Scientific Research Publishing

Psychology, 2025, 16(9), 1019-1033
https://www.scirp.org/journal/psych
ISSN Online: 2152-7199
ISSN Print: 2152-7180

Facing Our "Inevitable End": The Effects of Death Thoughts on Environmental Attitudes and Behaviors

Zachary Z. Smith, Sheila Brownlow*

Department of Psychology, Catawba College, Salisbury, NC, USA
Email: *sbrownlo@catawba.edu

How to cite this paper: Smith, Z. Z., & Brownlow, S. (2025). Facing Our "Inevitable End": The Effects of Death Thoughts on Environmental Attitudes and Behaviors. *Psychology, 16,* 1019-1033.
https://doi.org/10.4236/psych.2025.169057

Received: August 8, 2025
Accepted: September 7, 2025
Published: September 10, 2025

Abstract

While some believe protecting the environment is a necessity to avoid the end of the world, others avoid the issue entirely due to the fear that arises from considering this issue. Our study examined the effects of death thoughts on peoples' environmental attitudes and behaviors, accounting for their guiding values of life. College students ($N = 120$) reported their guiding values in life, then wrote about their own death (mortality salience manipulation) or about dental pain. Participants completed two filler tasks and then reported their environmental behavior, attitudes, and self-identity; they also answered demographic questions. Mortality salience positively affected peoples' ecocentric attitudes regardless of baseline guiding values and other demographic differences. However, mortality salience did not influence perceived environmental behaviors, environmental self-identity, or anthropocentric and apathetic attitudes toward the environment. Women reported engaging in more environmentally-friendly behaviors than men. These results suggest that while provoking death thoughts can positively affect the pro-environmentalism of some persons, understanding of the situations under which this might occur requires further study.

Keywords

Mortality Salience, Ecocentrism, Environmental Attitudes

"*Only when the last tree has died and the last river been poisoned and the last fish been caught will we realize we cannot eat money.*"

Native American Cree prophecy, attributed to Alanis Obomsawin.

1. Introduction

Efforts to raise environmental awareness and bring positive changes to environ-

mental attitudes and behaviors have become a focus of research across many disciplines. One popular method of raising awareness includes bringing someone's own mortality into attention to illuminate the severity of the crisis. Examples of this method can be seen in news articles, online websites, and YouTube documentaries that detail the end of life due to our actions against the environment. Making people aware of their own death, a phenomenon called mortality salience, influences attitudes and behaviors. For example, Greenberg et al. (1997) found that provoking these death thoughts eventually leads to a bolstering of our own beliefs, creating disdain for values that go against our own. These heightened values can have a direct impact on people's environmental attitudes and behaviors (Greenberg et al., 1997). This study examines how environmental identity and guiding values interact with death thoughts to bring change to self-perceived environmental attitudes and behaviors.

A study by the Pew Research Center (2023) found that 14% of Americans do not believe there is solid evidence backing the environmental crisis, and 26% of Americans believe that the evidence points to natural patterns, rather than human activity, as causal. Several inter- and intrapersonal factors influence such environmental attitudes. For example, Gould and Lewis (2014) suggest skepticism of governments, politicians, and scientists about the environmental crisis damages willingness to commit to pro-environmental attitudes and behaviors. Lack of knowledge of the environmental crisis also contributes to skepticism, and (in turn) low pro-environmental attitudes (Bamberg & Möser, 2007). These findings suggest that while there is research evidence, government backing, and political action addressing the environmental crisis, a large number of people fail to acknowledge the existence of human-created climate change.

Education level and political lean also influence environmentalism. Several researchers (e.g., Bamberg & Möser, 2007; Gifford & Nilsson, 2014) found that, across several countries, higher education levels are positively related with environmental concerns and actions; moreover, highly-educated parents reward pro-environmental behaviors in their children (Grønhøj & Thøgersen, 2017). As to political lean, McCright & Dunlap (2011) found that conservative White men were more likely to deny climate change in comparison to women, people of color, and self-reported liberals, no matter education levels. Kahan et al. (2007) found a similar effect for White men who held hierarchal cultural worldviews. Finally, people who have high levels of materialism have less concern for the environment due to profiting off degradation of ecosystems, which may explain why conservative beliefs usually associated with materialistic worldviews tend to cause less concern for the environment (Akil et al., 2018; Chopik & Edelstein, 2014).

Environmental self-identification describes how connected someone feels to nature, and those who are high in environmental self-identification are more likely to have positive environmental concern and behaviors compared to those who have less environmental self-identification (Wang et al., 2021). Connection to nature can stem from various factors, including parental attitudes, personal positiv-

ity about the environment, and perceptions that our own actions have an influence on the environment (Robinson & Brownlow, 2015). According to Bamberg and Möser (2007), intended pro-environmental behavior is an important aspect to predicting actual pro-environmental behavior, and environmental self-identity is an important variable in predicting behavioral intentions. The nature of the environmental identity, however, may be variable according to views of the inherent purpose of the environment.

