Ecospirituality: The Psychology of Moral Concern for Nature

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Abstract

People across time and cultures have often conceived of nature, and humanity's connection to it, as essentially spiritual. Yet the psychological literature about this "ecospiritual" orientation has been meager. In eight samples, recruited from the USA, Canada, UK, and Singapore (Total N = 8,795), we investigated the relationship between ecospirituality and moral concern for nature. We developed and validated an 8-item measure of ecospirituality for this purpose. Ecospirituality, over and above environmental attitudes, environmentalist identity, and political orientation, uniquely predicted several aspects of moral concern for nature, such as including nature in one's moral circle, treating nature as a sacred value, and endorsing a reasoning style that places importance on principles and duties to nature. This reasoning style was reflected in decisions involving nature-economic trade-offs, as well as in an unconditional voting style for the Green Party. We discuss how a spiritual view of nature is an important component of the moral psychology of the human-nature relationship, and what implications it might have for interventions aimed at increasing sustainability.

Keywords: moral cognition; sacred values; environmental attitudes; decision-making; sustainability

1. Introduction

The idea that humanity and nature are spiritually connected is prevalent across cultures and throughout time. Yet little psychological research has examined, what we will call, *ecospirituality*. Outside of psychology, spirituality has been implicated in processes that elevates natural sites to objects of moral concern and sanctity (Cohen, 1976; Eliade, 1958; Stokols, 1990). Building on previous work, we integrate key insights from environmental psychology (Eom et al., 2021; Gagnon Thompson & Barton, 1994; Mackay & Schmitt, 2019; Milfont, 2007; Tam & Milfont, 2020; Whitmarsh & O'Neill, 2010), moral psychology (Feinberg & Willer, 2013; Markowitz & Shariff, 2012; Preston & Baimel, 2021; Rottman et al., 2015), and the sacred values literature (Atran, 2016; Baron & Spranca, 1997; Graham & Haidt, 2012; Handfield, 2020; Tetlock et al., 2000), to better understand the ways that spirituality is implicated in human-nature interactions. Specifically, we investigate the relationship between ecospirituality and moral concern for nature. We begin this section by introducing the concept of ecospirituality. Next, we introduce the sacred values framework and discuss its importance for the present research.

1.1. The Spiritual vs. Instrumental View of Nature

Spirituality is best understood at the individual level as "the personal, subjective, non-institutionalized, and unmediated experience with the sacred" (Ferguson & Tamburello, 2015, p.297. Also see Fuller, 2001; Mercadante, 2014). This definition highlights the two core aspects of spirituality. First, a thing can be *appraised* to have spiritual qualities ("the sacred" in the quote above). Second, those spiritual qualities can be *experienced*. Such experiences have been termed the "oceanic feeling" (Freud, 1929/2015) or the "numinous" (Rappaport, 1999), and have been associated with feelings like awe and self-transcendence (Fuller, 2007; Keltner & Haidt, 2003).

Ecospirituality may then be defined as the appraisal and experience of nature's spiritual qualities. This definition captures common features across many examples of what one may reasonably call ecospiritual. From animistic indigenous conceptions, like the K'tunaxa's belief that the Grizzly Bear Spirit resides in the Rocky Mountains (Carroll, 2020), to sacred groves in some Hindu traditions in India (Rath, Banerjee, & John, 2020), to notions emphasizing the experience of holiness and spiritual renewal in the outdoors by American transcendentalists who influenced the environmental movement (Emerson, 2015; Muir, 2010).

Beyond the two core aspects of appraisal and experience, two additional themes run across various ecospiritual traditions and are worthy of consideration (see Selin's, 2003 volume on non-Western perspectives and Taylor, 2009 for spiritual-but-not-religious perspectives). First, ecospirituality typically emphasizes connectedness to nature, either as humanity's inherent dependence on nature or one's personal connection with nature. Second, ecospirituality typically imbues nature with anthropomorphic qualities—especially mental qualities—that facilitate the appraisal of nature as a social entity with which one may have a connection. These two ancillary themes, though importantly related, are not necessary to ecospirituality, nor is spirituality a necessary component of these themes. Consequently, past psychological research on connectedness to nature and anthropomorphism of nature do not necessarily invoke spirituality (Klain et al., 2017; Mayer & Frantz, 2004; Nisbet et al., 2009; Ojalehto et al., 2017; Schultz, 2001; St John & MacDonald, 2007).

The spiritual view of nature can be contrasted with the *instrumental view of nature* (Milfont, 2007). The instrumental view values nature as a means of serving human flourishing and uses the tools of economic rationality to determine the conditions for which the exploitation of nature is justifiable (e.g., Costanza et al., 1997). According to this instrumental view, it is

rational—and therefore acceptable—to exploit nature if the value provided through its preservation is outweighed by the value provided through its consumption. This kind of cost-benefit analysis is inconsistent with a spiritual view of nature. When nature is viewed as having an intrinsic sacred—and therefore moral—value, decisions about its preservation or exploitation are not justified based on strictly rational cost-benefit analysis but are instead subject to fundamental beliefs about right and wrong (Skitka et al., 2005, 2021).

1.2. Implications for the Moralization of Nature

The spiritual and moral domains are closely related because "what a thing is" constrains ideas about "how one ought to act" in relation to that thing (Searle, 1995). When a thing is appraised to have spiritual significance—like a holy scripture or a sacred river—it may be set apart from the profane, its treatment governed by different rules and principles (Cohen, 1976; Durkheim, 1995; Eliade, 1958; Rappaport, 1999). Whether clear-cutting a forest is viewed as a business transaction or as desecration ultimately depends on whether one thinks the forest is *mere cellulose or the domain of spirits* (Davis, 2009). Since ecospirituality addresses the question of what nature is, while other environmental attitudes and self-concepts do not, it should be uniquely and importantly linked to the moral domain. Specifically, ecospirituality may be one key pathway through which nature is elevated as an object of moral concern.

1.3. Moralization and Sacred Values

Moral values to which one is completely devoted can take on the quality of being sacred (i.e., non-fungible beyond the consideration of any material costs and benefits). Rather than seeking to maximize one's expected utility, as a rational actor might, a devoted actor seeks to defend what is sacred against any transgression—real or hypothetical—even at a great cost to the self (Atran, 2016; Baron & Spranca, 1997; Handfield, 2020; Tetlock et al., 2000).

Sacred values have been hypothesized to possess several key properties that are potentially relevant for environmental decision-making. If ecospirituality is uniquely connected to the moral domain, then we might expect highly ecospiritual people to make decisions about the environment in the following ways. First, their decisions may be governed by principle-based, rather than cost-benefit, reasoning (Atran, 2016; these reasoning styles are sometimes referred to as deontology and utilitarianism, respectively). Second, they may reject the consideration that the protection of nature can be exchanged for economic gain (Tetlock et al., 2000). Third, even offering them a trade-off between the protection of nature and economic gain—real or hypothetical—may produce negative moral emotions like outrage and disgust (Tetlock et al., 2000). Fourth, they may exhibit specific cognitions associated with sacred values, including quantity insensitivity, moral universalism, and denial of benefits through wishful thinking (Baron & Spranca, 1997). And fifth, they may be more willing to endure immense costs to protect nature because such costs do not strongly factor into their decisions (Atran, 2021; Atran & Ginges, 2012).

1.4. Ecospirituality and Environmentalist Identity

It is important to note that spiritual beliefs can have powerful implications for the self-concept (Ysseldyk et al., 2010), and so ecospirituality and environmental identity are likely highly related constructs. This has further implications for the moralization of nature, given evidence that attitudes gain moral significance when they become embedded in or fused with one's identity (Atran, 2016; Sheikh et al., 2013, 2016; Swann et al., 2012). The conceptual relationships between ecospirituality, environmentalist identity, and moral concern for nature implies multiple causal structures that cannot be directly tested in the present article. However, the first step to understanding the causal structure between ecospirituality, identity, and moral

concern is understanding the correlational structure. Therefore, the studies presented in this article always include a measure of environmentalist identity.

1.5. Developing a Measure of Ecospirituality

There is not currently a viable measure of ecospirituality. Some measures have been proposed to assess spiritual views of nature (Delaney, 2005; Kaufman & Mock, 2014; Rican & Janosova, 2010; Suganthi, 2019), while others capture ancillary aspects of ecospirituality (e.g., anthropomorphizing nature; Tam, 2019). However, the available measures are limited for several reasons. Some scales feature items that are conflated with potential outcome variables, like having respect and an obligation to nature (Rican & Janosova, 2010; Delaney, 2005) or caring for the environment (Suganthi, 2019). The language used in some scale items may also be too obscure to be interpretable in the present research context (e.g., "To be a human being living in this world, I hold myself as an enigma"; Suganthi, 2019). Finally, these measures generally assess an overly broad conception of spirituality (Delaney, 2005; Rican & Janosova, 2010; Suganthi, 2019) or a conception of ecospirituality that is particular to one tradition (e.g., Buddhist ecospirituality, Kaufman & Mock, 2014).

Before investigating the relationship between ecospirituality and moral concern for nature, we first developed and validated a measure of ecospirituality that was not committed to any single cultural or religious tradition and reflected the psychological core of the construct, the appraisal and experience of nature's spiritual qualities ("Ecospirituality Scale", see Table 1). The Supplemental Material reports, in detail, this initial task of scale development and validation, which uses data from all eight samples.

Those results provided good support for the 8-item Ecospirituality Scale. The scale's factor structure was replicated across three medium-sized samples from the United States,

Canada, and Singapore, and across five religious groups within Singapore. The measure was internally reliable and stable across time. An examination of the correlations between the measure and plausibly related constructs provided an assessment of the measure's convergent and discriminant validity. These correlations indicated that the Ecospirituality Scale was closely related to spirituality, pro-environmental attitudes, and environmentalist identity; distantly related to religiosity and environmental citizenship behavior; and largely unrelated to consumerism, political orientation, and environmental policy preference. In addition, ecospirituality was modestly positively associated with the personality traits agreeableness and openness, as well as socially desirable responding and identifying as female.

This initial validation study further suggested that ecospirituality is endorsed by people from a diversity of backgrounds. Indeed, only 17% of the total sample scored below the midpoint on at least one ecospirituality subscale and the scale was largely unrelated to political orientation, unlike other environmental constructs that are politically polarized. Interestingly, atheists, who scored very low on the measure of general spirituality (M = 1.80 [1.65, 1.94][1]), still displayed an average score above the midpoint of the Ecospirituality Scale (M = 4.89 [4.83, 4.96]). Using this measure, we now investigate the relationship between ecospirituality and moral concern for nature.

[1] Throughout this article, key descriptive statistics (M's, r's, β's) are accompanied—in square brackets—by 95% confidence intervals (CI's). These CI's provide useful information about the precision of the statistical estimate, and also provide information necessary to make binary judgments about statistical significance (with α set at .05). The inferential information provided by p-values is largely redundant with the information provided by these CI's, and are therefore not reported here.

Table 1.

Ecospirituality Scale factor loadings and subscale correlations in three samples.

