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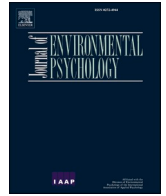
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# Religion, environmental guilt, and pro-environmental support: The opposing pathways of stewardship belief and belief in a controlling god

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## ABSTRACT

Religion exerts significant influence on how individuals respond to social issues. The present research investigates the implications of religious beliefs on emotions and behaviors regarding environmental issues. In three studies conducted with Christians in the U.S. ( $N = 1970$ ), we test the model in which stewardship belief and belief in a controlling god are oppositely (i.e., positively for stewardship belief and negatively for belief in a controlling god) associated with environmental guilt, which in turn leads to greater pro-environmental support. We do so by employing both correlational (Studies 1 and 2) and experimental data (Study 3) with diverse measures of pro-environmental support, such as behavioral commitment for environmental organizations (Study 1), policy support (Studies 2 and 3), and financial donation (Study 3). Religion is a system including various beliefs that may have different implications on environmental action. Given the vast number of the religious across the world, understanding this complexity is important to address current global environmental challenges.

“For Christians, doing something about climate change is about living out our faith—caring for those who need help, our neighbors here at home or on the other side of the world, and taking responsibility for this planet that God created and entrusted to us.”

– Katharine Hayhoe (Climate Scientist)

“As a Christian, I believe that there is a creator in God who is much bigger than us. And I’m confident that, if there’s a real problem, he can take care of it.”

– Tim Walberg (U.S. Congressman)

## 1. Introduction

Across the world, religion is an important part of many people’s lives that exerts significant influence on their attitudes and behaviors about social issues, such as those concerning the environment. People often assume that religious people are less environmentally friendly (Pearson et al., 2018), possibly due to the close association between religiosity and political conservatism. However, such an assumption is not entirely consistent with empirical findings (Biel & Nilsson, 2005; Kanagy &

Willits, 1993). The opening quotes exemplify that even people who share the same religion can differ considerably in how they approach environmental issues. It suggests that religion may include elements that could underlie both pro- and anti-environmental attitudes.

In this article, we investigate two religious beliefs that may provide sources of contrasting views on environmental issues among religious individuals: stewardship belief (i.e., the belief that humans have a responsibility of taking care of the world that a god created) and belief in a controlling god (i.e., the belief that a god controls and determines the events in the world according to his plan). Given that stewardship and a controlling god are themes commonly found in many religions, these two beliefs may co-exist within religious people’s minds. We propose that these two beliefs have contrasting (positive for stewardship belief and negative for belief in a controlling god) effects in promoting individuals’ pro-environmental support because of their distinct implications for a sense of guilt for environmental problems, a theorized key emotion that motivates environmental actions.

We also test whether situational cues can change the relative salience of the two religious beliefs, thereby affecting individuals’ environmental actions. By presenting the opposing effects of stewardship belief and belief in a controlling god and their dynamic nature, the current

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research unpacks psychological processes of how religion is associated with environmental action.

### 1.1. Religion and environmentalism

There has been much research on how religion is associated with environmentalism. Given the association between religiosity and political conservatism in the U.S., there is a notion that religious people, especially Christians, are relatively anti-environmental. For example, using a nationally representative sample, Pearson et al. (2018) showed that the American public underestimated religious people's environmental concern compared to what religious people actually reported. This perception of a negative association between religiosity and environmentalism may not always be justified. A number of correlational studies on the relation between religiosity and environmental attitudes and behaviors have offered mixed evidence. Some studies have shown the negative association between religiosity and pro-environmental tendencies (e.g., Eckberg & Blocker, 1989; Hand & Van Liere, 1984), but other studies have found null effects of religion (e.g., Biel & Nilsson, 2005; Hayes & Marangudakis, 2001) or even a positive relationship between religiosity and pro-environmental tendencies (e.g., Kanagy & Willits, 1993). Moreover, an analysis using recent public poll data in the U.S. showed that the relation between having religion and environmental attitudes varied across different environmental issues (Pew Research Center, 2015). This inconclusiveness reflects the complex nature of religiosity as a construct. The aforementioned studies mostly examined the correlation between a broad concept of religiosity or religious affiliations, rather than specific religious beliefs, and environmental attitudes and behaviors.

Religion, as a form of cultural system, consists of a loosely connected set of beliefs and practices (Cohen, 2009). As such, different aspects of religiosity, even within the same religion, may lead to different and sometimes contradictory tendencies and behaviors. For example, research on religion and prejudice shows that religious fundamentalism (the belief that there is one set of inerrant religious teachings that must be followed) is positively associated with prejudice, whereas religious quest (a tendency to search for answers to existential questions through religion) has a negative association (e.g., Altemeyer & Hunsberger, 1992). Similarly, literal religious beliefs and symbolic religious beliefs have contrasting influence on prosocial behavior (negative for literal beliefs vs. positive for symbolic beliefs) (Pichon & Saroglou, 2009). Thus, it is simplistic to inquire whether religiousness facilitates or hinders pro-environmental action in an absolute sense. Rather, understanding the link between religion and environmentalism requires analyzing the specific ways in which multiple beliefs associated with religion affect (some beliefs facilitate, while others hinder) pro-environmental action.

### 1.2. Stewardship belief and belief in a controlling god: opposing effects on pro-environmental support through environmental guilt

Among diverse religious beliefs that may influence environmental action, the present research focuses on religious stewardship belief and belief in a controlling god. Both the notions of stewardship and a controlling god are commonly endorsed in many, especially Abrahamic, religions. Moreover, beliefs in both notions are markers of high religiosity (i.e., positive correlations with religiosity) (Eom et al., 2021, for belief in a controlling god; Shin & Preston, 2019, for stewardship belief). The belief in a controlling god posits that God is the agent (e.g., lord or master) who exerts powerful control over the world and intervenes in affairs of humans (e.g., Isaiah 40:23; Romans 9:15–16; Qur'an 16:70). Indeed, belief in such an omnipotent and intervening god is prevalent across many religions (Norenzayan et al., 2016). Stewardship refers to the roles of humankind as stewards who are responsible to take care of the world created by a god. For example, Christianity highlights God's ownership for the world and all living things and his command for

humans to look after it (e.g., Genesis 2:15; Leviticus 25:23; Psalm 24:1) (Hall, 1990). Similar teachings also appear in Islam, emphasizing that humans are *khala'ifa* (successors and stewards) upon the earth that Allah created (e.g., Qur'an 6:165; 2:60) (Saniotis, 2012).

Although both beliefs of stewardship and controlling god share the belief that a god has ultimate governance over the world, only stewardship belief accepts human responsibility to take care of the world according to a god's will. Belief in a controlling god accepts strong determinism by god's plan, so there is little room for human accountability over the world. With stewardship belief, people deem humans as stewards who have a responsibility to look after the world bestowed by a god, including the natural environment. Religious stewardship is positively associated with pro-environmental beliefs and behaviors (e.g., Leary et al., 2016). For example, Sherkat and Ellison (2007) found that those with stronger religious stewardship beliefs perceived environmental problems, such as global warming and pollution, as more serious and reported greater willingness to sacrifice for the environment. Research also shows that a secular form of stewardship of nature that does not involve religious concepts is positively associated with pro-environmental behaviors (Braitto et al., 2017).