Thompson and Barton (1994) delineated different types of environmentalism and developed a scale to measure these types. *Ecocentric* attitudes toward the environment involve valuing nature for its intrinsic value, finding purpose in the environment beyond human use, while *anthropocentric* attitudes tap into valuing nature for its usefulness to the human population, such as for paper from trees, land to hunt game, lakes for boating and fishing, and gas for our cars (Thompson & Barton, 1994). An *apathetic* view toward the environment involves not having strong opinions about it and the tendency to be indifferent to environmental issues. In Thompson and Barton's (1994) study, ecocentric individuals showed less apathy towards the environment, more intent to join environmental organizations, and greater amounts of pro-environmental behavior when observed compared to anthropocentric individuals, who revealed less value of the environment and fewer pro-environmental behaviors. Differences in environmental behavior between ecocentric and anthropocentric individuals may stem from feelings of dominance over the environment for anthropocentric people, and a feeling of equality to nature from ecocentric people. Sockhill et al. (2022) found that ecocentric and anthropocentric attitudes are associated with high and low connectivity to nature, respectively, and feelings of connectivity are also related directly to environmental self-identification.

While differences across large groups of people can explain some of the differences in environmental beliefs, it is also important to recognize intrapersonal differences that undergird general belief systems related to environmentalism. Steg et al. (2014) connected four guiding values—altruistic, biospheric, egoistic, and hedonic—to environmental behavior. Altruism is related to concern for other people's well-being, and biospheric values are related to concern for the natural environment; both are related to more pro-environmental behaviors and attitudes (de Groot & Steg, 2008; Fritsche & Häfner, 2012). Egoistic values are concerns for oneself, and hedonic values are concerns about having pleasure and joy in the world for humans. Both values are related to lower pro-environmental behaviors and attitudes (de Groot & Steg, 2008; Steg et al., 2014). These differences in concerns show that guiding values and worldviews not explicitly related to environmentalism can still influence attitudes and behaviors toward the environment.

Although generally stable, worldviews can become more or less salient depending on situational factors. Terror-Management Theory (Greenberg et al., 1997) suggests that humans evolved with self-awareness of our own life, which gives rise

to awareness of our inevitable death, which in turn instills terror and actions toward self-preservation (Greenberg et al., 1997). However, Greenberg et al.'s (1997) theory suggests that we evolved to work around this terror through the creation of cultural worldviews that provide social norms and community values by which we abide. This defense towards terror works because having core values and the ability to leave a lasting presence leads to a feeling of legacy that extends beyond death (Greenberg et al., 1997; Routledge & Vess, 2019).

The theory also proposes that people manage mortality salience by invoking proximal and distal defenses that deter this sense of terror (Greenberg et al., 1997; Pyszczynski et al., 1999). Proximal defenses work through distraction with other tasks that do not relate directly to what is causing this mortality salience, such as looking at funny cat videos as a distraction from the news article that proposes the world will end due to the environmental crisis (Pyszczynski et al., 1999). However, distal defenses are more common when death-thoughts indirectly affect people outside of their immediate focus (Pyszczynski et al., 1999). Distal defenses show after proximal defenses deter death thoughts from consciousness, typically after a short time delay after the mortality salience (Burke et al., 2010), when people are no longer specifically focused on their death.

These distal defenses are important to this research, as studies show that distal defenses to mortality salience motivate individuals to identify with social norms, favor members of their in-group, and feel stronger about their cultural worldviews, causing disdain for outgroup individuals and ideas that go against these worldviews (Routledge & Vess, 2019). Distal defenses can also lead to an unconscious strengthening of cultural views such as favoring materialism in individuals with materialistic worldviews, increased prejudice against liberal groups among people with low biospherism (Uhl et al., 2016), favoring environmentalism and increasing pro-environmental identity in those with environmentalist worldviews (Akil et al., 2018; Chopik & Edelstein, 2014; Marais-Potgieter & Thatcher, 2023). A decrease in nature-connected values has been linked to the distal defense against nature under the effects of mortality thoughts, as nature is related directly to the physicality of our bodies, disease, sex, and death itself (Routledge & Vess, 2019).

For example, Fritsche and Häfner (2012) found that mortality salience in people with low environmental self-identity lowered biospheric concerns. This finding can be explained by Terror-Management Theory (Pyszczynski et al., 1999), as biospheric concerns are considered in-group worries for those who have a high connection to nature, but they are out-group concerns for those with little connection to nature. However, the researchers also found that mortality salience did not influence attitudes toward the environment among those who had egoistic concerns, or among those who had little care for the environment or who saw it only for its use to humans, likely because nature's value does not concern those who do not feel inherent value in nature.

In sum, environmental attitudes and behaviors are a complex result of demographic differences, beliefs, guiding values, and environmental self-identity. Our

research addresses how mortality salience affects environmental attitudes and behaviors among people with a range of guiding values. Specifically, we examined how mortality salience influenced ecocentrism, anthropocentrism, apathy, behaviors, and self-identity given core guiding values. We also sought to provide a more updated set of findings among US college students, predicting that mortality salience would sharpen pro-environmental attitudes and behaviors among those whose guiding values included biospheric and altruistic attitudes.

2. Method

Participants and Design

A total of 120 participants (60 men, 60 women) were assigned randomly to one of two groups within sex. In one group, participants completed two open-ended short-answer questions based on Rosenblatt et al. (1989) and their Mortality Attitudes Personality, referring to their emotions when thinking about their own death to arouse mortality salience. The other group answered two open-ended short-answer questions regarding dental pain, acting as a control group. These manipulations resulted in a 2 × 2 (Participant Sex × Mortality Salience Absent/Present) between-participants design.