	Sample 1 (USA) *N*=493		Sample 4 (Canada) *n*=4357		Sample 7 (Singapore) *N*=1375	
	Appr.	Exp.	Appr.	Exp.	Appr.	Exp.
1. There is a spiritual connection between human beings and the natural environment	**.86**	.00	**.75**	.15	**.72**	.11
2. There is sacredness in nature	**.63**	.11	**.56**	.24	**.61**	.24
3. Everything in the natural world is spiritually interconnected	**.87**	-.04	**.90**	-.07	**.93**	-.03
4. Nature is a spiritual resource	**.85**	.00	**.89**	-.05	**.92**	-.07
5. I feel intense wonder towards nature	-.03	**.85**	.03	**.73**	-.01	**.75**
6. When I am in nature, I feel a sense of awe	-.01	**.89**	-.05	**.86**	-.03	**.86**
7. Sometimes I am overcome with the beauty of nature	-.02	**.75**	.01	**.76**	.03	**.82**
8. There is nothing like the feeling of being in nature	.12	**.66**	.08	**.67**	.04	**.76**
Variance explained by factor	32%	33%	31%	32%	34%	34%
Subscale correlations (Pearson *r*)	.57 [.50, .62]		.48 [.46, .51]		.55 [.51, .59]	

Note: Factor loadings above .32 are bolded. Square brackets indicate 95% confidence intervals.

Appr. denotes appraisal of nature's spiritual qualities. Exp. denotes experience of nature's spiritual qualities.

Participants rated agreement with items on a 7-point scale from strongly disagree to strongly agree.

Item 2 (*There is sacredness in nature*) shares conceptual overlap with outcome variables pertaining to sacred values. Dropping this item from the scale does not change the pattern of results reported below, which is also suggested by the correlation between the two versions of the scale, r = .99 [.99, .99].

1.6. Overview of Studies

The main article reports five studies that triangulate the relationship between ecospirituality and moral concern for nature. We chose some samples because they were accessible and demographically diverse (e.g., USA survey participants and Canadian university students), while in other cases, the samples were targeted to achieve specific goals, as in the case of Green Party members in the UK sample and the religiously diverse and less WEIRD Singaporean sample. In the course of this research, we attempted to directly replicate each effect at least once (with the exception of Study 2). Each "study" in this article reports results relevant to a single effect of interest across all samples (as opposed to all effects assessed within a single sample) to aid in assessing the generalizability and replicability of each effect. Table 2 reports information on each sample, including demographic characteristics and the studies in which each sample is featured. All studies were approved by the university's behavioral research ethics board.

In Study 1, we assess the degree to which participants place nature within their moral circles of concern, using a census-matched sample of Americans (Sample 1), a religiously diverse sample of Singaporeans (Sample 7), and a sample of Canadian university students (Sample 8).

In Study 2, we assess participants' moral judgments of harm done to nature, using photos of nature affected by anthropogenic activity and natural disasters. For this purpose, we draw on data from a sample of Singaporeans (Sample 7).

In Study 3, we assess the degree to which participants believe that rules, principles, and duties versus an analysis of consequences is important when making decisions about the

environment. Responses from three samples of Americans (Samples 1, 2 & 3) are used to this end.

In Study 4, we employ moral trade-off scenarios to investigate four markers of treating nature as a sacred value: Refusal to make monetary trade-offs, moral emotions in response to trade-offs, cognitions associated with sacred values, and willingness to make sacrifices to protect nature. Responses come from two American samples (Samples 2 & 3) and one Canadian sample (Sample 5).

In Study 5, we examine the devoted reasoning style in Green Party voters from Canada (Sample 5) and the United Kingdom (Sample 6) by assessing strategic versus unconditional voting style and their relationship with ecospirituality.

1.7. Note on Preregistration and Data Analysis

Preregistrations have been uploaded to the Open Science Framework pertaining to analyses in Samples 2, 3, 5, 6, 7, & 8. In this article, we follow the methods, recruitment strategy/sample sizes, and exclusions criteria detailed in all preregistrations. We deviate from these preregistrations in two ways.

First, all analyses use the Ecospirituality Scale, which does not include an anthropomorphism of nature subscale. This is only reflected in the final preregistration made for analyses in Sample 8. We jettison the anthropomorphism subscale because it is not a necessary feature of ecospirituality according to our final definition of ecospirituality. The exclusion of this subscale does not substantially affect results, and future work on this topic could certainly include it depending on the research goals.

Second, all preregistrations either included additional analyses that did not pertain to the hypothesis being directly addressed in this article or failed to include critical tests of robustness

(e.g., by including subsets of potentially relevant covariates in the model). The analyses presented here do not abide by those idiosyncratic analytic decisions. Instead, we use the following protocol for data analysis in each study. We first report simple bivariate correlations between ecospirituality and measures of moral concern for nature. Then, to test the robustness of those effects—and to assess whether nonzero correlations represent effects unique to ecospirituality—we report additional analyses that include covariates that might plausibly act as third variables causing both ecospirituality and moral concern for nature. These variables include attitudes about the state of the ecological crisis, religiosity, political orientation, and socio-economic status. To provide one—perhaps unideal—test of the unique effects of ecospirituality, these models include *all* covariates that are common across all samples in that study. All data is available online for readers that want to test more specific causal models. We also report additional sample-wise models in the Supplemental Material and report here results that diverge from the cross-sample model.

Data, analysis scripts, study materials, and preregistrations are available on the Open Science Framework (tinyurl.com/2w7x7tad). The linked preregistrations also contain rationales for the selected size of each sample. The rationales differ depending on the key analyses of interest in each sample. For instance, we aimed to power Sample 7 to confidently conduct measurement invariance analyses across the five religious groups (n per group~400), while we aimed to power Sample 8 to detect a meaningful correlation between ecospirituality and social desirability (r~.20; N~200).

Table 2.

Information on the eight samples used in the present research.

		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8
Country		USA	USA	USA	Canada	Canada	UK	Singapore	Canada
N		493	468	469	4520	702	561	1375	207
Channel		Cloud Research	Mturk	Mturk	University Human Subject Pool	Direct recruitment + Cloud Research	Prolific	Qualtrics	University Human Subject Pool
Recruitment Parameters		Census matched	-	-	-	Nature clubs & non-nature clubs	Green Party-affiliated voters	5 religious groups, matched on gender and income	-
% Female		53%	50%	53%	73%	60%	66%	49%	72%
Age Mean (SD)		Median [45 - 54]	38 (13)	39 (14)	20 (3)	45 (16)	35 (13)	37 (12)	21 (5)
Ethnicity*	White:	303	323	317	1099	543	510	Chinese: 1047	59
	Black:	51	60	71	54	12	7	Malay: 227	2
	Asian:	17	40	38	2689	108	20	Filipino: 44	117
	Hispanic:	73	30	39	71	7	4	Singaporean: 57	6
					Middle Eastern: 173				
Religion*	Christian:	289	270	266	951	307	89	309	37
	No religion:	139	157	159	2186	315	421	304	135
					Buddhist: 184			Buddhist: 291	
					Hindu: 168			Muslim: 269	
					Sikh: 161			Taoist: 202	
					Muslim: 156				
Featured in Studies…†		V, 1, 2, 3	V, 3, 4	V, 3, 4	V	V, 4, 5	V, 5	V, 1, 2	V, 1

*Only those categories with sizable values are presented here.

† Study "V" refers to the scale validation study described in the "Developing a Measure of Ecospirituality" section. It is fully reported in the Supplemental Material.

2. Study 1: Inclusion of Nature in One's Moral Circle

Moral concern can be defined in different ways. For this study, moral concern is defined as the degree of obligation or personal responsibility one feels to ensure another's welfare, as one might feel for one's children or close friends. To assess this kind of moral concern for nature, we administered the Moral Expansiveness Scale (Crimston et al., 2016) to participants in Samples 1, 7, and 8. This measure records how close to one's innermost circle of moral concern one places a number of targets, including nature and non-nature targets. We also included measures of pro-environmental attitudes and environmentalist identity, among other demographic variables, to assess the degree to which ecospirituality independently predicts this kind of moral concern for nature.

2.1. Methods

2.1.1. Ecospirituality

Participants completed the 8-item Ecospirituality Scale, assessing participants' appraisal of nature's spiritual qualities and experience of these qualities (see Table 1). Agreement was rated on a 7-point scale from "strongly disagree" to "strongly agree". Scores were computed as the mean of all eight items (mean $\alpha = .89$ across all samples).

2.1.2. Moral Expansiveness

Participants in all three samples completed similar versions of the Moral Expansiveness Scale (Crimston et al., 2016), which assessed the relative moral standing of a series of entities. The measure presents a graphic of a stick figure at the center of three concentric circles (the graphic can be found in Appendix A of Crimston et al., 2016 or via a Google image search). The circles create four regions that represent decreasing degrees of moral concern as the regions become further from the self. Participants were given a list of entities and asked to *"place them*

within your own moral circles that reflect your individual views and feelings". The four regions were as follows: The inner circle of moral concern (*"You have a moral obligation to ensure their welfare and feel a sense of personal responsibility for their treatment"*), the outer circle (*"You are concerned about their moral treatment; however, your sense of obligation and personal responsibility is greatly reduced"*), the fringes (*"You are not morally obligated or personally responsible for their moral treatment"*), and outside the moral boundary (*"Feeling concern or personal responsibility for their moral treatment is extreme or nonsensical"*). Each region had a corresponding moral concern score (inner circle = 4, outer circle = 3, fringes = 2, outside the moral boundary = 1).

In all three samples, six non-nature targets were used as a general moral concern benchmark: *Family member, Close friend, Somebody from your neighborhood, Foreign citizen, Somebody from an opposing political party, Murderer*. The nature targets slightly varied across samples. All three samples included the same four nature targets: *Old-growth forest, Desert, Mountains, Ocean*. Each sample had one nature target that was culturally relevant: *Yosemite National Park* (USA), *Bukit Timah Nature Reserve* (Singapore), and *Stanley Park* (Vancouver, Canada). In Samples 7 and 8, three additional nature targets were added to capture nature on a smaller scale: *Chimpanzee, Fish, and Bee*. Mean scores for the general non-nature targets (mean $\alpha = .72$) and the nature targets (mean $\alpha = .93$) were taken in each sample. The alpha for the non-nature targets composite is expected to be lower because it includes a more diverse set of targets.

2.1.3. New Ecological Paradigm

As a measure of pro-environmental attitudes, participants completed the 15-item New Ecological Paradigm (NEP; Dunlap et al. 2000), assessing attitudes about environmental issues, like the state of the ecological crisis ("*If things continue on their present course, we will soon*

experience a major ecological catastrophe"). Agreement was rated on a 5-point scale from "strongly disagree" to "strongly agree". Scores were calculated as the mean of all items (mean α = .80).

2.1.4. Environmentalist Identity

The degree to which participants identified as environmentalists was assessed using the 4-item scale from Brick et al., (2017), which included the following items: "*I see myself as pro-environmentalist*"; "*I am pleased to be pro-environmentalist*"; "*I feel strong ties with pro-environmentalist people*"; and "*I identify with pro-environmentalist people*". Agreement was rated on a 7-point scale (strongly disagree - strongly agree). Scores were calculated as the mean of all items (mean α = .93).