In contrast, belief in a controlling god leads people to think that a god determines what happens in the world. Research suggests that belief in an external control decreases a sense of personal control over outcomes (Kay et al., 2008). Accordingly, people may view that a god is in charge of all the matters in the end, including environmental problems. When misdeeds are attributed to external rather than internal factors, the wrongdoers are less likely to be blamed (Cullen et al., 1985; Richardson & Campbell, 1982; Stroessner & Green, 1990). Given this, people who believe in a controlling god may feel relatively free from environmental responsibility. One study showed that representing a god as authoritarian, which is related to the concept of a controlling god, was associated with lower perceived importance of preserving nature and animals (Johnson et al., 2017). When people hold beliefs in external sources of control, such as belief in fate (Chan & Tam, 2021) and belief in scientific progress (Meijers & Rutjens, 2014), they also hold weaker pro-environmental orientations. These findings suggest that belief in potent external determinants often undermines pro-environmental motivation.

Despite their close conceptual relevance, no research to date has systematically examined the potentially opposing roles that stewardship belief and belief in a controlling god play in relation to environmental behavior and the psychological mechanisms explaining their influence. Based on our reasoning that stewardship belief and belief in a controlling god have contrasting implications for human responsibility to the world, we propose environmental guilt as a psychological mediator that unifies the opposing effects involving stewardship belief vs. belief in a controlling god. Guilt is an emotion that primarily results from a sense of responsibility for harmful actions (Ellsworth & Smith, 1988; Izard, 1977; Wohl et al., 2006; Zeelenberg & Breugelmans, 2008) and a key element within many religions used as a motivational tool for the religious to maintain their spirituality and morality in particular (Narromore, 1974). Importantly, research shows that environmental guilt is an important emotional driver of pro-environmental actions (Ferguson & Branscombe, 2010; Kaiser & Shimoda, 1999; Rees et al., 2015; Tam, 2019). Taken together, we hypothesized that stewardship belief and belief in a controlling god predict environmental guilt in opposite ways (i.e., stewardship belief positively versus belief in a controlling god negatively), and this guilt, in turn, predicts individuals' pro-environmental support (see Fig. 1 for the hypothesized model).

We designed three studies to test this mediation model. In Studies 1 and 2, we used correlational data. In Study 3, we took an experimental approach to examine how the influence of the two contradictory beliefs shifts according to situational primes. Although religious people hold both stewardship belief and belief in a controlling god within themselves, their relative salience varies at any given time and thus, the more salient belief is likely to shape one's environmental action more

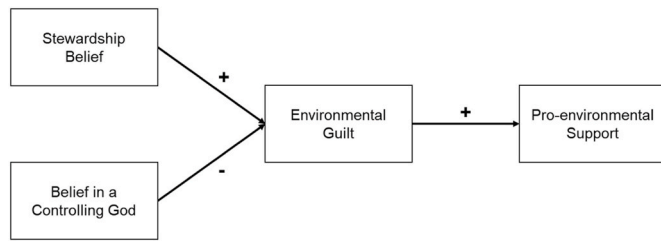


Fig. 1. Hypothesized mediation model.

powerfully in the moment. No studies to date have examined such a dynamic between the two beliefs.

We examined concrete behavioral outcomes, including signing up for volunteering and petition and donating for environmental causes. In this way, we advance the previous studies on the relationship between either stewardship belief or beliefs about a god and environmentalism that used self-report measures of environmental attitudes or behaviors. In our analyses, political identification was included as a covariate based on our examination of its correlations with our key variables.<sup>1</sup> Given the religious nature of the key constructs, our samples consisted of Christians in the U.S. We will visit the issue of generalizability of the findings in the general discussion. Our research adheres to the APA ethical principles and ethical code of conduct for research with human participants. The materials and the data of all studies are publicly available at the Open Science Framework: <https://osf.io/sbq4x/>.

## 2. Study 1

Study 1 aimed to find initial evidence supporting our hypothesized model. We measured stewardship belief, belief in a controlling god, and environmental guilt using scale items. For the outcome measure, we examined the extent to which participants signed up for local pro-environmental organizations and their initiatives.

### 2.1. Participants

Using G\*Power, we conducted an a priori power analysis. For each path composing the hypothesized model (Fig. 1), we assumed its size to be small-to-medium ( $f^2 = 0.08$ ). The power analysis results showed that approximately 100 participants were required to achieve 80% power ( $\alpha = 0.05$ ). For indirect effects with the paths of small-to-medium effect sizes, it has been demonstrated that a sample size of 159 is required (80% power,  $\alpha = 0.05$ ) (Fritz & MacKinnon, 2007). Thus, with 159 as a minimum in mind, we ran the study for two full academic terms to ensure sufficient power. As a result, 243 undergraduate students (90 males, 152 females, and 1 other;  $M_{age} = 18.81$ ,  $SD_{age} = 2.78$ , 4 did not report age) from a Christian college in California participated in the study (religiosity level:  $M = 5.15$ ,  $SD = 1.50$  on a 7-point scale from 1 = *not at all religious* to 7 = *very much religious*). Participants received course credit for their participation. The largest ethnic group was White (67.1%) followed by Hispanic (10.3%), Asian (8.2%), other (7.4%), Black (4.9%), Native Pacific Islander (1.2%), and Native American (0.8%). The median family income bracket was between \$75,001 and \$100,000.

<sup>1</sup> The results for the main mediation model remained consistent when this covariate was excluded. The key pattern of the results also remained consistent when we controlled for other demographic variables, such as age, gender, income, education, and ethnicity. See the supplemental materials for these results.

<sup>2</sup> We conducted one factor confirmatory factor analysis for measures of environmental guilt in our studies. The results showed that all the three items had significant loadings onto a single factor. Specific results are reported in the supplemental materials.

## 2.2. Measures

### 2.2.1. Stewardship belief

We measured stewardship belief by using two items: (1) “Human beings should respect nature because it was created by God,” and (2) “We, as stewards of God, have a responsibility to take good care of the Earth and life in it” (1 = *strongly disagree* to 7 = *strongly agree*). We took the first item from Sherkat and Ellison (2007) and created the second item based on the conceptual definition of stewardship belief. We used this brief 2-item measure due to the lack of commonly used and well-validated stewardship scales in the relevant literature, and also because we wanted to keep the survey length short considering the relatively low attention span of participants online. We generated a composite by averaging the scores across the two items ( $M = 6.16$ ,  $SD = 1.02$ ;  $r = 0.85$ ,  $p < .001$ ). Higher scores indicated higher stewardship belief.

### 2.2.2. Belief in a controlling god

We used a four-item scale (from Eom et al., 2021) to measure how strongly people believed that a god is in control of the events in the world. The items were as follows: (1) “God is in complete control of the events happening within our college,” (2) “Every single event that occurs in this world unfolds according to God’s plan,” (3) “There are things in the world that often occur without God’s control” (reverse), and (4) “The life of every creature is determined by God’s pre-existing plan” (1 = *strongly disagree* to 7 = *strongly agree*). The scores of four items were averaged as a composite ( $M = 4.76$ ,  $SD = 1.35$ ;  $\alpha = 0.77$ ). Higher scores indicated stronger belief in a controlling god.