Stimulus Materials

Values. Participants completed the Steg Guiding Values scale (Steg et al., 2014), using 7-point bipolar scales (endpoints *not at all important* to *extremely important*) to measure the importance of four guiding principles (each with four facets) in their lives. Scale reliabilities varied. The principles and sample facets were hedonic (e.g., *pleasure* and *enjoying life*; α = .57), egoistic (e.g., *social power* and *ambition*; α = .66), altruistic (e.g., *social justice* and *world at peace*; α = .70), and biospheric (e.g., *respecting for the earth* and *unity with nature*; α = .89). These scales allowed us to tap into baseline attitudes, especially those focused on environmental benevolence.

Mortality salience manipulation. Two open-ended short-answer questions, adapted from the directions given in Fritsche and Häfner (2012) served as the manipulation and control. Mortality salience participants were told: "in one to two sentences, explain what will happen to you as you physically die and once you are physically dead" and "jot down the emotions that the thought of your own death arouse in you". We told control participants to write "in one to two sentences, describe the emotions that the thought of a painful dental procedure arouses in you" and "jot down what it feels like when undergoing a painful dental procedure".

Filler Tasks

Two filler tasks were provided to direct participants' focal attention away from mortality, which is when distal defenses appear. The first filler task was a 10 × 10 letter word search puzzle created in Microsoft Word. We told participants to find 12 words in two *min*, providing a sand timer to allow them to monitor their progress. We then directed them to complete Watson et al.'s (1988) Positive and Neg-

ative Affect Schedule (PANAS), a commonly used filler task for mortality salience studies. Participants indicated to what extent they had felt each of 20 emotions (e.g., proud, alert, irritated) in the past few days, measured on a 5-point bipolar scale, ranging from (1) *Not at all or very slightly* to (5) *Extremely*.

Dependent Measures

Environmental behaviors. Participants completed a four-question scale adapted from Markle's (2013) Environmental Behavior Scale, providing self-reported environmental behaviors on a 7-point bipolar scale, ranging from (1) *Strongly disagree* to (7) *Strongly agree*. These tapped into constructs focusing on eating less meat to reduce emissions, driving less/walking more, all-material recycling, and making time/money contributions to environmental organizations. Internal consistency was low, α = .56.

Environmental attitudes. Participants completed the Ecocentric and Anthropocentric Attitudes Toward Sustainable Development (EAATSD) scale, developed by, developed by Kopnina (2012), using 7-point bipolar scales (ranging from 1 *Strongly disagree* to 7 *Strongly agree*) to represent beliefs about three major attitudes: ecocentrism, anthropocentrism, and environmental apathy. Examples of questions aligned to each, respectively, as well as internal consistency, include "It makes me sad to see forests cleared for agriculture" (α = .89), "environmental threats such as deforestation and ozone depletion have been exaggerated" (α = .64), and "I find it hard to get too concerned about environmental issues" (α = .74).

Environmental identity. Participants completed a three-question scale created by van der Werff et al. (2013) to reveal their self-perceived environmental identification. Participants indicated agreement with three statements regarding environmental self-identity, using 7-point bipolar scales, with endpoints ranging from (1) *Strongly disagree* to (7) *Strongly agree*. An example of these questions includes "I am the type of person who acts environmentally friendly". Internal consistency was high, α = .90.

Participant demographics. Participants listed their gender identity, age, race/ethnicity, and major. They also revealed the highest level of education of their highest educated parent, from options (1) *High school or less* (2) *Some college or technical/community college* (3) *Four-year college degree* (4) *Advanced* (*masters*) *degree* (5) *Professional advanced degree* (*MD*, *JD*, *PhD*).

Procedure

Participants were recruited through classes, via friends/volunteers, or from friends of friends (via snowball sampling). Each participated alone. After we obtained consent, we handed participants a booklet containing the manipulation and the scales and read them the directions. We first presented the Guiding Values scale, and then the major writing manipulation. We provided a two *min* sand timer for the word search, and then participants completed the PANAS, which took another two or three *min*, thus creating a time gap of around five *min*. Following Fritsche and Häfner (2012), this gap in time between the writing task and

the attitude scales should have been sufficient to create distal defenses. Participants then completed the behavior, attitude, and identity scales. They provided demographic information last, and after those we fielded questions and dismissed participants.

3. Results

Overview

Preliminary analyses on Steg's guiding values were conducted because research (e.g., Fritsche & Häfner, 2012) suggests that baseline guiding values may influence responses to the manipulations. Four separate 2 × 2 (Participant Sex × Mortality Salience) ANOVAs with biospherism, altruism, egocentrism, and hedonism were conducted. None of the ANOVAs produced significant main or interaction effects, all Fs(1, 116) ≤ 2.03, all ps ≥ .157. Thus, participants' baseline guiding values were not different across conditions.

Effects of Sex and Mortality Salience on Attitudes and Behaviors

Five separate 2 × 2 (Participant Sex × Mortality Salience) ANOVAs were conducted to measure the effects of sex and mortality salience on participants' behaviors, attitudes, and environmental self-identity. The means and SDs from these analyses are displayed in Table 1, while the means and CIs of ecocentric attitudes are shown in Figure 1. To account for calculating five ANOVAs, we adjusted our acceptable p-level to .01.