2.1.5. Demographic Variables

In Sample 1, participants rated their political orientation on a 7-point scale (very liberal - very conservative). In Samples 7 and 8, participants indicated on three 100-point sliders (extremely liberal - extremely conservative) their political orientation on 1) social issues, 2) economic issues, and 3) in general. A political conservatism composite was calculated as the mean of the three items. Z-scores were created for cross-sample models.

Religiosity composites were calculated by standardizing and then averaging three religiosity items in each sample. In Sample 1, the religiosity composite contained belief in god (7-point scale), general religiosity (7-point scale), and religious affiliation (dummy coded as 0 = no religious affiliation and 1 = religious affiliation)[2]. Sample 7 contained general religiosity, importance of living a religious lifestyle (7-point scale), and religious service attendance (5-point

[2] These items also composed the religiosity composite variables in Samples 2, 3, 5, and 6. Sample 4 did not assess religiosity.

scale). And Sample 8 contained general religiosity, importance of living a religious lifestyle, and religious affiliation.

In all samples, participants' age, gender, and household income was also assessed. In Sample 1, participants also indicated their educational attainment. In Sample 8, participants also indicated their relative socio-economic status on a ladder from 1 (“lowest”) to 10 (“highest”), as well as a validated shortened 20-item measure of social desirability (Strahan & Gerbasi, 1972).

2.2. Results

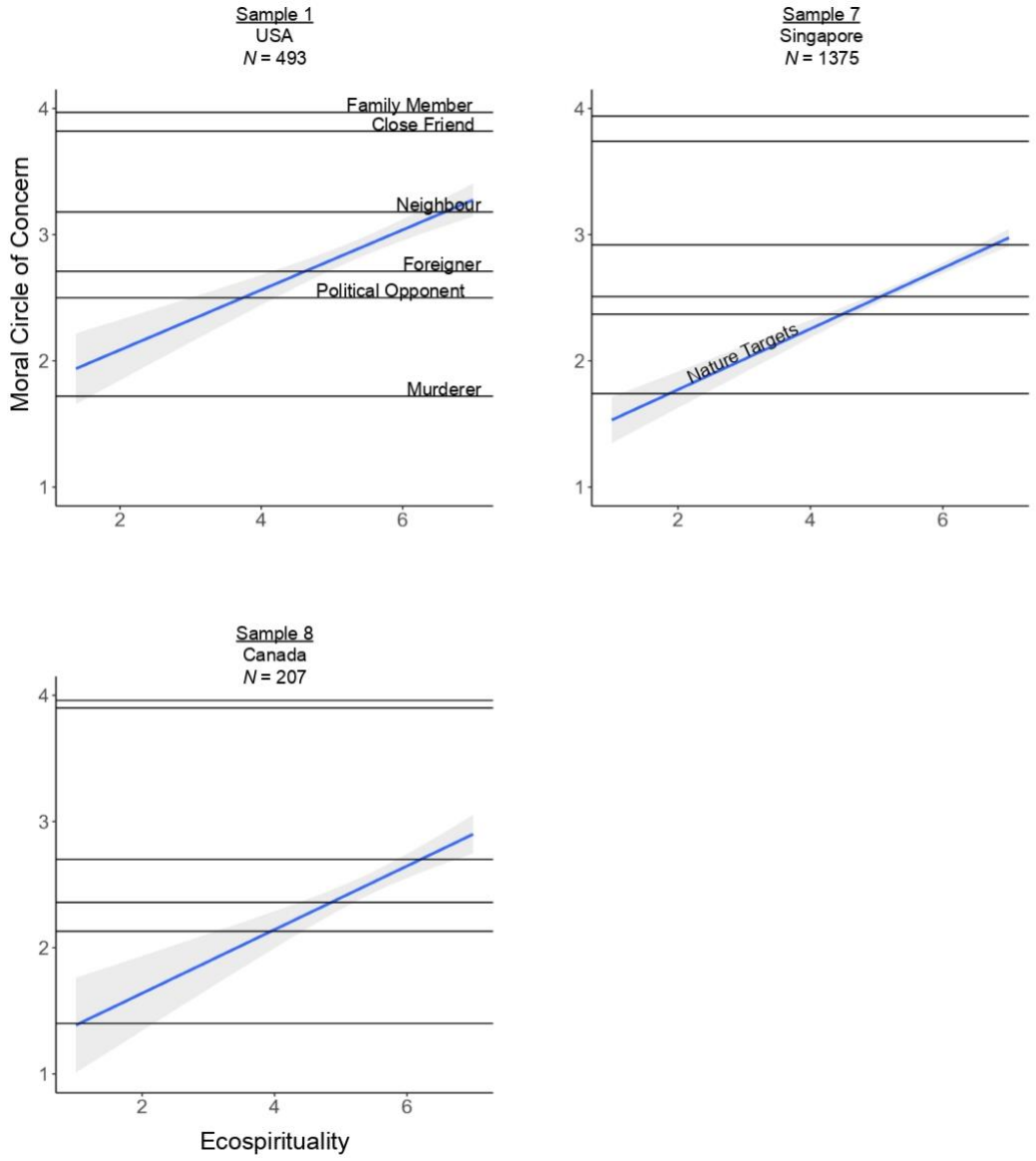
An examination of the bivariate correlations indicated that ecospirituality correlated with moral expansiveness for nature targets in all three samples (Figure 1): Sample 1, r = .32 [.23, .40]; Sample 7, r = .31 [.26, .35]; Sample 8, r = .40 [.27, .51]. The measure of environmental attitudes (NEP) showed similar correlations with nature targets: Sample 1, r = .34 [.25, .42]; Sample 7, r = .12 [.068, .17]; Sample 8, r = .28 [.15, .41]. So did the measure of environmentalist identity: Sample 1, r = .40 [.31, .47]; Sample 7, r = .31 [.27, .36]; Sample 8, r = .31 [.18, .43]. Figure 1 shows that individuals high in ecospirituality morally viewed nature targets like they did neighbors, but not quite like family members and close friends.

To assess the unique predictive validity of the Ecospirituality Scale, we used a mixed-effect model with a random intercept for sample. The model included the following predictors: Ecospirituality, moral expansiveness for non-nature targets, environmental attitudes (NEP), environmentalist identity, political orientation, religiosity, age, sex, and income ($R^2_{\text{Marginal/Conditional}}$ = .19/.26). Results suggested that ecospirituality uniquely predicted moral expansiveness for nature (β = .16 [.11, .20]). Environmentalist identity (β = .19 [.14, .23]) and environmental attitudes (β = .15 [.11, .20]) were also unique predictors of moral expansiveness for nature. This effect was found within each sample and held with the addition of educational

attainment (Sample 1) and perceived socioeconomic status and social desirability (Sample 8; see Supplemental Material for sample-wise models).

Figure 1.

Correlation between ecospirituality and moral expansiveness for nature targets in three samples.



Note: Rank order of non-nature targets' moral concern was identical across the three samples.

3. Study 2: Reactions to Environmental Transgressions (RET) Task

Moral concern also involves emotions rooted in different moral domains, like fairness and purity. This may be reflected in the degree to which one moralizes the degradation of nature, viewing it as "unfair" or "disgusting". To investigate this aspect of the moralization of nature, we developed the Reactions to Environmental Transgressions (RET) task, which measures moral reactions to images of nature being degraded by human and natural activity. While both kinds of activity may result in "harm" to nature (oil spills and forest fires may harm equal numbers of habitats), the two differ in potentially meaningful ways. For example, it may be relevant that a human agent is directly responsible for an oil spill (Gray & Wegner, 2012) or that a naturally occurring forest fire may be ultimately beneficial to the ecosystem. As a consequence, people's moral reactions may differ in response to these two kinds of degradation.

3.1. Methods

Participants in Sample 7 completed the Ecospirituality Scale, the measure of environmentalist identity (Brick et al., 2017), the New Ecological Paradigm (Dunlap et al., 2000), and measures of political orientation, religiosity, age, gender, and income.

The Reactions to Environmental Transgressions (RET) task assessed the degree to which participants morally reacted to images of environmental degradation. Participants were randomly presented with images from two within-subjects conditions. The anthropogenic degradation condition presented two of five images of human-caused environmental degradation (air pollution, plastic contamination, clear-cutting, landfill, oil spill). The natural degradation condition presented two of five images of naturally caused environmental degradation (landslide, flood, volcano, hurricane, storm). In response to each image, participants were asked "*To what extent does this photo depict something that is…*": *morally wrong, deserving of punishment,*

unfair, *disgusting*, *disloyal*, *disrespectful*, *harmful*, and *oppressive* (7-point scale; not at all - very much)[3]. For each of the eight moral attributions, two mean scores were calculated indicating the degree to which each moral was attributed to anthropogenic degradation and to natural degradation.

3.2. Results

Results were largely invariant across the eight moral attributions, indicating that people did not tend to discriminate between moral attributions in their reactions to environmental degradation. For this reason, we average scores across the eight morals in subsequent analyses. Bivariate correlations indicated that ecospirituality was positively correlated with moralizing anthropogenic (mean r = .30 [.25, .34]) and natural degradation of nature (mean r = .18 [.13, .23]). Environmentalist identity was also positively correlated with moralizing anthropogenic (mean r = .24 [.19, .29]) and natural degradation (mean r = .25 [.20, .30]). Environmental attitudes (NEP) was positively correlated with moralizing anthropogenic degradation (mean r = .16 [.11, .21]), but weakly negatively correlated with moralizing natural degradation (mean r = -.060 [-.11, -.0074]). Figure 2 shows the relationships between the moral attributions scores and ecospirituality, environmentalist identity, and environmental attitudes.