### 2.2.3. Environmental guilt

We measured how strongly people felt guilt about humans producing greenhouse gases by using three items (from Ferguson & Branscombe, 2010): (1) “I feel guilty that humans today produce greenhouse gas emissions (by driving automobiles, consuming electricity, etc.),” (2) “I feel regretful that humans today produce greenhouse gas emissions,” and (3) “I feel remorseful that humans today produce greenhouse gas emissions” (1 = *not at all* to 5 = *extremely*). The scores of three items were averaged into a composite ( $M = 3.11$ ,  $SD = 0.99$ ;  $\alpha = 0.90$ ). Higher scores indicated higher guilt.<sup>2</sup>

### 2.2.4. Support for pro-environmental organizations

We asked participants to sign up to be involved in various initiatives from local non-profit organizations (a method adapted from Sasaki et al., 2013). Participants were first asked to enter their email addresses to be potentially contacted by local organizations for involvement opportunities. Then, participants were given a list of six real local organizations (their titles, logos, and basic information). Four of them were environmental organizations and two of them were non-environmental organizations (e.g., charity for poverty) as fillers. For each organization, participants were instructed to check yes or no for each of the four given options according to their interest: Whether or not they (1) would like to be contacted by the organization with more information about their initiatives, (2) would like to be contacted by the organization when there is a volunteer opportunity, (3) would be willing to donate to the organization, and (4) would sign a petition to support the organization. For the last option, participants were told that if they signed the petition, their names would be shown in the list of supporters on the organization’s webpage and in the documents used to ask for funding from the government and donors. We summed the number of yes responses (for environmental organizations only) to generate an index of pro-environmental support ( $M = 3.80$ ,  $SD = 4.11$ ). In reality, participants’ responses were not given to any of the organizations. Participants were fully debriefed about this deception after participation.

2.3. Results

Table 1 presents means and standard deviations of the key variables and bivariate correlations between them.<sup>3</sup>

To test our hypothesized model, we conducted a path analysis in which we entered stewardship belief and belief in a controlling god as predictors, environmental guilt as the mediator, and support for pro-environmental organizations as the outcome. We included the direct paths from stewardship belief and belief in a controlling god to the outcome. We controlled for the effects of political identification (1 = *strongly Democrat* to 7 = *strongly Republican*;  $M = 4.32$ ,  $SD = 1.54$ ) on environmental guilt and support for pro-environmental organizations. Political identification was correlated with both variables:  $r = -0.293$ ,  $p < .001$  with environmental guilt;  $r = -0.154$ ,  $p = .017$  with support for pro-environmental organizations. Fig. 2 presents the results of the model.<sup>4</sup>

The results showed that higher stewardship belief was associated with higher environmental guilt,  $\beta = .307$ ,  $b = 0.297$ ,  $SE = 0.059$ ,  $z = 5.05$ ,  $p < .001$ , 95% CI of  $b = [0.182, 0.413]$ . In contrast, stronger belief in a controlling god was associated with lower environmental guilt,  $\beta = -0.140$ ,  $b = -0.104$ ,  $SE = 0.045$ ,  $z = -2.30$ ,  $p = .021$ , 95% CI of  $b = [-0.193, -0.015]$ . Environmental guilt in turn positively predicted support for pro-environmental organizations,  $\beta = 0.179$ ,  $b = 0.744$ ,  $SE = 0.276$ ,  $z = 2.70$ ,  $p = .007$ , 95% CI of  $b = [0.203, 1.285]$ .

Furthermore, the indirect path between stewardship belief and support for pro-environmental organizations via environmental guilt was significant,  $\beta = .055$ ,  $b = 0.221$ ,  $SE = 0.093$ ,  $z = 2.38$ ,  $p = .017$ , 95% CI of  $b = [0.039, 0.403]$ . The indirect path between belief in a controlling god and support for pro-environmental organizations via environmental guilt was marginally significant,  $\beta = -0.025$ ,  $b = -0.078$ ,  $SE = 0.044$ ,  $z = -1.75$ ,  $p = .080$ , 95% CI of  $b = [-0.164, 0.009]$ . Stewardship belief was also directly associated with support for pro-environmental organizations,  $\beta = .234$ ,  $b = 0.941$ ,  $SE = 0.265$ ,  $z = 3.55$ ,  $p < .001$ , 95% CI of  $b = [0.422, 1.461]$ . In contrast, the direct path between belief in a controlling god and support for pro-environmental organizations was not significant,  $\beta = -0.026$ ,  $b = -0.080$ ,  $SE = 0.196$ ,  $z = -0.41$ ,  $p = .681$ , 95% CI of  $b = [-0.464, 0.303]$ .

In line with the correlations above, political identification (higher, more strongly Republican) was significantly negatively associated with both environmental guilt,  $\beta = -0.313$ ,  $b = -0.201$ ,  $SE = 0.038$ ,  $z =$

Table 1

Means and standard deviations of the variables and bivariate correlations between them in Study 1.

	<i>M (SD)</i>	1	2	3	4
1. Stewardship belief	6.16 (1.02)	-			
2. Belief in a controlling god	4.76 (1.35)	.244***	-		
3. Environmental guilt	3.11 (0.99)	.221***	-.091	-	
4. Support for pro-environmental organizations	3.80 (4.11)	.249***	-.036	.260***	-

\*\*\* $p < .001$ .

<sup>3</sup> We examined how stewardship belief and belief in a controlling god were correlated with religiosity across the studies. Supporting the idea that these beliefs indicate high religiosity, we found positive correlations. Study 1:  $r = 0.367$  for stewardship belief and  $r = 0.421$  for belief in a controlling god; Study 2:  $r = 0.541$  for stewardship belief and  $r = 0.540$  for belief in a controlling god; and Study 3:  $r = 0.437$  for stewardship belief and  $r = 0.492$  for belief in a controlling god. All the correlations were significant ( $ps < .001$ ).

<sup>4</sup> The associations in the key paths in the model were not moderated by the levels of religiosity (i.e., no significant interaction with religiosity).

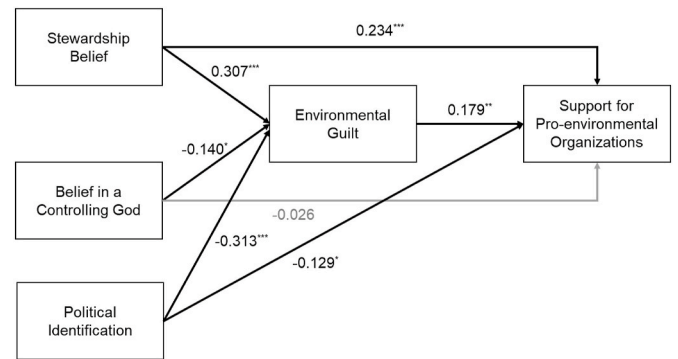


Fig. 2. Path model results of the associations between stewardship belief, belief in a controlling god, and support for pro-environmental organizations through environmental guilt, controlling for political identification in Study 1. Note. Standardized path coefficients are shown. Black lines represent significant paths ( $p < .05$ ) and the grey line represents a non-significant path ( $p > .05$ ). \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

$-5.26$ ,  $p < .001$ , 95% CI of  $b = [-0.276, -0.126]$ , and support for pro-environmental organizations,  $\beta = -0.129$ ,  $b = -0.343$ ,  $SE = 0.173$ ,  $z = -1.99$ ,  $p = .047$ , 95% CI of  $b = [-0.682, -0.005]$ .

2.4. Discussion

Study 1 provided the initial evidence supporting our hypothesis. We found that stewardship belief and belief in a controlling god were associated with environmental guilt in opposite directions, although they were positively correlated as markers of religiosity, and environmental guilt in turn predicted greater behavioral commitment to environmental sustainability (i.e., signing up to support pro-environmental organizations). These findings suggest that the two beliefs of stewardship and a controlling god, which are commonly held by religious people, have opposing implications for people’s emotion and behavior toward environmental sustainability. However, the sample of Study 1, which was relatively young, educated and affluent, and lived in California, one of the most pro-environmental states in the U.S., may limit the generalizability of the findings. Study 2 was designed to address this issue.

3. Study 2

In Study 2, we aimed to demonstrate the robustness of the initial findings in Study 1. We tested our proposed model using a large U.S. Christian sample with greater diversity in age, education and income level, and geolocation. As in Study 1, we measured stewardship belief, belief in a controlling god, and environmental guilt by using scale items. For the outcome measure, we examined the extent to which participants supported pro-environmental governmental policies.