Table 1. Means and SDs for environmental attitudes and behaviors as a function of mortality salience and sex.

	Mortality Salience Condition					
	Control			Mortality Salience		
	Sex					
	Men	Women	Total	Men	Women	Total
	(n = 30)	(n = 30)	(n = 60)	(n = 30)	(n = 31)	(n = 61)
Behaviors	3.48 (1.00)	3.76 (1.16)	3.62 (1.09)	3.33 (1.09)	3.83 (1.06)	3.58 (1.10)
Ecocentrism	4.93 (0.63)	5.37 (0.95)	5.15_a (0.83)	5.33 (0.74)	5.76 (0.86)	5.54_b (0.82)
Anthropocentrism	3.98 (0.89)	3.73 (1.02)	3.86 (0.95)	3.91 (0.92)	4.12 (0.87)	4.01 (0.89)
Apathy	2.97 (0.91)	2.69 (1.02)	2.83 (0.97)	2.6 (0.98)	2.66 (1.02)	2.63 (0.99)
Self-Identity	4.3 (1.14)	4.63 (1.29)	4.47 (1.22)	4.65 (1.51)	4.34 (1.36)	4.5 (1.43)

Note. Means with different subscripts are significantly different, $p < .01$.

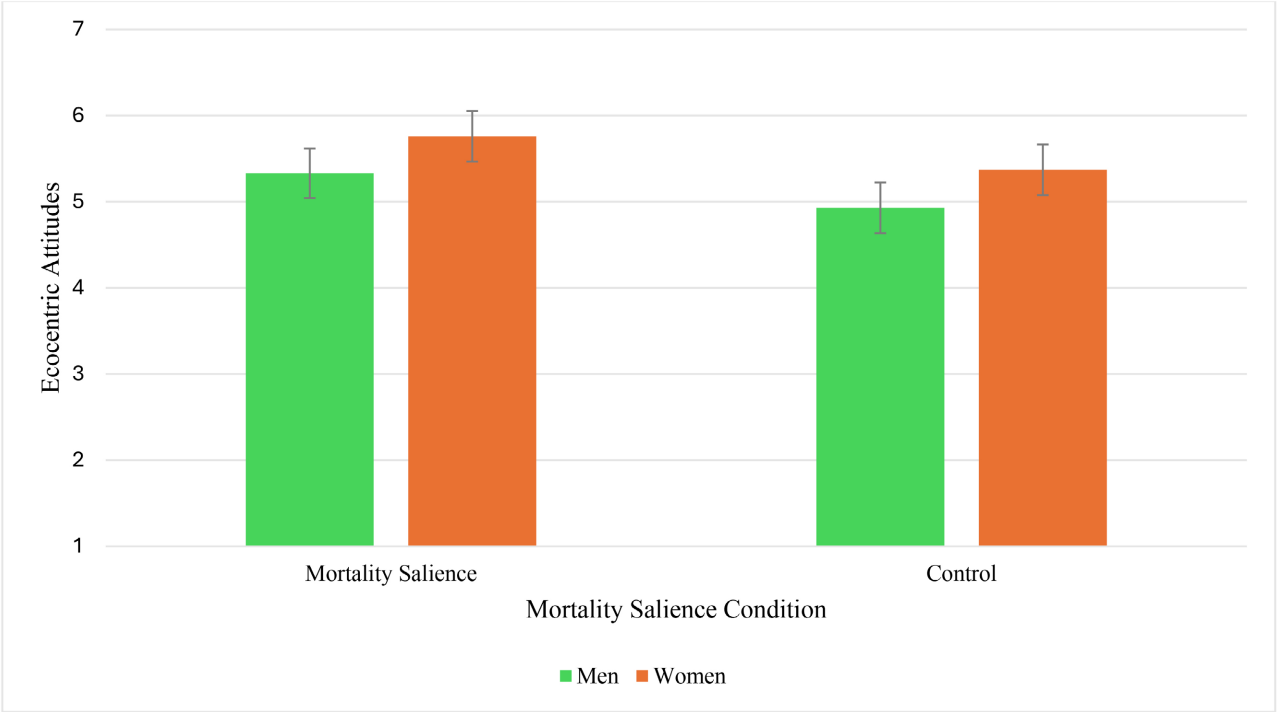

Figure 1. Means and 95% CIs of ecocentric attitudes as a function of mortality salience and sex.

The ANOVA for ecocentric attitudes showed both a main effect of sex, $F(1, 117) = 8.89$, $MSE = .65$, $p = .003$, $\eta_p^2 = .07$, and mortality salience, $F(1, 117) = 7.12$, $p = .009$, $\eta_p^2 = .05$, although the interaction effect was not significant, $F(1, 117) = 0$, $p = .988$. Women ($M = 5.57$, $SD = .92$) had a more ecocentric attitude than men ($M = 5.13$, $SD = .71$), and participants under threat of mortality salience ($M = 5.54$, $SD = .82$) had a more ecocentric attitude than participants not under threat of mortality salience ($M = 5.15$, $SD = .83$).