We used a linear mixed-effect model with a random intercept for moral attribution and a random slope for ecospirituality to investigate the independent effect of ecospirituality across each of the eight moral attributions. The model predicted moralization scores from the following variables: Ecospirituality, environmentalist identity, environmental attitudes (NEP), political orientation, religiosity, age, gender, and income. The model also included three interaction terms to investigate how the slopes of the three key variables—ecospirituality, identity, and

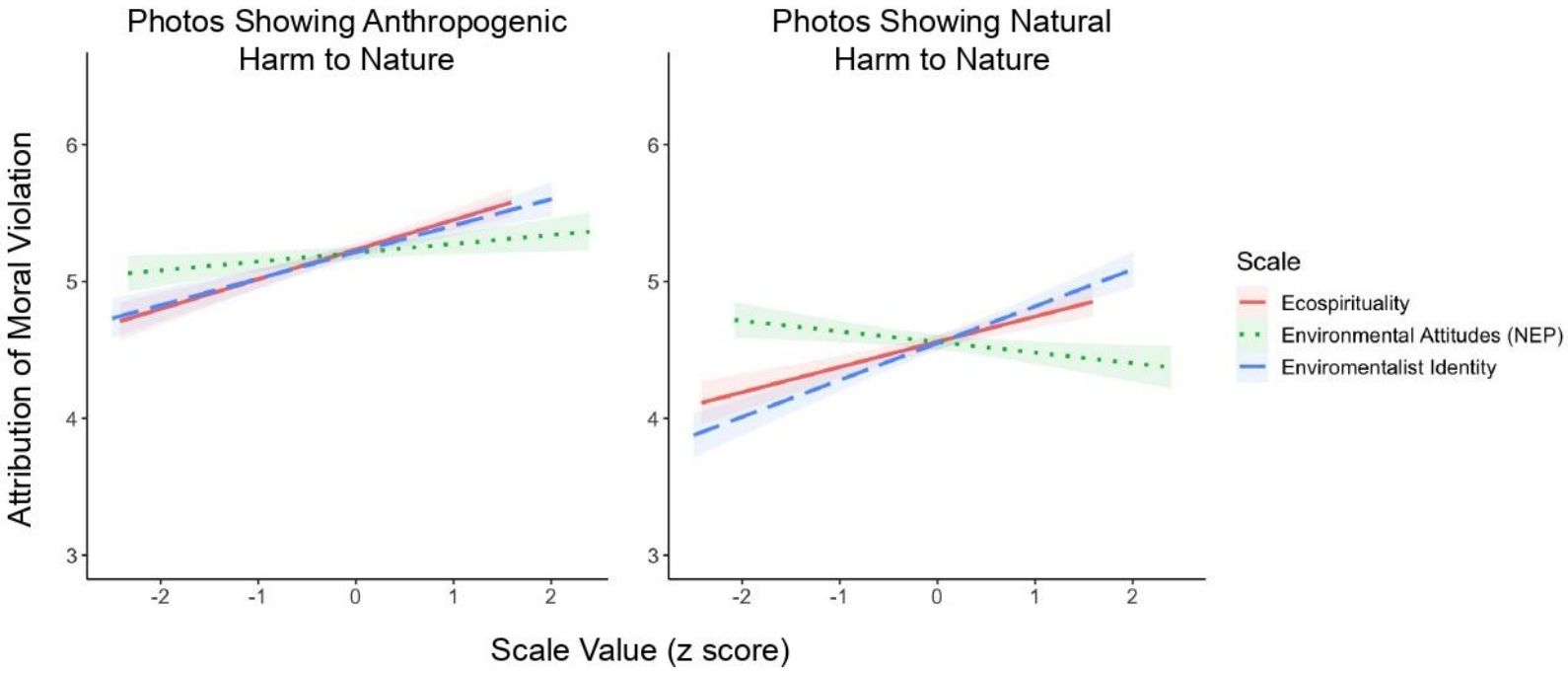
[3] As a manipulation check, participants also rated the extent to which the image depicted something that was *human-caused*.

environmental attitudes—differed across the two degradation conditions ($R^2_{Marginal/Conditional}$ = .20/.22).

Results showed that ecospirituality (β = .15 [.15, .16]), environmentalist identity (β = .11 [.10, .11]), and environmental attitudes (β = .08 [.08, .09]) each independently predicted moralization scores. Each of the three interaction terms were significant and the simple slopes reflected the same pattern of results as the bivariate correlations (see Figure 2). Ecospirituality showed a stronger positive slope for anthropogenic degradation (β = .27 [.26, .28]) and a weaker positive slope for natural degradation (β = .15 [.14, .16]). Environmentalist identity showed a weaker positive slope for anthropogenic degradation (β = .19 [.17, .20]) and a stronger positive slope for natural degradation (β = .33 [.32, .35]). Environmental attitudes showed a positive slope for anthropogenic degradation (β = .14 [.13, .15]) and a negative slope for natural degradation (β = -.15 [-.16, -.14]). These results suggest that all three variables predict greater moralization of human-caused harm to nature but—we speculate—may also be associated with different appraisals of naturally occurring harm. For example, ecospirituality and environmentalist identity may predict believing that morally dubious human behavior causes natural disasters, while the new ecological paradigm may predict viewing these disasters as natural processes and thus outside the moral domain.

Figure 2.

Correlation between ecospirituality and attributing moral violations to photos depicting the destruction of nature.



4. Study 3: Moral Reasoning Style

Beyond the broad senses of moral concern assessed in Studies 1 and 2, one may also become completely devoted to one's values, transforming them into sacred values. Sacred values are posited to be values that possess "transcendental significance that precludes comparisons, trade-offs, or indeed any mingling with secular values" (Tetlock, 2003, p.320). These values have also been hypothesized to possess a number of distinctive psychological qualities that distinguish them from others (Atran, 2016; Baron & Spranca, 1997; Tetlock, 2003). Perhaps the key characteristic of sacred values is that people tend to rely on ideas about principles, rules, and duties, rather than costs and benefits, when making decisions about them. In Study 3, we assess the relationship between ecospirituality and people's preference for these two moral reasoning styles when it comes to making decisions about the natural environment.

4.1. Methods

Participants in Samples 1, 2, and 3 completed the Ecospirituality Scale, the measure of environmentalist identity (Brick et al., 2017), and measures of political orientation, religiosity, age, gender, and income. Participants indicated their moral reasoning style preferences by completing the 8-item moral reasoning style scale from Sacchi et al., (2014). Participants were told, "*You will see a series of reasons for the decisions we can make about the environment. Please indicate how important each reason is*", then rated the importance of relying on principle-based reasoning (e.g., "*thinking that some behaviors are definitely right or wrong, irrespective of the consequences*") and cost-benefit reasoning (e.g., "*after a cost-benefit analysis*"). Importance was rated on a 5-point scale (not important at all - very important). Composites were made of the four items that assessed a principle-based orientation (mean $\alpha = .71$) and the four items that assessed a cost-benefit orientation (mean $\alpha = .71$).

4.2. Results

Ecospirituality was positively correlated with placing importance on rules, principles, and duties when making decisions about the environment in all three samples (Figure 3): Sample 1, *r* = .40 [.31, .46]; Sample 2, *r* = .45 [.37, .52]; Sample 3, *r* = .38 [.30, .45]. Environmentalist identity also displayed a similar pattern of correlations: Sample 1, *r* = .40 [.32, .47]; Sample 2, *r* = .45 [.37, .52]; Sample 3, *r* = .34 [.25, .42]. Environmental attitudes (NEP), which was only assessed in Sample 1, also showed a positive correlation with principle-based reasoning (*r* = .21 [.13, .30]). In Samples 2 and 3, ecospirituality and environmentalist identity were uncorrelated with placing importance on costs and benefits, and in Sample 1, environmental attitudes (NEP) was also uncorrelated with cost-benefit reasoning. In Sample 1, however, ecospirituality and environmentalist identity were positively correlated with cost-benefit reasoning (*r*'s = .33 [.25, .41] and .26 [.18, .34], respectively). This may be a result of the high collinearity between the two reasoning styles found only in Sample 1 (*r* = .56 [.49, .61]), but not Sample 2 (*r* = .10 [.01, .19]) or Sample 3 (*r* = .15 [.057, .23]).

We used two mixed-effects models with random intercepts for sample to investigate the independent effect of ecospirituality on each of the two moral reasoning styles. The models included the following predictors: Ecospirituality, environmentalist identity, political orientation, religiosity, age, gender, and income (Principle-based reasoning: $R^2_{\text{Marginal/Conditional}}$ = .21/.21; Cost-benefit reasoning: R^2 = .044[4]).

Ecospirituality independently predicted rating a principle-based reasoning style to be important in making decisions regarding the environment (β = .25 [.20, .31]), but it did not

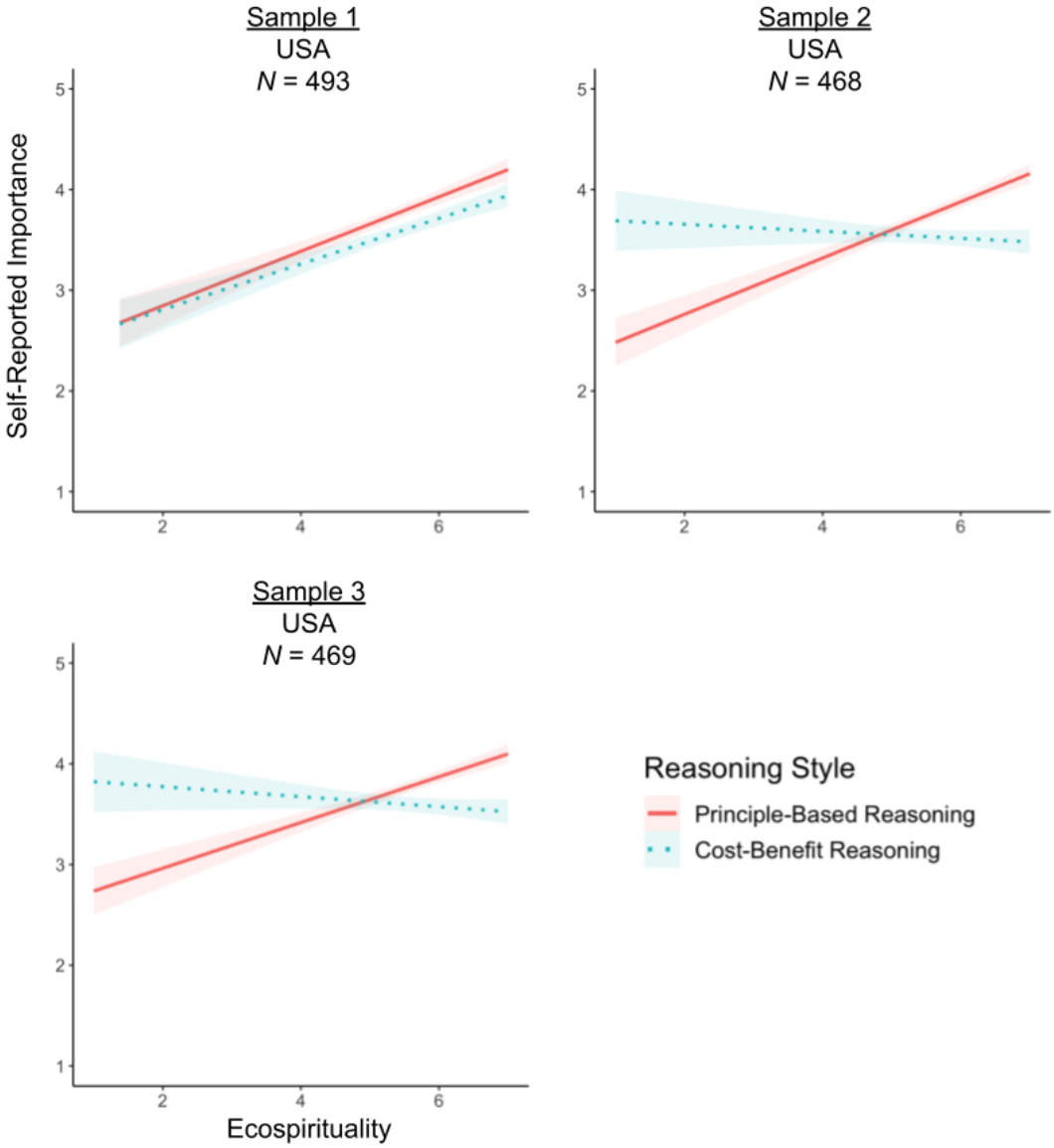
[4] The model failed to converge because of the low sample-wise variance. The model estimates are equivalent to a simple linear model with sample as a covariate.

predict rating cost-benefit as important (β = .03 [-.03, .09])[5]. Environmentalist identity was found to be a significant predictor of principle-based reasoning (β = .26 [.20, .32]), and cost-benefit reasoning (β = .10 [.04, .16]). In sample-wise models, the effect of ecospirituality on principle-based reasoning held with the addition of educational attainment and environmental attitudes (Sample 1; see Supplemental Material).