3.1. Participants

To test the model with high statistical power, we aimed to recruit 1000 Christians in the U.S. We posted our study seeking Christians in the U.S. on Amazon Mechanical Turk using CloudResearch, a crowdsourcing data acquisition platform (<https://www.cloudresearch.com/>). 1179 participants completed our study. We excluded non-Christians ( $n = 99$ ) based on their reported religion in the survey and those who failed our

attention check item<sup>5</sup> ( $n = 11$ ). As a result, 1069 Christians (440 males, 628 females, and 1 other;  $M_{age} = 42.29$ ,  $SD_{age} = 27.07$ ; 448 Protestants, 329 Catholics, and 292 other Christians) were used as a final sample in the analysis (religiosity level:  $M = 4.83$ ,  $SD = 1.70$  on a 7-point scale from 1 = *not at all religious* to 7 = *very much religious*). The largest ethnic group was White (74.0%) followed by Black (13.6%), Asian (5.9%), Hispanic (4.6%), Other (1.3%), and Native American (0.7%). The median family income bracket was between \$50,001 and \$75,000. The median highest education level was a bachelor's degree.

3.2. Measures

3.2.1. Stewardship belief and belief in a controlling god

We used the same items used in Study 1. As in Study 1, we generated a composite for each variable by averaging the scores of the corresponding items. Higher scores indicated higher stewardship belief (1 = *strongly disagree* to 7 = *strongly agree*;  $M = 6.00$ ,  $SD = 1.17$ ;  $r = 0.82$ ,  $p < .001$ ) or higher belief in a controlling god (1 = *strongly disagree* to 7 = *strongly agree*;  $M = 4.60$ ,  $SD = 1.65$ ;  $\alpha = 0.86$ ).

3.2.2. Environmental guilt

We made a minor modification in the prompt. In Study 1, we asked participants to report their guilt specifically about humans producing greenhouse gases. A proper understanding of the implications of greenhouse gases for the environment requires background knowledge, and our participants might have had varying knowledge in that subject. Thus, in Study 2, we used more general wording by asking participants to report felt guilt about environmental problems: "When thinking about environmental problems occurring now (e.g., climate change, air and water pollution, deforestation, loss of biodiversity, etc.) ...," (1) I feel guilty, (2) I feel regretful, and (3) I feel remorseful (1 = *not at all* to 5 = *extremely*). The ratings of the three items were averaged into a composite ( $M = 2.87$ ,  $SD = 1.2$ ;  $\alpha = 0.92$ ).

3.2.3. Pro-environmental policy support

We measured how strongly participants supported pro-environmental governmental policies as the outcome variable. Participants reported how much they supported or opposed a series of six environmental policies (items used in Ding et al., 2011), such as "regulating carbon dioxide as a pollutant," "adding a surcharge to electrical bills to establish a fund to help make buildings more energy efficient and to teach U.S. citizens how to reduce energy use," and "providing tax rebates for people who purchase energy-efficient vehicles or solar panels" (1 = *strongly oppose* to 4 = *strongly support*). We averaged the scores of the six items to generate a composite ( $M = 2.75$ ,  $SD = 0.67$ ;  $\alpha = 0.83$ ). Higher numbers indicated stronger support.

3.3. Results

Table 2 presents means and standard deviations of the key variables and bivariate correlations between them.

As in Study 1, we tested our mediation model in a path analysis. We entered stewardship belief and belief in a controlling god as predictors, environmental guilt as the mediator, and support for pro-environmental policies as the outcome, including the direct paths from stewardship belief and belief in a controlling god to the outcome. Political identification (1 = *strongly Democrat* to 7 = *strongly Republican*;  $M = 4.09$ ,  $SD = 1.86$ ) was correlated with both environmental guilt ( $r = -0.205$ ,  $p <$

<sup>5</sup> In the measure of support for pro-environmental policies, we included an item "please select *support* for this item" for attention check. Those who did not give the proper response were excluded. We also used the tools provided in CloudResearch to improve the data quality: blocking duplicate IP addresses and suspicious geocode locations and verifying worker locations based on IP addresses.

Table 2

Means and standard deviations of the variables and bivariate correlations between them in Study 2.

	M (SD)	1	2	3	4
1. Stewardship belief	6.00 (1.17)	-			
2. Belief in a controlling god	4.60 (1.65)	.498***	-		
3. Environmental guilt	2.87 (1.22)	.075*	-.055 <sup>†</sup>	-	
4. Support for pro-environmental policies	2.75 (0.67)	.084**	-.067*	.472***	-

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , <sup>†</sup> $p < .10$ .

.001) and pro-environmental policy support ( $r = -0.407$ ,  $p < .001$ ), so its effects on the mediator and the outcome variable were controlled for. Fig. 3 presents the results of the path model.<sup>6</sup>

The results showed that higher stewardship belief was associated with higher environmental guilt,  $\beta = .144$ ,  $b = 0.151$ ,  $SE = 0.036$ ,  $z = 4.23$ ,  $p < .001$ , 95% CI of  $b = [0.081, 0.222]$ . In contrast, stronger belief in a controlling god was associated with lower environmental guilt,  $\beta = -0.090$ ,  $b = -0.067$ ,  $SE = 0.026$ ,  $z = -2.61$ ,  $p = .009$ , 95% CI of  $b = [-0.117, -0.017]$ . Environmental guilt in turn positively predicted support for pro-environmental policies,  $\beta = 0.393$ ,  $b = 0.215$ ,  $SE = 0.014$ ,  $z = 15.27$ ,  $p < .001$ , 95% CI of  $b = [0.188, 0.243]$ .

The indirect path between stewardship belief and support for pro-environmental policies via environmental guilt was significant,  $\beta = .057$ ,  $b = 0.033$ ,  $SE = 0.008$ ,  $z = 4.08$ ,  $p < .001$ , 95% CI of  $b = [0.017, 0.048]$ , as was the indirect path between belief in a controlling god and support for pro-environmental policies,  $\beta = -0.035$ ,  $b = -0.014$ ,  $SE = 0.006$ ,  $z = -2.57$ ,  $p = .010$ , 95% CI of  $b = [-0.025, -0.003]$ . Stewardship belief was directly associated with support for pro-environmental policies,  $\beta = .116$ ,  $b = 0.067$ ,  $SE = 0.017$ ,  $z = 3.99$ ,  $p < .001$ , 95% CI of  $b = [0.034, 0.099]$ . In contrast, the direct path between belief in a controlling god and support for pro-environmental policies was not significant,  $\beta = -0.043$ ,  $b = -0.017$ ,  $SE = 0.012$ ,  $z = -1.46$ ,  $p = .144$ , 95% CI of  $b = [-0.041, 0.006]$ .

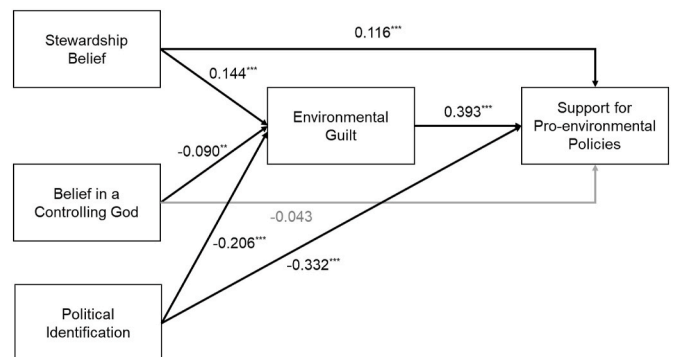


Fig. 3. Path model results of the associations between stewardship belief, belief in a controlling god, and support for pro-environmental policies through environmental guilt, controlling for political identification in Study 2

Note. Standardized path coefficients are shown. Black lines represent significant paths ( $p < .05$ ) and the grey line represents a non-significant path ( $p > .05$ ). \*\*\* $p < .001$ , \*\* $p < .01$ .