The ANOVA for environmental behaviors produced a trend for sex, $F(1, 117) = 3.89$, $MSE = 1.17$, $p = .051$, $\eta_p^2 = .03$. Women ($M = 3.79$, $SD = 1.10$) reported themselves as engaging in significantly more environmentally friendly behaviors than men ($M = 3.41$, $SD = 1.04$). However, no other significant main or interaction effects occurred, all Fs$(1, 117) \leq .33$, all ps $\geq .569$. Surprisingly, the ANOVA for environmental self-identity produced no significant main or interaction effects, all Fs$(1, 117) \leq 1.72$, all ps $\geq .193$.

While we expected that mortality salience would positively influence ecocentrism, behaviors, and identity, we did not expect that apathetic and anthropocentric attitudes would be increased by the manipulation. Our data confirm that expectation, as the ANOVA for anthropocentric attitudes showed no significant main or interaction effects, all Fs$(1, 117) \leq 1.85$, all ps $\geq .176$, nor did the ANOVA for apathetic attitudes, all Fs$(1, 117) \leq 1.28$, all ps $\geq .261$.

Although pre-existing differences in altruism (concern for others' well-being) and biospherism (concern for the natural environment) were not seen, general benevolence (as seen in altruism) and general environmental benevolence (as seen

in biospherism) may have influenced the foregoing results as both are related to higher amounts of pro-environmental behaviors and attitudes (de Groot & Steg, 2008; Fritsche & Häfner, 2012). We thus used both of these as covariates in a 2 × 2 ANCOVA for ecocentric attitudes. While the covariate of biospherism was significant, $F(1, 114) = 6.86$, $MSE = .58$, $p = .01$, $\eta_p^2 = .06$, altruism was not, $F(1, 114) = .54$, $p = .465$. More importantly, the significant main effect of mortality salience remained, $F(1, 114) = 7.22$, $p = .008$, $\eta_p^2 = .06$, as did the effect of participant sex, $F(1, 114) = 8.75$, $p = .004$, $\eta_p^2 = .07$. As before the introduction of the covariates, the interaction was not significant, $F(1, 114) = .33$, $p = .570$.

Similar ANCOVAs on our other variables of interest (identity, behaviors, anthropocentrism, apathy) did not change the pattern of results found without covarying baseline levels of general and environmental-specific benevolence. While the ANCOVA for environmental behaviors showed significance for both biospherism, $F(1, 114) = 34.45$, $MSE = .91$, $p < .001$, $\eta_p^2 = .23$, and a trend for altruism, $F(1, 114) = 4.30$, $p = .04$, $\eta_p^2 = .04$, the main effect of sex was strengthened, $F(1, 114) = 5.561$, $p = .021$, $\eta_p^2 = .05$. However, as before the covariate, no main effect of mortality salience or interaction effect occurred, all Fs ≤ 1.67, all ps ≥ .200. Similarly, in the ANCOVA for environmental self-identity, the additional covariates produced a significant covariate effect for biospherism, $F(1, 114) = 50.85$, $MSE = 1.19$, $p < .001$, $\eta_p^2 = .31$, while no other significant effects were seen, all Fs ≤ 1.80, all ps ≥ .302.

The additional covariates in the ANCOVA for anthropocentric attitudes did not change the pattern of results, as there were no significant main, interactive, or covariate effects, all $F(1, 114) \leq 1.62$, $MSE = .87$, all ps ≥ .206. However, in the ANCOVA for apathetic attitudes, biospherism was a significant covariate, $F(1, 114) = 15.22$, $MSE = .86$, $p < .001$, $\eta_p^2 = .12$, while no other changes occurred to the pattern of results, all Fs ≤ 1.18, all ps ≥ .280.

4. Discussion

The results of this study revealed that participant sex and mortality salience both affected ecocentric attitudes and environmental behaviors. Individuals who were prompted to contemplate their death reported higher ecocentric attitudes than those who wrote about a non-death related topic. Women were also more ecocentric than men and also reported engaging in more environmentally friendly behaviors than men. More importantly, these patterns were the same even when baseline attitudes of biospherism and altruism were held constant, suggesting that the manipulation was effective at increasing ecocentrism regardless of pre-existing attitudes. Neither anthropocentrism nor environmental apathy were changed under threats of mortality salience, a finding that harmonizes with previous research (Fritsche & Häfner, 2012). Environmental self-identity was also unchanged by the manipulation, perhaps because members of our sample may already identify highly with environmentalism, owing to being a student at a carbon-neutral institution where environmental issues are a key piece of the curriculum.

The findings that mortality salience increased valuing nature for its own intrinsic value (i.e., ecocentrism) is in contrast to those reported by Fritsche and Häfner (2012), who found decreases in connection to nature under threats of mortality salience. There are several variables that may explain the lack of alignment in findings, including the 13-year gap in testing time and the salience of environmentalism in the particular college setting of our participants. Previous research (Sockhill et al., 2022; Thompson & Barton, 1994) has shown that ecocentric people intend to participate in more pro-environmental behaviors when prompted to think about environmentalism. This connection would mean mortality salience has a positive impact on environmental attitudes through the strengthening of ecocentric attitudes. Distal defenses have been observed to strengthen someone's cultural worldviews and identify with social norms, explaining why mortality salience heightened ecocentric attitudes in this study (Greenberg et al., 1997; Jonas et al., 2008).