[5] In Samples 2 and 3, where high collinearity between the two reasoning styles was not observed, ecospirituality was found to not predict cost-benefit reasoning, while in Sample 1, it did (β = .24 [.13, .34])

Figure 3.

Correlation between ecospirituality and importance of two moral reasoning styles when making decisions about the environment in three samples.



5. Study 4: Taboo Trade-Offs

In Study 3, we used a self-report questionnaire to examine the first key marker of sacred values—preference for a principle-based reasoning style. In Study 4, we get closer to real decision-making behavior by having participants respond to moral trade-off scenarios. Compromising a sacred value for monetary gain is considered taboo and feels morally dubious to those asked to make such a trade-off.

In this study, we use taboo trade-off scenarios to investigate if ecospirituality predicts the other key markers of sacred values established in the literature. First, we test whether participants refuse to consider monetary trade-offs for the protection of nature. Second, we examine participants' negative moral emotions in response to potential taboo trade-offs. Third, we examine participants' cognitions about the trade-off scenarios. Fourth, we examine the degree to which participants are willing to make personal and societal sacrifices to defend nature[6].

5.1. Methods

In Samples 2, 3, and 5, participants completed the Ecospirituality Scale, the measure of environmentalist identity (Brick et al., 2017), and measures of political orientation, religiosity, age, gender, and income.

5.1.1. Environmental Attitudes Inventory

A broader set of environmental attitudes was also assessed in Sample 5 using the Brief Environmental Attitudes Inventory (EAI-24; Milfont & Duckitt, 2010), a validated short version of the comprehensive Environmental Attitudes Inventory. The scale assesses 12 distinct attitudes about the environment that have been previously studied in psychological research. These

[6] We also examined if people's sacred values were immune to temporal and spatial discounting. Discounting was not observed, so we could not conduct the key analyses. Results and discussion are reported in the Supplemental Material.

attitudes load onto two higher-order factors: Preservation and Utilization. The preservation attitudes include “enjoyment of nature”, “support for interventionist conservation policies”, “environmental movement activism”, “environmental fragility”, “personal conservation behavior”, “ecocentric concern”, and “support for population growth policies”. The utilization attitudes include “anthropocentric concern”, “confidence in science and technology”, “altering nature”, “human dominance over nature”, and “human utilization of nature”. Agreement was rated on a 7-point scale (strongly disagree - strongly agree), and items were combined into two composites representing preservation (mean $\alpha = .81$) and utilization attitudes (mean $\alpha = .75$).

5.1.2. Moral Trade-Off Scenarios

Participants were presented with moral trade-off scenarios. In these scenarios, participants read the following prompt: “*In this section, you will be presented with information about newly planned industrial projects. After you have learned about some benefits and costs associated with the project, you will be asked to answer some questions about the project. Specifically, we want to know to what degree you endorse the projects*”. Participants responded to two scenarios, one after the other, which presented construction plans for two different industrial projects. The projects were randomly selected from a set of four: 1) “*a waste disposal plant on the grounds of previously untouched wilderness”*, 2) “*a 4-lane highway into a national park”*, 3) “*a transnational pipeline for the transportation of oil”*, and 4) “*a new airport on top of marshlands”*. Participants viewed a table of two economic benefits offered by the project (e.g., “*Will produce a large number of well-paying locally-sourced jobs…*”) and two potential costs to the natural environment (e.g., “*Will require the clear cutting of 1000 acres of virgin forest…*”).

In Sample 2, the scenarios varied by temporal distance. One industrial project was set for construction “*immediately*” and the other set for construction “*at some time very far away in the*

future". In Samples 3 and 5, the projects varied by spatial distance, with one "*set for construction in a location very close to where you live - perhaps somewhere you could easily visit by car*", the other "*set for construction in a location very far away from where you live - perhaps a foreign country halfway across the globe*". The presentation of each scenario was randomized so that half of the participants viewed the close-to-self trade-off first and vice versa. Since responses to the close and the distant trade-offs were highly consistent, we averaged participant responses to both scenarios on each measure.

Participants then answered a series of questions.

Refusal to Make Monetary Trade-Offs. In all three samples, participants responded to two items assessing the amount of economic benefit they personally required to endorse the industrial project. Items assessed social good ("*How much revenue must be made in order for you to endorse the construction of this project?*") and personal good ("*How large of a reduction of your current income tax would you need in order to endorse this project?*"). Ratings were made on a slider from 0% - 100% and—importantly—participants could refuse to even engage in this exercise by selecting the option, "*No amount is acceptable - On principle, I would never even consider this trade-off*". Since participants viewed two scenarios (one close to the self, the other distant), they had four opportunities to refuse to engage in a trade-off. Preliminary analyses revealed no differences in responses by social versus personal good nor by distance to self, so responses to the four measures were combined (0 - 1; proportion of trade-offs refused).

Negative Moral Emotions. In Samples 2 and 3, participants' negative moral emotions (disgust, anger, outrage, and contempt) in response to each trade-off were assessed on a 5-point scale (does not describe my feelings - clearly describes my feelings). Responses for each

emotion were averaged for the close-to-self and for the distant-to-self scenarios, then these two average scores were combined into an overall moral emotion composite (mean $\alpha = .92$)[7].

Cognitions Concerning Sacred Values. In Samples 2 and 3, three cognitions associated with sacred values were assessed in response to the trade-off scenario. Participants rated how much they agreed with the following statements on a 7-point scale (strongly disagree - strongly agree): "*Even if this plan did one-tenth the damage, it would still be equally immoral and wrong*" [quantity insensitivity]; "*This would be wrong even in a country where everyone thought it was not wrong*" [moral universalism]; "*In the real world, nothing can be gained by allowing this*" [denial of benefits by wishful thinking]. Items were combined into composites (mean $\alpha = .83$).

Willingness to Make Sacrifices. In all three samples, participants were asked how much they would be willing to sacrifice in order to cancel the industrial project. On a slider from 0% - 100%, participants indicated their willingness to sacrifice societal good ("*How many jobs are worth sacrificing in order to cancel this project?*") and personal good ("*How much money (paid via income tax) would you sacrifice in order to have this project canceled?*")[8]. For each of the two kinds of sacrifices, scores from the close- and distant-to-self scenarios were averaged, resulting in one societal benefit score and one personal benefit score.

[7] Since the consistency between close and distant moral emotion ratings would inflate the alpha reliability, this estimate is derived from only assessing the close-to-self moral emotions across the two samples. The same is true for cognitions concerning sacred values.

[8] Participants in Sample 2 also had the option to not respond to the items assessing willingness to sacrifice (n = 215); however, it was not clear to us what this option indicates. Therefore, we removed this choice in Sample 3, and then reframed it more clearly in Sample 5, stating if the participant did not wish for the project to be canceled, they could select not to answer these items (n = 205 participants selected this option at least once).

5.2. Results

5.2.1. Refusal to Make Monetary Trade-Offs

A large proportion of participants put a price on nature in all four opportunities (43%), while a smaller proportion rejected all four trade-offs (28%). Ecospirituality was positively correlated with refusing to engage in moral trade-offs on principle in all three samples: Sample 2 r = .29 [.21, .37], Sample 3 r = .26 [.17, .34], Sample 5 r = .23 [.16, .30]. Environmentalist identity showed a similar pattern of correlations: Sample 2 r = .22 [.13, .30], Sample 3 r = .24 [.15, .32], Sample 5 r = .30 [.23, .36]. The environmental attitudes inventory (EAI-24) was assessed in Sample 5. Preservation of nature attitudes positively correlated with refusing trade-offs (r = .41 [.34, .47]), while utilization of nature attitudes negatively correlated with refusing trade-offs (r = -.44 [-.49, -.37]).

A mixed-effect binomial regression model returned a singular fit, indicating an overfit model. Dropping terms from the model did not resolve the problem, so we instead modelled the proportion of trade-offs refused using a quasibinomial regression model with the following predictors: Ecospirituality, environmentalist identity, political orientation, religiosity, age, gender, income, and sample (R^2 = .084). Ecospirituality (*Odds Ratio* = 1.44 [1.30, 1.60]) and environmentalist identity (*OR* = 1.15 [1.07, 1.24]) were both found to be independent predictors of refusing to engage in nature-economic trade-offs. The predicted probabilities from the model indicated that, controlling for other variables, those low in ecospirituality (-1 SD) were predicted to reject these trade-offs 30% [27, 33] of the time, while highly ecospiritual people (+1 SD) were predicted to reject these trade-offs 48% [45, 52] of the time—a 18% increase across samples.

Sample-wise analyses indicated that controlling for preservation and utilization attitudes in Sample 5, ecospirituality and environmentalist identity were no longer significant predictors (see Supplemental Material).

5.2.2. Negative Moral Emotions

Ecospirituality positively correlated with negative moral emotions in response to trade-offs in both samples it was assessed in: Sample 2, r = .35 [.26, .42]; Sample 3, r = .33 [.25, .41]. Environmentalist identity also correlated with moral emotions in both Sample 2 (r = .53 [.46, .60]) and Sample 3 (r = .48 [.40, .54]).

In a mixed-effect model with a random intercept for sample ($R^2_{\text{Marginal/Conditional}}$ = .27/.27), both ecospirituality (β = .14 [.07, .20]) and environmentalist identity (β = .43 [.36, .49]) independently predicted moral emotions with controls. Sample-wise models indicated that ecospirituality was only a significant predictor in Sample 3, while identity was significant in both Samples 2 and 3 (see Supplemental Material).

5.2.3. Cognitions about Trade-offs

Sacred value cognitions—quantity insensitivity, moral universalism, and wishful thinking—were assessed in Samples 2 and 3. Ecospirituality correlated with these cognitions in both Sample 2 (r = .45 [.38, .52]) and Sample 3 (r = .38 [.30, .46]). Environmentalist identity also correlated with these cognitions in both samples: Sample 2, r = .51 [.44, .57]; Sample 3, r = .53 [.47, .60].

A mixed-effects model failed to converge, so a linear model was used, which included sample as an additional covariate (R^2 = 0.32). Both ecospirituality (β = .19 [.12, .25]) and environmentalist identity (β = .41 [.35, .48]) independently predicted cognitions about trade-offs.