<sup>6</sup> The paths from belief in a controlling god to guilt and from guilt to policy support were not moderated by the levels of religiosity. The path from stewardship belief to guilt was stronger among more religious people (i.e., significant positive interaction between stewardship belief and religiosity on guilt,  $b = .044$ ,  $p = .037$ ).

In line with the correlations above, political identification (higher, more strongly Republican) was significantly negatively associated with both environmental guilt,  $\beta = -0.206$ ,  $b = -0.135$ ,  $SE = 0.020$ ,  $z = -6.82$ ,  $p < .001$ , 95% CI of  $b = [-0.174, -0.096]$ , and support for pro-environmental policies,  $\beta = -0.332$ ,  $b = -0.120$ ,  $SE = 0.009$ ,  $z = -12.81$ ,  $p < .001$ , 95% CI of  $b = [-0.138, -0.101]$ .

### 3.4. Discussion

In Study 2, we replicated the findings in Study 1 with a larger and demographically more diverse sample. Furthermore, using policy support as the outcome, Study 2 demonstrated that the proposed model was not confined to the specific outcome used in Study 1. We found that stewardship belief was positively associated with environmental guilt, whereas belief in a controlling god was negatively associated with environmental guilt. Environmental guilt in turn positively predicted support for pro-environmental policies. However, the correlational nature of Studies 1 and 2 did not allow for causal interpretations of the relationships found. Thus, we designed Study 3 with an experimental approach.

## 4. Study 3

In Study 3, we aimed to provide experimental evidence for the idea that stewardship belief and belief in a controlling god predict environmental guilt in opposite directions and environmental guilt in turn predicts pro-environmental support. We experimentally primed stewardship belief and belief in a controlling god and examined how these primed beliefs affected environmental guilt and pro-environmental support. For the outcomes, we examined support for pro-environmental policies as in Study 2 as well as a behavioral outcome: financial donation for environmental causes.

### 4.1. Participants

There were three experimental conditions (stewardship, controlling god, and control). We aimed to collect at least 200 participants in each condition. This was to ensure detecting small-to-medium size effects of increase (Cohen's  $d = 0.30$ ) in stewardship belief and belief in a controlling god by our manipulation, compared to the control condition, with 80% power. As in Study 2, we posted our study seeking Christians in the U.S. on Amazon Mechanical Turk using CloudResearch (<https://www.cloudresearch.com/>). We opened for 750 participants considering a number of non-Christians possibly collected as in Study 2 and those who might fail our attention check. 755 participants completed our study. We excluded non-Christians ( $n = 86$ ) and those who either failed our attention check item (the same item used in Study 2) or did not write the appropriate content in the writing task ( $n = 11$ ). As a result, 658 Christians (238 males and 420 females;  $M_{age} = 39.98$ ,  $SD_{age} = 12.81$ ; 271 Protestants, 197 Catholics, and 190 other Christians) were used as a final sample in the analysis (religiosity level:  $M = 4.83$ ,  $SD = 1.62$  on a 7-point scale from 1 = *not at all religious* to 7 = *very much religious*). The largest ethnic group was White (74.5%) followed by Black (11.6%), Hispanic (5.8%), Asian (4.9%), Other (1.8%), Native American (1.2%), and Native Pacific Islander (0.3%). The median family income bracket was between \$50,001 and \$75,000. The median highest education level was a bachelor's degree.

### 4.2. Measures and materials

#### 4.2.1. Manipulation materials

Participants were randomly assigned to one of the three conditions: (1) stewardship ( $n = 214$ ), (2) controlling god ( $n = 213$ ), or (3) control condition ( $n = 231$ ). Participants in the stewardship condition read an article contending that humans are stewards of God's creation and taking care of the environment is a religious duty. Participants in the

controlling god condition read an article describing that God is the ultimate controller of the world and everything occurs under his plan. In both articles, relevant Bible verses were included to bolster the arguments, such as "They will neither harm nor destroy on all my holy mountain, for the earth will be full of the knowledge of the LORD as the waters cover the sea" (Isaiah 11:9) for the stewardship condition and "The day is yours, and yours also the night; you established the sun and moon. It was you who set all the boundaries of the earth; you made both summer and winter" (Psalm 74:16–17) for the controlling god condition.

Participants in the control condition read an article unrelated to religion which discussed Pluto's status as a planet, specifically why it was downgraded to a dwarf planet and how people reacted to the change. The articles for the controlling god condition and the control condition were adapted from Laurin et al. (2012), and the article for the stewardship condition was adapted from Shin and Preston (2019). After reading the assigned article, participants briefly summarized it. This summary task was used to check if participants properly went through the experimental material. As indicated earlier, those whose responses were irrelevant to the assigned articles were excluded.

#### 4.2.2. Stewardship belief

We used the same two items used in Studies 1 and 2. Higher scores indicated higher stewardship belief (1 = *strongly disagree* to 7 = *strongly agree*;  $M = 6.09$ ,  $SD = 1.19$ ;  $r = 0.76$ ,  $p < .001$ ).

#### 4.2.3. Belief in a controlling god

In Study 3, we replaced two items from Studies 1 and 2 with items directly asking about a god's control over the environment to make it more comparable to stewardship belief. Accordingly, we used the following four items: (1) "God is in complete control of the events happening in the world," (2) "Every single event that occurs in this world unfolds according to God's plan," (3) "Environmental changes on the Earth take place under God's plan," and (4) "God controls the climate and its change" (1 = *strongly disagree* to 7 = *strongly agree*). The four items were highly intercorrelated ( $\alpha = 0.92$ ). Thus, we combined them into a composite by averaging the scores ( $M = 4.64$ ,  $SD = 1.75$ ).

#### 4.2.4. Environmental guilt

We used the same three items as in Study 2 to measure environmental guilt. Higher scores indicated higher guilt about environmental problems (1 = *not at all* to 5 = *extremely*;  $M = 3.04$ ,  $SD = 1.19$ ;  $\alpha = 0.92$ ).

#### 4.2.5. Pro-environmental policy support

We used the same six items as in Study 2 to measure support for pro-environmental policies. We averaged the scores to generate a composite (1 = *strongly oppose* to 4 = *strongly support*;  $M = 2.79$ ,  $SD = 0.66$ ;  $\alpha = 0.83$ ). Higher numbers indicated stronger policy support.

#### 4.2.6. Donation

As a bonus for participation, we told participants that they would be entered into a lottery to win \$10. We then told them that they had the option to donate part of the bonus to a non-profit environmental advocacy organization, Natural Resources Defense Council (NRDC). We provided participants with brief information about the organization along with a link to their website. Participants indicated how much they would donate, from \$0 to \$10, if they won the \$10 bonus ( $M = 2.80$ ,  $SD = 2.80$ ). We used this donation amount as a measure of pro-environmental behavior (adapted from Zaval et al., 2015). A winner for the bonus was selected, and the amount of money that the winner indicated was sent to the organization.

### 4.3. Results

Table 3 presents means and standard deviations of the key variables and bivariate correlations between them.

We first explored between-condition differences in the key variables

**Table 3**

Means and standard deviations of the variables and bivariate correlations between them in Study 3.