Women also had a more ecocentric attitude than men, a finding supported by previous research on sex differences in environmental attitudes and behaviors (Briscoe et al., 2019; Echavarren, 2023). Gould and Lewis (2014) have argued that women may be more likely to have anti-hierarchal worldviews that are strengthened by mortality salience, which would result in a higher valuation of nature for its intrinsic value due to the neglect it constantly faces by humans. Similarly, a "conservative White man" effect might explain why men, who commonly hold a more hierarchal cultural worldview, lack concern for the environment compared to women (McCright & Dunlap, 2011).

While making mortality salient increased ecocentric attitudes compared to those for whom mortality was not made salient, it did not affect their reporting of environmental behaviors. However, we used a scale for people's perceptions of their own behaviors, not for their intentions to commit to environmental behaviors, preventing participants to indicate behavioral intentions. Also, some of the questions tapped into behaviors that many have not considered, such as not eating meat to reduce emissions (versus something as common as recycling). The scale was not internally consistent, perhaps because it included only four questions.

While previous research has shown that pro-environmental self-identity increases environmental attitudes and behaviors under mortality salience (Marais-Potgieter & Thatcher, 2023; Uhl et al., 2016; Vess & Arndt, 2008; Wang et al., 2021), we found no influence of this manipulation on self-identity, an unexpected finding because distal defenses strengthen people's own cultural worldviews (Routledge & Vess, 2019). The self-identity scale was the last scale in a lengthy set of scales, and participants may have been less attentive; or possibly experimental demand may have been present.

Neither environmental apathy nor anthropocentrism are typically influenced by mortality salience (Fritsche & Häfner, 2012), as distal defenses bolster previously held worldviews (Greenberg et al., 1997; Pyszczynski et al., 1999), and apathetic attitudes are a result of being indifferent. However, in measuring anthropocentrism and apathy, we did not use the Thompson and Barton (1994) scale be-

cause of its length, but its previous use with this population (i.e., Robinson & Brownlow, 2015) has shown variations in both of those facets. Neither anthropocentrism nor apathy were strongly internally consistent.

Critiques and Directions for Future Studies

This study was completed on a college campus with a large population of environmental science majors, which may result in more environmental knowledge and concern than is found in the average population[1]. Previous research (Bamberg & Möser, 2007; Gifford & Nilsson, 2014) showed that exposure to environmental issues is common in higher education, perhaps because of a link to parental education, which positively increases children's environmental attitudes and behaviors (Grønhøj & Thøgersen, 2017). The participants in the sample were all college-aged, and they reside on the only carbon-neutral college in the Southeast United States where both curricular and co-curricular programming are pro-environment forward. Moreover, participants may have been homogeneous due to snowball sampling, and they may also have been used to mortality salience regarding the environment, due to the large number of environmental talks and events held on campus. In the future, examining these variables on a more generalized popu-

[1]Prior research (Grønhøj & Thøgersen, 2017) shows that parental education, as well as environmental knowledge, may influence environmental attitudes and behaviors. To determine if these variables influenced participants' responses, a series of 2 × 2 (Participant Sex × Mortality Salience) ANCOVAs with covariates of biospherism, altruism, *and* parental education, on non-environmental majors only (to account for environmental knowledge), were calculated separately for ecocentrism, apathy, anthropocentrism, identity, and behaviors.

For ecocentrism, holding constant the extra covariate and using *only* non-environmental science majors did not alter the pattern of responses for mortality salience, as ecocentrism was higher for those under mortality salience than those in the control. The effect of sex was significant, with women higher than men on ecocentrism. Specifically, there were significant main effects of sex, $F(1, 96) = 5.46$, $p = .021$, $\eta_p^2 = .05$, and mortality salience, $F(1, 96) = 7.47$, $p = .007$, $\eta_p^2 = .07$. Women ($M = 5.49$, $SD = .93$) and people under threat of Mortality Salience ($M = 5.49$, $SD = .84$) had significantly higher ecocentric attitudes than men ($M = 5.06$, $SD = .69$) and people not under threat of mortality salience ($M = 5.06$, $SD = .84$). There were significant effects of the covariates, biospherism, $F(1, 96) = 7.38$, $MSE = .53$, $p = .008$, $\eta_p^2 = .07$, and parental education, $F(1, 96) = 9.53$, $p = .003$, $\eta_p^2 = .09$. We found no effect of altruism nor an interaction, all Fs ≤ 1.45, all ps ≥ .231.

When we added parental education as a covariate in the analysis for environmental behaviors; this ANCOVA produced significant effects for the covariates biospherism, $F(1, 96) = 17.07$, $MSE = .66$, $p < .001$, $\eta_p^2 = .15$, and parental education, $F(1, 96) = 5.30$, $p = .014$, $\eta_p^2 = .01$, and also produced a significant main effect of sex, $F(1, 96)$, $p = .014$, $\eta_p^2 = .06$, while no other main or interaction effects were significant, all Fs ≤ 3.04, all ps ≥ .052. As with the analysis not including parental education, women reported themselves as engaging in significantly more environmentally friendly behaviors than men.