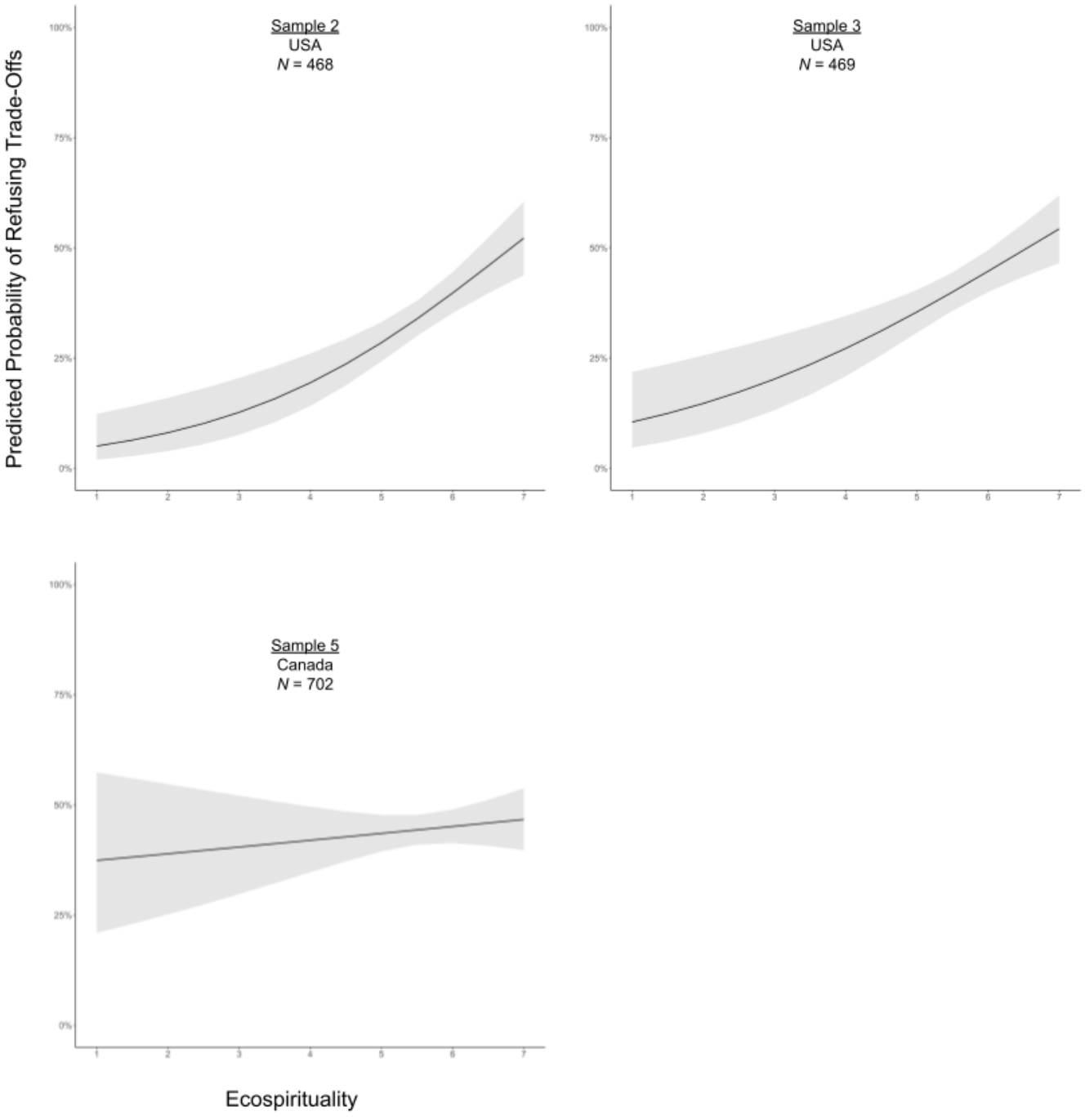
5.2.4. Willingness to Make Sacrifices

Ecospirituality correlated with willingness to sacrifice societal benefits in Sample 2 (r = .12 [.0058, .23]), Sample 3 (r = .16 [.066, .24]), and Sample 5 (r = .18 [.095, .26]). However, ecospirituality was only correlated with willingness to sacrifice personal benefits in Sample 5 (r = .14 [.059, .22]). Environmentalist identity correlated with willingness to sacrifice societal and personal benefits in all three samples. Societal benefits: Sample 2, r = .39 [.29, .48]; Sample 3, r = .32 [.24, .40]; Sample 5, r = .19 [.10, .27]. Personal benefits: Sample 2, r = .37 [.27, .46]; Sample 3, r = .38 [.29, .45]; Sample 5, r = .28 [.19, .35]. Preservation attitudes positively correlated with willingness to sacrifice both societal (r = .28 [.20, .35]) and personal benefits (r = .27 [.18, .34]) in Sample 5. Utilization attitudes negatively correlated with willingness to sacrifice both societal (r = -.29 [-.40, -.22]) and personal benefits (r = -.29 [-.36, -.21]) in Sample 5.

Mixed-effects models with random intercept for sample (Societal benefits: $R^2_{\text{Marginal/Conditional}}$ = .088/.09; Personal benefits: $R^2_{\text{Marginal/Conditional}}$ = .13/.13) indicated that ecospirituality was not an independent predictor of willingness to sacrifice societal benefits (β = .04 [-.02, .11]), and there was even a suppression effect, whereby ecospirituality became a negative predictor of willingness to sacrifice personal benefits (β = -.08 [-.14, -.02]). Environmentalist identity, on the other hand, independently predicted both willingness to sacrifice societal (β = .27 [.21, .33]) and personal benefits (β = .35 [.29, .41]).

Figure 4.

Predicted probabilities of refusing to engage in a nature-economic trade-off "on principle" based on ecospirituality score with controls in three samples.



6. Study 5: Unconditional Voting for Green Party Candidates

The results from Studies 1 and 2 suggested ecospirituality independently predicted the moralization of nature. Studies 3 and 4 suggested ecospirituality independently predicted reasoning about nature in a moralistic way that may affect decision-making. In Study 5, we test whether this moral reasoning style has implications for an important realm of decision-making that concerns all voting adults: Political decision-making.

Some political decisions people make are less about their political orientation, *per se*, and more a product of their reasoning style. *How* people vote, rather than *who* they vote for, may be more influenced by ecospirituality by virtue of its association with a principle-based reasoning style. The political voting literature makes a distinction between the strategic voter and the unconditional voter (Aldrich et al., 2018). The dynamics of these two voting styles may play a role in environmental politics. For instance, the strategic Green Party voter will vote to advance environmental policies. If the Green Party candidate in their riding/district has no possibility of winning, then their vote is better spent—from a utility-maximizing perspective—on the mainstream candidate with the better environmental platform. The unconditional voter will vote for the Green Party no matter the strategic context of the election; they vote Green "on principle". Both kinds of voters care about environmental policy but may arrive at different political decisions based on their reasoning style. In this study, we examine the relationship between ecospirituality and an unconditional voting style amongst Green Party voters in Canada and the United Kingdom.

6.1. Methods

Participants in Samples 5 and 6 completed the Ecospirituality Scale, the measure of environmentalist identity (Brick et al., 2017), the EAI-24 (Milfont & Duckitt, 2010), and measures of political orientation, religiosity, age, gender, and income.

Participants were also asked about their voting preference and style. First, participants indicated if they would consider voting Green in the next general/federal election ("*not indicating that you will certainly vote for them, only that you would consider it*"). Participants who would consider voting Green were then asked under what conditions they would vote Green. The wording of this prompt was slightly different across samples. Sample 5 responded to, "*I would vote for the Green Party…*", by selecting either "*No matter what*" or "*Only if they were likely to win*". The first option was coded as an unconditional voting style. The Sample 6 prompt was as follows: "*Think about the next general election. You are in a constituency where there are candidates from the Green Party, Labour Party, Liberal Democrats, and the Conservative Party running for a seat in the house. Under what conditions would you vote for the Green Party?*". Participants chose one of three responses, (1) "*I would vote for the Green Party NO MATTER WHAT*", (2) "*I would NOT vote for the Green Party if they had no chance at winning OR if it was a close race between two other parties*", and (3) "*There are specific conditions under which I would vote for the Green Party that are not listed here*". The first option was coded as an unconditional voting style.

6.2. Results

Ecospirituality correlated with an unconditional voting style in both Sample 5 (r = .13 [.034, .23]) and Sample 6 (r = .12 [.034, .21]). Environmentalist identity correlated with an unconditional voting style only in Sample 5 (r = .23 [.13, .32]). Preservation of nature attitudes

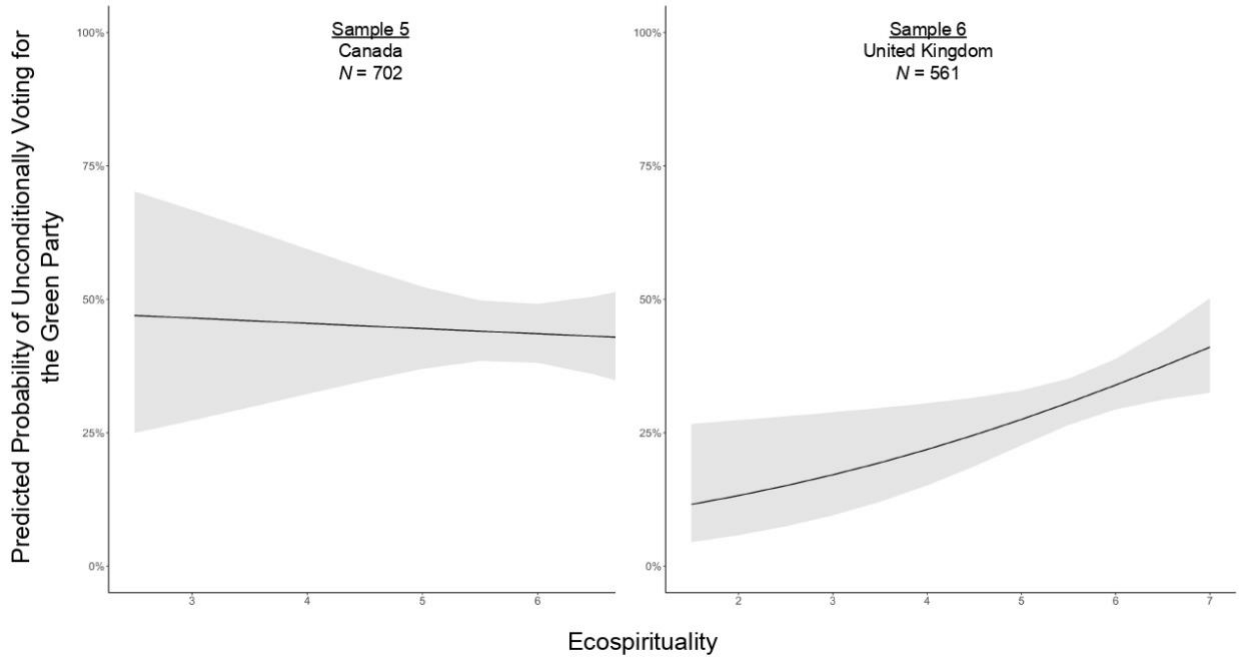
positively correlated with unconditional voting in Sample 5 (r = .23 [.14, .32]), while utilization attitudes negatively correlated with unconditional voting in Sample 5 (r = -.18 [-.28, -.090]).