	<i>M (SD)</i>	1	2	3	4	5
1. Stewardship belief	6.09 (1.19)	-				
2. Belief in a controlling god	4.64 (1.75)	.446***	-			
3. Environmental guilt	3.04 (1.19)	.125**	-.094*	-		
4. Support for pro-environmental policies	2.79 (0.66)	.108**	-.137***	.540***	-	
5. Donation	2.80 (2.80)	.115**	-.084*	.317***	.370***	-

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

by running a series of one-way ANOVAs. For stewardship belief, there was a significant main effect of the condition,  $F(2, 655) = 4.74, p = .009, \eta^2 = 0.014$ . Stewardship belief was higher in the stewardship condition ( $M = 6.18, SD = 1.02$ ) than in the control condition ( $M = 5.89, SD = 1.39$ ),  $p = .026$ . Unexpectedly, stewardship belief was also higher in the controlling god condition ( $M = 6.20, SD = 1.08$ ) than in the control condition,  $p = .019$ . There was no significant difference between the stewardship condition and the controlling god condition in stewardship belief,  $p = .993$ . For belief in a controlling god, there was a significant main effect of the condition,  $F(2, 655) = 7.73, p < .001, \eta^2 = 0.023$ . Belief in a controlling god was higher in the controlling god condition ( $M = 5.02, SD = 1.74$ ) than either in the control condition ( $M = 4.47, SD = 1.79$ ),  $p = .002$ , or in the stewardship condition ( $M = 4.44, SD = 1.65$ ),  $p = .002$ . There was no significant difference in belief in a controlling god between the control condition and the stewardship condition,  $p = .985$ . For environmental guilt, policy support, and donation, there was no significant condition difference. Thus, the experimental priming did not have direct main effects on these variables. The full results of these ANOVAs are reported in the supplemental materials.

Given that our primes did not directly change environmental guilt, nor the downstream outcome variables, we focused on examining indirect effects of the primes using measured stewardship belief and belief in a controlling god as mediators. Indirect effects inform psychological processes and therefore, analytic approaches focusing on indirect paths are valuable for theory building regardless of significance of total effects (see Rucker et al., 2011; Zhao et al., 2010). Thus, using a path analytic approach, we examined whether the prime changed participants' stewardship belief and belief in a controlling god and how these changes were associated with environmental guilt, which, in turn, might predict the two outcome variables.

We ran two path models, treating policy support or donation as the key outcome variable in each model. To represent experimental conditions, we created two dummy variables with the control condition as the reference group. The first dummy contrasted the stewardship condition with the control condition, and the second dummy contrasted the controlling god condition with the control condition. The direct links from dummy variables to environmental guilt and the outcome variables were omitted given no between-condition differences in those variables. As in previous models in this paper, we included the direct paths from stewardship belief and belief in a controlling god to the outcome variables. Political identification (1 = *strongly Democrat* to 7 = *strongly Republican*;  $M = 4.03, SD = 1.81$ ) significantly correlated with belief in a controlling god ( $r = 0.170, p < .001$ ), environmental guilt ( $r = -0.281, p < .001$ ), support for pro-environmental policies ( $r = -0.435, p < .001$ ), and donation ( $r = -0.119, p = .002$ ), but not with stewardship belief ( $r = 0.004, p = .917$ ). Political identification was controlled for in the models accordingly.

The results from the model with policy support as the outcome variable showed a good model fit: comparative fit index = 1.00, root-mean-square error of approximation (RMSEA) < 0.001,  $\chi^2(5) = 1.30$ ,

standardized root-mean-square-residual (SRMR) = 0.009 (see Hooper et al., 2008; Hu & Bentler, 1999; Kline, 2015 for model fit guidelines). Fig. 4 presents the results of the path model.<sup>7</sup> The stewardship prime increased participants' stewardship belief, as compared to the control condition,  $\beta = .115, b = 0.291, SE = 0.112, z = 2.60, p = .009, 95\% CI$  of  $b = [0.071, 0.510]$ . The increase in stewardship belief was associated with higher environmental guilt,  $\beta = .186, b = 0.186, SE = 0.041, z = 4.50, p < .001, 95\% CI$  of  $b = [0.105, 0.268]$ . The indirect effect of the stewardship prime on environmental guilt through reported stewardship belief was significant,  $\beta = .021, b = 0.054, SE = 0.024, z = 2.25, p = .024, 95\% CI$  of  $b = [0.007, 0.101]$ .

The controlling god prime increased participants' belief in a controlling god, as compared to the control condition,  $\beta = 0.153, b = 0.570, SE = 0.162, z = 3.53, p < .001, 95\% CI$  of  $b = [0.253, 0.887]$ . The increase in belief in a controlling god was associated with lower environmental guilt,  $\beta = -0.132, b = -0.090, SE = 0.029, z = -3.16, p = .002, 95\% CI$  of  $b = [-0.146, -0.034]$ . The indirect effect of the controlling god prime on environmental guilt through reported belief in a controlling god was significant,  $\beta = -0.020, b = -0.052, SE = 0.022, z = -2.35, p = .019, 95\% CI$  of  $b = [-0.094, -0.009]$ .

In turn, environmental guilt positively predicted support for pro-environmental policies,  $\beta = 0.436, b = 0.243, SE = 0.018, z = 13.49, p < .001, 95\% CI$  of  $b = [0.207, 0.278]$ . As noted above, unexpectedly, the controlling god prime also increased stewardship belief, as compared to the control condition,  $\beta = .119, b = 0.303, SE = 0.112, z = 2.71, p = .007, 95\% CI$  of  $b = [0.084, 0.523]$ .

Furthermore, stewardship belief and belief in a controlling god predicted support for pro-environmental policies via environmental guilt. The indirect path between stewardship belief and support for pro-environmental policies via environmental guilt was significant,  $\beta = .081, b = 0.045, SE = 0.011, z = 4.27, p < .001, 95\% CI$  of  $b = [0.024, 0.066]$ , as was the indirect path between belief in a controlling god and support for pro-environmental policies via environmental guilt,  $\beta = -0.058, b = -0.022, SE = 0.007, z = -3.08, p = .002, 95\% CI$  of  $b = [-0.036, -0.008]$ . Both direct paths between stewardship belief and support for pro-environmental policies,  $\beta = .094, b = 0.053, SE = 0.019, z = 2.71, p = .007, 95\% CI$  of  $b = [0.015, 0.091]$ , and between belief in a controlling god and support for pro-environmental policies,  $\beta = -0.088, b = -0.033, SE = 0.013, z = -2.52, p = .012, 95\% CI$  of  $b = [-0.059, -0.007]$ , were significant.

Political identification (higher, more strongly Republican) positively predicted belief in a controlling god, and negatively predicted environmental guilt and support for pro-environmental policies.

