracial/Multiracial
- None of the above (please specify) \_\_\_\_\_

2. How do you describe yourself?

- Cisgender Man
- Cisgender Woman
- Transgender/Transsexual/Gender-Nonconforming
- Do not identify as any of the above.

3. If yes to transgender, transsexual, or gender non-conforming, which one of the following describes you the best:

- Transgender or transsexual, male to female
- Transgender or transsexual, female to male

Gender non-conforming or non-binary

None of the above (please specify) \_\_\_\_\_

4. What is your age?

18 years old

19 years old

20 years old

21 years old

22 years old

23 years old or older



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