We modeled the incidence of unconditional Green Party voting in a mixed-effect binomial regression model with a random intercept for sample. The model included the following predictors: Ecospirituality, environmentalist identity, preservation attitudes, utilization attitudes, political orientation, religiosity, age, gender, and income ($R^2_{\text{Marginal/Conditional}}$ = .080/.11).

Of the key variables of interest, only environmentalist identity was found to be an independent predictor of unconditional voting across samples (OR = 1.23 [1.04, 1.46]). Sample-wise analyses indicated that there was quite a bit of variability between the two samples. In Canada (Sample 5), environmentalist identity independently predicted unconditional voting, whereas ecospirituality did not; in the UK (Sample 6), ecospirituality predicted unconditional voting, whereas identity did not. Specifically, in Sample 6 those low in ecospirituality (-1 SD) were predicted to unconditionally vote Green 25% [20, 32] of the time, while highly ecospiritual people (+1 SD) were predicted to do so 38% [32, 46] of the time—a 13% increase, controlling for other variables (see Figure 5). In neither sample did environmental attitudes independently predict unconditional voting.

Figure 5.

Predicted probabilities of unconditionally voting for the Green Party based on ecospirituality score with controls in two samples of Green Party voters.



7. General Discussion

If the environmental crisis of our times is partly a consequence of our conception of nature as an instrumental good, it is ever more important to explore alternative conceptions. In this article, we explored the spiritual conception of nature. Using eight samples from the United States, Canada, the United Kingdom, and Singapore, with representation from multiple religious backgrounds, we sought to investigate the relationship between ecospirituality and moral concern for nature.

Our findings suggested that ecospirituality may be a unique pathway to moral concern for nature. Ecospirituality robustly predicted the moralization of nature, over and above environmental attitudes, environmentalist identity, and political orientation. Participants higher in ecospirituality were more likely to include nature within their close circles of moral concern (Study 1) and see the degradation of nature as a moral violation (Study 2). Ecospirituality was also shown to predict the more absolute kind of moralization captured by sacred values, which prioritizes a principle-based reasoning style over a cost-benefit one (Study 3 - 5). This preference in reasoning styles was shown to have potential implications for participants' decision-making about environmental issues. Participants higher in ecospirituality tended to prefer principle-based reasoning for decisions concerning the environment (Study 3) and were more likely to refuse to put a price on nature out of principle (Study 4). This reasoning style was also found to be potentially implicated in how people vote—even among Green Party voters, those who were highly ecospiritual were more likely to unconditionally vote for the Green Party (Study 5).

For the majority of dependent measures assessed across these studies, results showed that ecospirituality uniquely predicted measures of moral concern, even when controlling for variables that might plausibly act as third variables—including environmental identity, which has

been shown to strongly predict environmental behavior (e.g., Brick et al., 2017). However, for several dependent measures (e.g., willingness to sacrifice societal benefits to protect nature; Study 4) zero-order correlations with ecospirituality were eliminated or weakened when controlling for covariates, whereas the effects of environmental identity persisted. Overall, these results suggest that the relationship between ecospirituality and the moralization of nature may be *partially*—but probably not completely—mediated by environmental identity. We must be cautious, however, when drawing conclusions about mediation from these data (see Maxwell & Cole, 2007 on the limitations of cross-sectional mediation analysis). Longitudinal and/or experimental methods may be required to more rigorously reveal the exact causal relations between ecospirituality, environmental identity, and the moralization of nature.

7.1. Strengths and Limitations

There are several methodological and conceptual shortcomings of the present research that future research can address. We recruited participants from multiple national, cultural, religious, and ethnic backgrounds. This strategy allowed us to confirm the factor structure of the Ecospirituality Scale across countries and religions and provided an indication of the generalizability and replicability of key effects across different populations. However, our sampling method does not permit us to draw confident conclusions about national or cultural differences (e.g., Green Party voters are not representative of the UK). One exception may be in comparing results in the US census-matched sample and the Singaporean sample, which were both fairly diverse. Results showed that the Ecospirituality Scale's factor structure, response distribution, and correlation with moral concern for nature was replicated across these two samples. This is not to say that cultural variability does not exist. Indeed, ethnographic work demonstrates that ecospirituality varies greatly across cultures and is shaped by local ecological

context (e.g., Crockford, 2017; Heintzman, 2009; Labate & MacRae, 2016; Rappaport, 1999; Taylor, 2009). Cross-cultural research will be crucial to understanding the psychology of ecospirituality and moral concern for nature.

A second limitation is that the item pool for the Ecospirituality Scale was generated via a non-systematic top-down process. We aimed to develop a measure of ecospirituality that captured the construct in the broadest sense. To this end, the items are relatively content-free, instead referencing basic psychological aspects of ecospirituality (appraisal and experience) that may be expressed in multiple ways across cultures. Still, the items were not sampled from a representative set of ecospiritual beliefs, and therefore it cannot be ruled out that the measure ignores other interpretations of nature spirituality.

Furthermore, while the spiritual experience subscale aimed to capture the broad construct of "numinous experiences in nature", one might regard these four items as a more narrow assessment of feeling awe in nature. There are two reasons for this. First, factor analyses showed that these four items had larger factor loadings than items tapping into other kinds of experiences (e.g., "I experience the holy when I am in the natural world"), suggesting that they were most representative of the set of items assessing spiritual experiences in nature. Second, we generated items for this subscale with an understanding that "awe is central to the mystical experience that people often deem 'spiritual'" (Monroy & Keltner, 2022, p.5). However, it is clear that elevating awe to a genuine spiritual experience requires the recruitment of additional processes, like appraisal mechanisms, sense of small self, and feelings of transcendence (Keltner & Haidt, 2003; Preston & Shin, 2017). Future research can consider how these processes interact to produce moral concern for nature.

7.2. Future Directions

There are many opportunities for future research on ecospirituality from a psychological perspective. There are multiple pathways to moral concern for nature, including the ones consider here—spirituality and identity. While the present investigation identified ecospirituality as a "unique" predictor of moral concern in the statistical sense (predicting unique variance), a deeper theoretical understanding of the unique aspects of each pathway to moral concern for nature can still be achieved. Research on the development of, and the interactions between, the multiple pathways to moral concern will inform both the basic theory on moral development and the applied interventions that seek to increase moral concern for nature.

While we have found that ecospirituality can contribute to concern for nature and its protection, we emphasize that there are potentially less constructive features of ecospirituality, which may include some of the hazards of moral beliefs more generally, like moral licensing and aversion to compromise (Baron & Spranca, 1997; Sacchi et al., 2014; Tetlock et al., 2000). As an example, Sachdeva (2017) found that sacred beliefs about the Ganges river predicted a *lower* perception of pollution in the river because of participants' belief that the Ganges is self-purifying. Future research may investigate if these findings are particular to the cultural and religious conceptions prevalent in India of the Ganges river or if they are diagnostic of the broader psychology of sacredness and purity (Graham et al., 2011; Graham & Haidt, 2012).

Sacred values may also backfire in political decision-making contexts because people may not even consider solutions that represent steps in the right direction because they are perceived to fall short of some absolute or ideal standard. Yet change is often achieved incrementally and depends on successfully negotiating and finding compromises with groups that have competing incentives and conflicting values (like in the Paris Accords to curb climate

change or the acceptance of nuclear power to replace coal). This is not to say that the commitment engendered by sacred values cannot be productive. Indeed, the long-term success of minority pro-environmental parties relies on the unconditional voting of a subset of devout voters. But this comes at the cost of taking away votes from eco-friendly mainstream parties, which may be in a better position to create short- and intermediate-term incremental change. Future research that clarifies the conditions under which sacred, spiritual, and purity beliefs about nature help *and* hinder environmental preservation is likely to be of applied value.

7.3. Implications for the Study of Religion

Recent research on the "greening-of-religion" hypothesis investigates the ways in which religion can influence people's beliefs about nature and their motivation to protect it (Taylor, 2001a, 2001b; Taylor et al., 2016). Part of this work involves deconstructing religion to understand the elements most pertinent to people's environmental attitudes (Carr et al., 2012; Eom et al., 2020, 2021; Preston & Baimel, 2021; Sherkat & Ellison, 2007; Tarakeshwar et al., 2001). For example, work by Preston & Shin (2022) suggests spirituality, rather than religious fundamentalism, may be motivating religious "greening". Our work shows that ecospirituality more strongly predicts concern for nature compared to a general measure of spirituality. Perhaps ecospirituality is a core feature of "greening" religious communities (and non-religious communities too, considering atheists who report low spirituality still moderately endorse ecospiritual beliefs). This raises questions about how ecospiritual beliefs emerge in religious communities and the factors that shape how different communities express ecospiritual beliefs.

7.4. Implications for the Preservation of Nature

While nature may be protected for the benefits it affords to humans, there are many reasons why this type of instrumental reasoning may fail. For one, if a natural site is only valued

for the functions it serves, the motivation to protect it may be reduced when there are other means of serving those functions. Second, it is difficult to precisely calculate the real value of nature in economic terms, which can often result in lowball estimates that mistakenly justify environmental degradation. Third, securing a sustainable future seems to require immediate personal and societal economic sacrifices (e.g., paying a premium for green goods or investing upfront capital to transition to green energy). The motivation to protect nature, if purely instrumental, may be hampered by discounting biases that make immediate benefits more appealing than distant costs are unappealing (Böhm & Pfister, 2005; Jacquet et al., 2013; Markowitz & Shariff, 2012; Mazutis & Eckardt, 2017; McDonald et al., 2015; Rickard et al., 2016; Singh et al., 2017; Sparkman et al., 2021; Spence & Pidgeon, 2010). More research is needed to establish whether viewing nature as sacred can safeguard against these potential hazards.

Our findings suggest that ecospirituality and environmentalist identity represent two pathways to treating nature as a sacred value. But they differ in ways relevant to theory and policy interventions. One key difference is that ecospirituality does not seem to implicate one's social identity. As a result, ecospirituality may be more malleable than environmental identity because it does not conflict with other social identities, like one's political identity. This may be a crucial insight for the American context, where social identity has become a barrier in political discourse surrounding environmental preservation.

Interventions aimed at cultivating one's environmental identity are therefore at risk of backfire effects in specific populations, such as American political conservatives. This is especially important because conservatives tend to express less concern about the environment than liberals (Cruz, 2017), which makes interventions aimed at increasing conservative

environmental concern particularly pressing. American conservatives do not typically identify with the label “environmentalist” and, in some cases, may even distrust environmental science because it is promoted by environmentalists (e.g., Huber, 2008). Appealing to people’s environmentalist identity risks alienating the political cohort that the appeal intends to target. Ecospirituality, in contrast, might be a more fruitful avenue to galvanize care for nature, since our data indicates that conservatives are approximately as ecospiritual as liberals. This idea is an important implication of the current research ripe for future investigation.

7.5. Conclusion

If we are to develop a greater understanding of the cultural causes of the ecological crisis and work towards imagining the possible cultural futures beyond the crisis, then we must first understand the many cultural conceptions of the natural world. The idea that humanity and nature share a spiritual connection is common across cultures but has received little attention in psychological literature. The current work provides some insight into the psychological consequences of relating to nature in spiritual terms and offers one tool—the Ecospirituality Scale—to help generate future research on the topic.