A similar ANCOVA for anthropocentric attitudes produced no main or interaction effects, all Fs$(1, 96) ≤ 1$, all ps ≥ .319, just as the ANCOVA without parental education held constant did. The ANCOVA for apathetic attitudes revealed a significant effect of the covariate biospherism, $F(1, 96) = 11.89$, $MSE = .82$, $p < .001$, $\eta_p^2 = .11$, while no other main or interaction effects were significant, all Fs ≤ 2.32, all ps ≥ .131. In the ANCOVA for environmental self-identity, significant effects of the covariates, biospherism, $F(1, 96) = 30.81$, $MSE = 1.08$, $p < .001$, $\eta_p^2 = .24$, and parental education, $F(1, 96) = 6.84$, $p = .010$, $\eta_p^2 = .07$, were found. No other main or interaction effects were significant, all Fs ≤ .76, all ps ≥ .387.

In sum, parental education was a significant covariate in several analyses but this extra covariate (and examining only on the non-environmental science majors) did not significantly alter the pattern of data. These results show further that while environmental knowledge still affected the results, the findings were not changed by removing environmental science majors.

lation in age and education will be beneficial to determine the effects for a broader set of people. Future studies may also be able to determine how long this mortality salience manipulation keeps its distal defense effects, giving better implications of the usefulness of mortality salience in teaching scenarios.

Our scales may not have adequately tapped into the constructs under examination, particularly in the use of a truncated version of the Thompson and Barton (1994) scale. Additionally, we may not have measured some of the variables that have been shown to be related to anthropocentrism, including engagement in college sports and political affiliation (Robinson & Brownlow, 2015), a variable that was salient during the time our study was conducted in the fall of 2024, amidst a US federal election cycle. Our study was underpowered (at .80) to locate a medium effect size, as we needed 45 participants per group, a difficult challenge on a small college campus. Finally, we relied solely on self-report of environmental attitudes and behaviors, which may have been subject to social desirability; thus, future research might include observations of behavior to more accurately tap into students' environmentalism.

Summary and Implications

This study has shown how environmental attitudes are impacted by provoking thoughts about death, a finding that held regardless of underlying guiding life values. Understanding responses to mortality salience may improve the efficacy of informing the public about environmental issues, enabling a shift towards pro-environmental attitudes. While shifts in societal attitudes, behaviors, and norms take time, each new finding on how to better educate people regarding the environment is a step closer to a world that prioritizes the nurturing of our planet's natural environment.

Acknowledgements

We thank Joey Baillie, Nikki Franz, and Hayes Smith for assistance with data collection, and Chad Betters, Timothy Clark, and Mary Utley for comments on earlier drafts of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Akil, H., Robert-Demontrond, P., & Bouillé, J. (2018). Exploitation of Mortality Salience in Communication on Climate Change. *Recherche et Applications en Marketing (English Edition), 33,* 2-29. https://doi.org/10.1177/2051570717745839

Bamberg, S., & Möser, G. (2007). Twenty Years after Hines, Hungerford, and Tomera: A New Meta-Analysis of Psycho-Social Determinants of Pro-Environmental Behaviour. *Journal of Environmental Psychology, 27,* 14-25. https://doi.org/10.1016/j.jenvp.2006.12.002

Briscoe, M. D., Givens, J. E., Hazboun, S. O., & Krannich, R. S. (2019). At Home, in Public, and in Between: Gender Differences in Public, Private and Transportation Pro-Environmental Behaviors in the US Intermountain West. *Environmental Sociology, 5,* 374-392. https://doi.org/10.1080/23251042.2019.1628333

Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two Decades of Terror Management Theory: A Meta-Analysis of Mortality Salience Research. *Personality and Social Psychology Review, 14,* 155-195. https://doi.org/10.1177/1088868309352321

Chopik, W. J., & Edelstein, R. S. (2014). Death of a Salesman: Webpage-Based Manipulations of Mortality Salience. *Computers in Human Behavior, 31,* 94-99. https://doi.org/10.1016/j.chb.2013.10.022

de Groot, J. I. M., & Steg, L. (2008). Value Orientations to Explain Beliefs Related to Environmental Significant Behavior: How to Measure Egoistic, Altruistic, and Biospheric Value Orientations. *Environment and Behavior, 40,* 330-354. https://doi.org/10.1177/0013916506297831

Echavarren, J. M. (2023). The Gender Gap in Environmental Concern: Support for an Ecofeminist Perspective and the Role of Gender Egalitarian Attitudes. *Sex Roles, 89,* 610-623. https://doi.org/10.1007/s11199-023-01397-3

Fritsche, I., & Häfner, K. (2012). 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,* 570-590. https://doi.org/10.1177/0013916510397759

Gifford, R., & Nilsson, A. (2014). Personal and Social Factors That Influence Pro-Environmental Concern and Behaviour: A Review. *International Journal of Psychology, 49,* 141-157. https://doi.org/10.1002/ijop.12034

Gould, K. A., & Lewis, T. L. (2014). *Twenty Lessons in Environmental Sociology.* Oxford University Press.