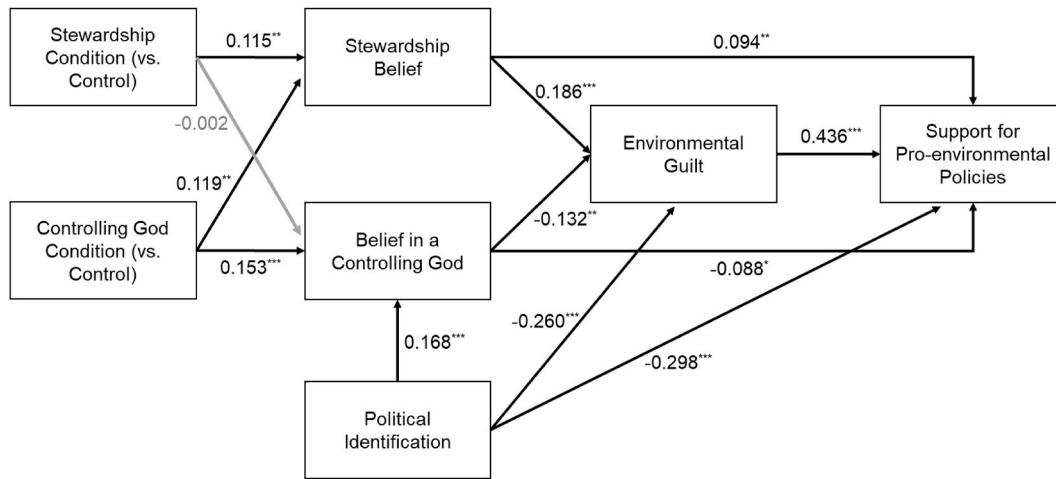
The results from the model with financial donation as the outcome variable were highly consistent. It showed a good model fit: comparative fit index = 1.00, root-mean-square error of approximation (RMSEA) < 0.001,  $\chi^2(5) = 3.29$ , standardized root-mean-square-residual (SRMR) = 0.012. Fig. 5 presents the results of the path model.<sup>8</sup> The paths until environmental guilt were identical to the results with policy support, so we do not reiterate them.

We found that environmental guilt positively predicted the donation (i.e., the amount of money donated),  $\beta = 0.285, b = 0.667, SE = 0.091, z = 7.34, p < .001, 95\% CI$  of  $b = [0.489, 0.846]$ . Environmental guilt also mediated the link between stewardship belief and donation as well as the link between belief in a controlling god and donation. The indirect path between stewardship belief and donation via environmental guilt was significant,  $\beta = .053, b = 0.124, SE = 0.032, z = 3.84, p < .001, 95\% CI$  of  $b = [0.061, 0.188]$ , as was the indirect path between belief in a controlling god and donation via environmental guilt,  $\beta = -0.038, b =$

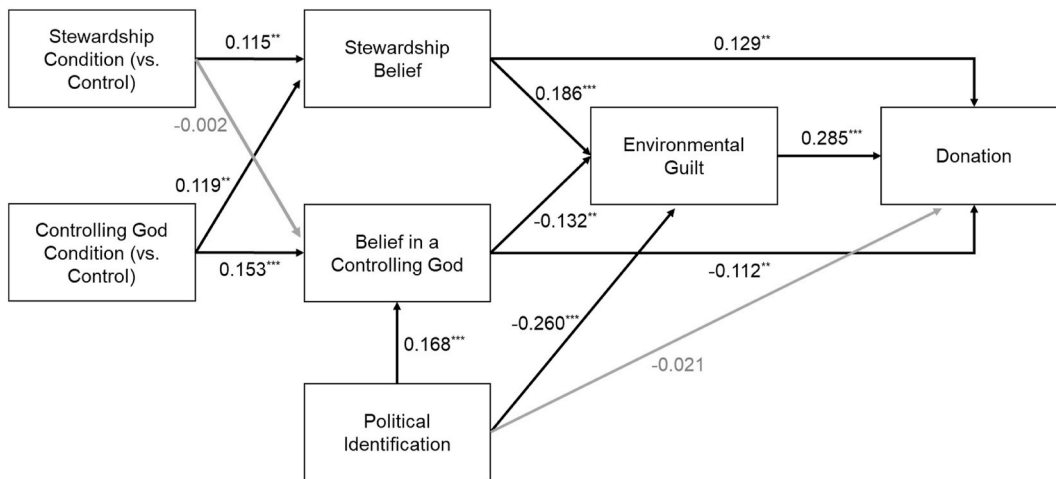
<sup>7</sup> We explored whether religiosity moderated the key paths in the hypothesized model (Fig. 1) and did not find any significant interactions with religiosity.

<sup>8</sup> Religiosity did not moderate any of the key paths in the hypothesized model (Fig. 1).





**Fig. 4.** Path model results with support for pro-environmental policies as the outcome variable, controlling for political identification in Study 3  
 Note. Standardized path coefficients are shown. Stewardship belief and belief in a controlling god were allowed to covary. Black lines represent significant paths ( $p < .05$ ) and the grey line represents a non-significant path ( $p > .05$ ). \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .



**Fig. 5.** Path model results with donation as the outcome variable, controlling for political identification in Study 3  
 Note. Standardized path coefficients are shown. Stewardship belief and belief in a controlling god were allowed to covary. Black lines represent significant paths ( $p < .05$ ) and grey lines represent non-significant paths ( $p > .05$ ). \*\*\* $p < .001$ , \*\* $p < .01$ .

-0.060,  $SE = 0.021$ ,  $z = -2.90$ ,  $p = .004$ , 95% CI of  $b = [-0.101, -0.020]$ . Both direct paths between stewardship belief and donation and between belief in a controlling god and donation were also significant,  $\beta = .129$ ,  $b = 0.303$ ,  $SE = 0.098$ ,  $z = 3.09$ ,  $p = .002$ , 95% CI of  $b = [0.111, 0.495]$  for the direct path from stewardship belief;  $\beta = -0.112$ ,  $b = -0.179$ ,  $SE = 0.067$ ,  $z = -2.66$ ,  $p = .008$ , 95% CI of  $b = [-0.310, -0.047]$  for the direct path from belief in a controlling god.

In contrast to the correlation reported above, political identification (higher, more strongly Republican) did not predict donation in this model including other predictors (i.e., stewardship belief, belief in a controlling god, and environmental guilt).

**4.4. Discussion**

By taking an experimental approach, Study 3 provided the consistent evidence for our proposed mediation model. Although our primes did not directly change environmental guilt and pro-environmental support, we found their significant indirect influence through changing participants' stewardship beliefs and controlling god beliefs. That is, exposure to the idea of stewardship as a religious duty increased stewardship belief, and the increase in stewardship belief was associated with higher

environmental guilt. In contrast, exposure to the idea of a controlling god increased belief in a controlling god, which was associated with lower environmental guilt. Environmental guilt, in turn, led to participants' greater support for environmental sustainability through policy support and donations.

In Studies 1 and 2, stewardship beliefs' associations with environmental guilt and environmental behavior were noticeably larger than belief in a controlling god's associations with these variables. In Study 3, we measured belief in a controlling god by including items specifically about god's control over the environment to make our key predictors more comparable. Consequently, belief in a controlling god, as compared with stewardship belief, had similar strengths of associations with environmental guilt and environmental behavior in Study 3. This finding suggests that depending on the specificity of the measured used (how specific the measures refer to the environment), the strengths of the effects of stewardship belief and belief in a controlling god can change in our model.

Unexpectedly, we found that the controlling god prime increased not only belief in a controlling god but also stewardship belief. We speculate that our material in the controlling god condition might remind people of a broad range of religious commandments. Specifically, a good

steward is an agent who understands that they are responsible to carry out a god's will and are accountable for their actions. Thus, being reminded of a controlling god or any types of gods may simultaneously remind one of stewardship. We note that similar priming methods have been used in research on belief about gods (e.g., Eom et al., 2021; Laurin et al., 2012). Our unexpected finding raises a possibility that the methods may prime multiple religious concepts beyond the targeted beliefs about gods. More systematic research will help understand what is activated in participants' minds by the primes.