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,* 61-139. https://doi.org/10.1016/s0065-2601(08)60016-7

Grønhøj, A., & Thøgersen, J. (2017). Why Young People Do Things for the Environment: The Role of Parenting for Adolescents' Motivation to Engage in Pro-Environmental Behaviour. *Journal of Environmental Psychology, 54,* 11-19. https://doi.org/10.1016/j.jenvp.2017.09.005

Jonas, E., Martens, A., Niesta Kayser, D., Fritsche, I., Sullivan, D., & Greenberg, J. (2008). Focus Theory of Normative Conduct and Terror-Management Theory: The Interactive Impact of Mortality Salience and Norm Salience on Social Judgment. *Journal of Personality and Social Psychology, 95,* 1239-1251. https://doi.org/10.1037/a0013593

Kahan, D. M., Braman, D., Gastil, J., Slovic, P., & Mertz, C. K. (2007). Culture and Identity-protective Cognition: Explaining the White-male Effect in Risk Perception. *Journal of Empirical Legal Studies, 4,* 465-505. https://doi.org/10.1111/j.1740-1461.2007.00097.x

Kopnina, H. (2012). Evaluating Education for Sustainable Development (ESD): Using Ecocentric and Anthropocentric Attitudes toward the Sustainable Development (EAATSD) Scale. *Environment, Development and Sustainability, 15,* 607-623. https://doi.org/10.1007/s10668-012-9395-z

Marais-Potgieter, A., & Thatcher, A. (2023). Exploring the Impact of the Pandemic on the Relationship between Individual Types and the Natural Environment: The Role of Mortality Concerns. *Current Research in Ecological and Social Psychology, 4,* Article ID: 100096. https://doi.org/10.1016/j.cresp.2023.100096

Markle, G. L. (2013). Pro-Environmental Behavior: Does It Matter How It's Measured? Development and Validation of the Pro-Environmental Behavior Scale (PEBS). *Human Ecology, 41,* 905-914. https://doi.org/10.1007/s10745-013-9614-8

McCright, A. M., & Dunlap, R. E. (2011). Cool Dudes: The Denial of Climate Change among Conservative White Males in the United States. *Global Environmental Change, 21,* 1163-1172. https://doi.org/10.1016/j.gloenvcha.2011.06.003

Pew Research Center (2023). *Why Some Americans Do Not See Urgency on Climate Change.* https://www.pewresearch.org/science/2023/08/09/why-some-americans-do-not-see-urgency-on-climate-change

Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A Dual-Process Model of Defense against Conscious and Unconscious Death-Related Thoughts: An Extension of Terror Management Theory. *Psychological Review, 106,* 835-845. https://doi.org/10.1037/0033-295x.106.4.835

Robinson, S., & Brownlow, S. (2015). Determinants of Proenvironmental Attitudes in College Students. *British Journal of Education, Society & Behavioural Science, 5,* 38-49. https://doi.org/10.9734/bjesbs/2015/12152

Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., & Lyon, D. (1989). Evidence for Terror Management Theory: I. The Effects of Mortality Salience on Reactions to Those Who Violate or Uphold Cultural Values. *Journal of Personality and Social Psychology, 57,* 681-690. https://doi.org/10.1037//0022-3514.57.4.681

Routledge, C., & Vess, M. (2019). *Handbook of Terror Management Theory.* Academic Press.

Sockhill, N. J., Dean, A. J., Oh, R. R. Y., & Fuller, R. A. (2022). Beyond the Ecocentric: Diverse Values and Attitudes Influence Engagement in Pro-Environmental Behaviours. *People and Nature, 4,* 1500-1512. https://doi.org/10.1002/pan3.10400

Steg, L., Perlaviciute, G., van der Werff, E., & Lurvink, J. (2014). The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions. *Environment and Behavior, 46,* 163-192. https://doi.org/10.1177/0013916512454730

Thompson, S. C. G., & Barton, M. A. (1994). Ecocentric and Anthropocentric Attitudes toward the Environment. *Journal of Environmental Psychology, 14,* 149-157. https://doi.org/10.1016/s0272-4944(05)80168-9

Uhl, I., Jonas, E., & Klackl, J. (2016). When Climate Change Information Causes Undesirable Side Effects: The Influence of Environmental Self-Identity and Biospheric Values on Threat Responses/Cuando la información sobre el cambio climático tiene efectos indeseados: la influencia de la identidad ambiental y de los valores biosféricos en la respuesta ante una amenaza. *PsyEcology: Bilingual Journal of Environmental Psychology, 7,* 307-334. https://doi.org/10.1080/21711976.2016.1242228

van der Werff, E., Steg, L., & Keizer, K. (2013). It Is a Moral Issue: The Relationship between Environmental Self-Identity, Obligation-Based Intrinsic Motivation and Pro-Environmental Behaviour. *Global Environmental Change, 23,* 1258-1265. https://doi.org/10.1016/j.gloenvcha.2013.07.018

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,* 1376-1380. https://doi.org/10.1016/j.jrp.2008.04.007

Wang, X., Van der Werff, E., Bouman, T., Harder, M. K., & Steg, L. (2021). I Am vs. We Are: How Biospheric Values and Environmental Identity of Individuals and Groups Can Influence Pro-Environmental Behaviour. *Frontiers in Psychology, 12,* Article 618956. https://doi.org/10.3389/fpsyg.2021.618956

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. *Journal of Personality and Social Psychology, 54,* 1063-1070. https://doi.org/10.1037/0022-3514.54.6.1063