## 5. General discussion

The present research examined the opposing effects of stewardship belief and belief in a controlling god on pro-environmental support via environmental guilt. Using correlational (Studies 1 and 2) and experimental (Study 3) data, we provided support for a mediation model where stewardship belief positively, whereas belief in a controlling god negatively, predicted environmental guilt, which, in turn, predicted greater pro-environmental support. Notably, these effects were demonstrated using attitudinal and behavioral measures that have a direct impact on social change towards sustainability, such as signing up to support environmental organizations (Study 1), supporting pro-environmental policies (Studies 2 and 3), and making monetary donations (Study 3).

### 5.1. Theoretical and pragmatic implications

The present research advances an understanding of how religiosity influences pro-environmentalism by focusing on the roles of stewardship beliefs and beliefs about god's control. Stewardship is about human responsibility to the world designated by a god, promoting pro-environmental attitudes and behaviors. Despite the fact that more religious people endorse stewardship more strongly, religiosity does not necessarily lead to greater pro-environmental engagement. As a complex system of beliefs, religion contains different beliefs that may enhance or counter each other. Previous work has identified other religious beliefs that suppress the positive influence of stewardship beliefs, such as dominion beliefs (i.e., belief that a god has given humans the right to rule over the natural world) (Shin & Preston, 2019). Our work extends previous research by identifying another religious belief—belief in a controlling god—that works in the opposite direction from stewardship beliefs. With the shared mechanism of environmental guilt, our research offers another framework for understanding the relation between religion and the environment.

Even after much research, no clear conclusion has been reached for the question of whether religiosity has a positive or negative influence on environmental attitudes and behaviors. The answer is more complex than might have been expected. As we found, those who believe in religion hold various worldviews, and some of these (e.g., stewardship belief) positively, while others (e.g., belief in a controlling god) negatively, affect pro-environmental tendencies. Moreover, as shown in Study 3, situational factors can shift which view is more salient in one's mind, influencing one's support for environmental actions (see also Schuld et al., 2017). Thus, despite the common stereotype of religious people being less environmentally friendly in the U.S. (Pearson et al., 2018), the influence of religion itself is not inherently anti-environmental. Religion contains both elements that can foster and hinder pro-environmental support (Preston and Baimel, 2021 for a relevant discussion).

The present research also fills the scant literature on affective processes connecting religious beliefs and environmental action. Future research should extend the current work by investigating more diverse emotional processes. For example, recognizing vastness and omniscience of a god may inspire awe, in particular among highly religious individuals (Krause & Hayward, 2015), and this may lead to greater pro-environmental engagement. Awe has been identified as an

emotional state that increases pro-environmental behavior (Yang et al., 2018; Zhao et al., 2018).

Lastly, the current research addresses the need for more research on how cultural factors shape the psychology of environmental action (see Clayton et al., 2016; Eom et al., 2019; Pearson et al., 2016 for relevant discussions). Much of the existing research has focused on identifying relatively proximal psychological factors, such as attitudes, beliefs, and emotions regarding environmental problems, to explain environmental behavior. By showing that worldviews associated with religion shape guilt regarding environmental problems, our findings suggest that those proximal psychological factors are under the influence of cultural factors. As no behavior takes place in a cultural vacuum, how individuals respond to environmental problems is culturally patterned (Eom et al., 2016; Milfont & Schultz, 2016; Sherman et al., 2021; Tam & Milfont, 2020). Incorporating cultural factors and examining the specific roles of cultural values, worldviews, and norms would advance the current understanding of the psychology of environmental action.

### 5.2. Limitations and future research directions

We note some limitations and intriguing questions for future work. First, our sample included only Christians in the U.S. The notions of an intervening god and stewardship for the natural environment are found in many religions across the world (Chuvieco, 2012; Norenzayan et al., 2016; Saniotis, 2012). Thus, we believe that the current findings may apply beyond the context of U.S. Christianity. We note, though, that there are religions without a strong notion of a god or a supernatural agent, such as Buddhism (Southwold, 1978). In such non-theist religions, belief in a controlling god is not typically found, and the concept of environmental responsibility may not necessarily involve a duty endowed by a god.

Nevertheless, our model can still help formulate predictions, such that religions without the notion of a controlling god, but with an emphasis on environmental responsibility, may help promote pro-environmental support. Consistent with this idea, some research found that Buddhists show greater engagement in pro-environmental behavior than Christians or Atheists (Minton et al., 2015; see also Du et al., 2014, for positive influence of Buddhism on pro-environmental practices in firms). Future research should examine whether the current model applies beyond the context of U.S. Christianity. Cross-religion differences in the concept of environmental responsibility and its implications for environmental attitudes and behaviors are also intriguing areas for future research.

Second, our findings do not preclude other causal models among the variables in the current research. In particular, we note that the mediator, environmental guilt, was not directly manipulated in our studies. We think that environmental guilt leading to pro-environmental support is more plausible than the other way round given that we consistently found positive correlations between guilt and environmental support. If the directionality was reversed (i.e., pro-environmental support precedes guilt), we should have found negative correlations because engaging in pro-environmental behavior likely decreases, rather than increases, environmental guilt. Nevertheless, it is possible that other variables may underlie the correlation between environmental emotions and pro-environmental support and thus, caution should be exercised in causal interpretations (Pirlott & MacKinnon, 2016).

Third, the two key predictors in our research may not be fully comparable in their conceptual levels of specificity. Belief in a controlling god is a more general belief about the nature of a god, whereas stewardship belief is a more specific and prescriptive belief about human responsibilities to society and the environment. This may explain the unexpected finding in Study 3 where the controlling god prime increased not only belief in a controlling god but also stewardship belief. That is, the implication of belief in a controlling god may be quite generalized, and could be associated with a range of specific religious beliefs, such as stewardship belief. Our intention was to present a

contrasting case of two beliefs that are commonly held by highly religious people but are theorized to work in the opposite directions. We recognize that beyond the beliefs addressed in the present research, there are other religious beliefs that may facilitate (e.g., purity concerns and supernatural punishment beliefs) and hinder (e.g., just-world beliefs and fundamentalist thinking style) pro-environmental action (see [Pres-ton & Baimel, 2021](#)) and that there is a hierarchical structure among religious beliefs. It would be useful for future work to explicitly examine the hierarchical processes in which various religious beliefs across different levels shape individuals' pro-environmental actions.

Lastly, although we focus on environmental guilt as a key mediator, other processes may also play roles. In particular, we consistently found that the direct association between stewardship belief and pro-environmental support was still significant taking into account the role of environmental guilt. Given this, guilt may not be the only factor explaining the effect of stewardship. For example, religious people with stewardship belief may assume strong social approval of pro-environmental behavior (or disapproval of anti-environmental behavior) from their religious community. These perceived social norms may be another reason why people with stewardship belief are motivated to support pro-environmental actions. Future work can extend the present research to explore more diverse psychological processes that explain the relation between stewardship and pro-environmental action.

## 6. Conclusion

Religion is a complex system encompassing various beliefs and worldviews. As exemplified in the quotes opening this article, these different beliefs can offer ideological bases for both pro- and anti-environmental perspectives. The present research demonstrated how stewardship belief and belief in a controlling god can lead religious individuals to respond to environmental issues in contrasting ways. Our findings highlight the importance of understanding the ways various religious beliefs, co-existing in the minds of the religious, affect environmental attitudes and behaviors. These findings offer insights into how to leverage religion, an important part of the lives of numerous individuals across the world, to address urgent environmental challenges.

## Author statement

Kimin Eom: Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft, Writing - Review & Editing, Visualization, Supervision, Funding acquisition. Tricia Qian Hui Tok: Writing - Review & Editing, Visualization. Carmel S. Saad: Methodology, Investigation, Writing - Review & Editing. Heejung S. Kim: Conceptualization, Methodology, Writing - Review & Editing, Supervision.

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## Appendix A. Supplementary data

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