References

Aldrich, J., Blais, A., & Stevenson, L. B. (2018). *Many faces of strategic voting: Tactical behavior in electoral systems around the world*. University of Michigan Press.

Atran, S. (2016). The devoted actor: Unconditional commitment and intractable conflict across cultures. *Current Anthropology*, *57*(S13), S192–S203. https://doi.org/10.1086/685495

Atran, S. (2021). Psychology of transnational terrorism and extreme political conflict. *Annual Review of Psychology*, *72*(1), 471–501. https://doi.org/10.1146/annurev-psych-010419-050800

Atran, S., & Ginges, J. (2012). Religious and sacred imperatives in human conflict. *Science*, *336*(6083), 855–857. https://doi.org/10.1126/science.1216902

Baron, J., & Spranca, M. (1997). Protected values. *Organizational Behavior and Human Decision Processes*, *70*(1), 1–16. https://doi.org/10.1006/obhd.1997.2690

Böhm, G., & Pfister, H. (2005). Consequences, morality, and time in environmental risk evaluation. *Journal of Risk Research*, *8*(6), 461–479. https://doi.org/10.1080/13669870500064143

Brick, C., Sherman, D. K., & Kim, H. S. (2017). "Green to be seen" and "brown to keep down": Visibility moderates the effect of identity on pro-environmental behavior. *Journal of Environmental Psychology*, *51*, 226–238. https://doi.org/10.1016/j.jenvp.2017.04.004

Carr, W. A., Patterson, M., Yung, L., & Spencer, D. (2012). The faithful skeptics: Evangelical religious beliefs and perceptions of climate change. *Journal for the Study of Religion, Nature and Culture*, *6*(3), 276–299. https://doi.org/10.1558/jsrnc.v6i3.276

Carroll, M. P. (2020). What Evicting Grizzly Bear Spirit Does (and Doesn't) Tell Us about Indigenous "Religion" and Indigenous Rights. *Studies in Religion/Sciences Religieuses*,

49(1), 32–49. https://doi.org/10.1177/0008429819854357

Cohen, E. (1976). Environmental orientations: A multidimensional approach to social ecology. *Current Anthropology*, *17*(1), 49–70. https://doi.org/10.1086/201669

Costanza, R., d'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'neill, R. V., & Paruelo, J. (1997). The value of the world's ecosystem services and natural capital. *Nature*, *387*(6630), 253–260. https://doi.org/10.1038/387253a0

Crimston, D., Bain, P. G., Hornsey, M. J., & Bastian, B. (2016). Moral expansiveness: Examining variability in the extension of the moral world. *Journal of Personality and Social Psychology*, *111*(4), 636–653. https://doi.org/10.1037/pspp0000086

Crockford, S. (2017). *After the American dream: The political economy of spirituality in Northern Arizona, USA*. The London School of Economics and Political Science (LSE).

Cruz, S. M. (2017). The relationships of political ideology and party affiliation with environmental concern: A meta-analysis. *Journal of Environmental Psychology*, *53*, 81–91. https://doi.org/10.1016/j.jenvp.2017.06.010

Davis, W. (2009). *The wayfinders: Why ancient wisdom matters in the modern world*. House of Anansi.

Delaney, C. (2005). The Spirituality Scale: Development and psychometric testing of a holistic instrument to assess the human spiritual dimension. *Journal of Holistic Nursing*, *23*(2), 145–167. https://doi.org/10.1177/0898010105276180

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). New trends in measuring environmental attitudes: Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, *56*(3), 425–442. https://doi.org/10.1111/0022-4537.00176

Durkheim, E. (1995). *Elementary forms of the religious life: Newly translated by Karen E. Fields*. Simon and Schuster.

Eliade, M. (1958). *Patterns in comparative religion.(Translated by Rosemary Sheed.) London and New York: Sheed and Ward*. Inc.

Emerson, R. W. (2015). *Nature (1836)*. Harvard University Press.

Eom, K., Hui Tok, T. Q., Saad, C. S., & Kim, H. S. (2021). Religion, environmental guilt, and pro-environmental support: The opposing pathways of stewardship belief and belief in a controlling god. *Journal of Environmental Psychology*, 101717. https://doi.org/10.1016/j.jenvp.2021.101717

Eom, K., Saad, C. S., & Kim, H. S. (2020). Religiosity moderates the link between environmental beliefs and pro-environmental support: The role of belief in a controlling god. *Personality and Social Psychology Bulletin*, 014616722094871. https://doi.org/10.1177/0146167220948712

Feinberg, M., & Willer, R. (2013). The moral roots of environmental attitudes. *Psychological Science*, *24*(1), 56–62. https://doi.org/10.1177/0956797612449177

Ferguson, T. W., & Tamburello, J. A. (2015). The natural environment as a spiritual resource: A theory of regional variation in religious adherence. *Sociology of Religion*, *76*(3), 295–314. https://doi.org/10.1093/socrel/srv029

Freud, S. (1929/2015). *Civilization and its discontents*. Broadview Press.

Fuller, R. C. (2001). *Spiritual, but not religious: Understanding unchurched America*. Oxford University Press.

Fuller, R. C. (2007). Spirituality in the flesh: The role of discrete emotions in religious life. *Journal of the American Academy of Religion*, *75*(1), 25–51.

https://doi.org/10.1093/jaarel/lfl064

Gagnon Thompson, S. C., & Barton, M. A. (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of Environmental Psychology*, *14*(2), 149–157. https://doi.org/10.1016/S0272-4944(05)80168-9

Graham, J., & Haidt, J. (2012). Sacred values and evil adversaries: A moral foundations approach. In M. Mikulincer & P. R. Shaver (Eds.), *The social psychology of morality: Exploring the causes of good and evil.* (pp. 11–31). American Psychological Association. https://doi.org/10.1037/13091-001

Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality and Social Psychology*, *101*(2), 366–385. https://doi.org/10.1037/a0021847

Gray, K., & Wegner, D. M. (2012). Morality takes two: Dyadic morality and mind perception. In M. Mikulincer & P. R. Shaver (Eds.), *The social psychology of morality: Exploring the causes of good and evil.* (pp. 109–127). American Psychological Association. https://doi.org/10.1037/13091-006

Handfield, T. (2020). The coevolution of sacred value and religion. *Religion, Brain & Behavior*, *10*(3), 252–271. https://doi.org/10.1080/2153599X.2019.1678512

Heintzman, P. (2009). Nature-based recreation and spirituality: A complex relationship. *Leisure Sciences*, *32*(1), 72–89. https://doi.org/10.1080/01490400903430897

Huber, P. W. (2008). *Hard green: Saving the environment from the environmentalists: A conservative manifesto*. Basic Books.

Jacquet, J., Hagel, K., Hauert, C., Marotzke, J., Röhl, T., & Milinski, M. (2013). Intra- and intergenerational discounting in the climate game. *Nature Climate Change*, *3*(12), 1025–

1028. https://doi.org/10.1038/nclimate2024

Kaufman, A. H., & Mock, J. (2014). Cultivating greater well-being: The benefits Thai organic farmers experience from adopting Buddhist eco-spirituality. *Journal of Agricultural and Environmental Ethics*, *27*(6), 871–893. https://doi.org/10.1007/s10806-014-9500-4

Keltner, D., & Haidt, J. (2003). Approaching awe, a moral, spiritual, and aesthetic emotion. *Cognition and Emotion*, *17*(2), 297–314. https://doi.org/10.1080/02699930302297

Klain, S. C., Olmsted, P., Chan, K. M. A., & Satterfield, T. (2017). Relational values resonate broadly and differently than intrinsic or instrumental values, or the New Ecological Paradigm. *PLOS ONE*, *12*(8), e0183962. https://doi.org/10.1371/journal.pone.0183962

Labate, B. C., & MacRae, E. (2016). *Ayahuasca, ritual and religion in Brazil*. Routledge.

Mackay, C. M. L., & Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*, *65*, 101323. https://doi.org/10.1016/j.jenvp.2019.101323

Markowitz, E. M., & Shariff, A. F. (2012). Climate change and moral judgement. *Nature Climate Change*, *2*(4), 243–247. https://doi.org/10.1038/nclimate1378

Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, *12*(1), 23–44. https://doi.org/10.1037/1082-989X.12.1.23

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, *24*(4), 503–515. https://doi.org/10.1016/j.jenvp.2004.10.001

Mazutis, D., & Eckardt, A. (2017). Sleepwalking into catastrophe: Cognitive biases and corporate climate change inertia. *California Management Review*, *59*(3), 74–108. https://doi.org/10.1177/0008125617707974

McDonald, R. I., Chai, H. Y., & Newell, B. R. (2015). Personal experience and the 'psychological distance' of climate change: An integrative review. *Journal of Environmental Psychology*, *44*, 109–118. https://doi.org/10.1016/j.jenvp.2015.10.003

Mercadante, L. A. (2014). *Belief without borders: Inside the minds of the spiritual but not religious*. Oxford University Press.

Milfont, T. L. (2007). Psychology of environmental attitudes. *Unpublished Doctoral Thesis, The University of Auckland, Auckland, NZ*.

Milfont, T. L., & Duckitt, J. (2010). The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, *30*(1), 80–94. https://doi.org/10.1016/j.jenvp.2009.09.001

Monroy, M., & Keltner, D. (2022). Awe as a pathway to mental and physical health. *Perspectives on Psychological Science*, 17456916221094856. https://doi.org/10.1177/174569162210948

Muir, J. (2010). *The Yosemite*. Modern Library.

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The Nature Relatedness Scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior*, *41*(5), 715–740. https://doi.org/10.1177/0013916508318748

Ojalehto, B. L., Medin, D. L., & García, S. G. (2017). Conceptualizing agency: Folkpsychological and folkcommunicative perspectives on plants. *Cognition*, *162*, 103–123. https://doi.org/10.1016/j.cognition.2017.01.023

Preston, J. L., & Baimel, A. (2021). Towards a psychology of religion and the environment. *Current Opinion in Psychology*, *40*, 145–149. https://doi.org/10.1016/j.copsyc.2020.09.013

Preston, J. L., & Shin, F. (2017). Spiritual experiences evoke awe through the small self in both religious and non-religious individuals. *Journal of Experimental Social Psychology*, *70*, 212–221. https://doi.org/10.1016/j.jesp.2016.11.006

Preston, J. L., & Shin, F. (2022). Opposing effects of spirituality and religious fundamentalism on environmental attitudes. *Journal of Environmental Psychology*, *80*, 101772. https://doi.org/10.1016/j.jenvp.2022.101772

Rappaport, R. A. (1999). *Ritual and religion in the making of humanity* (Vol. 110). Cambridge University Press.

Rath, S., Banerjee, S., & John, R. (2020). Greater tree community structure complexity in sacred forest compared to reserve forest land tenure systems in eastern India. *Environmental conservation*, *47*(1), 52-59. https://doi.org/10.1017/S0376892919000390

Rican, P., & Janosova, P. (2010). Spirituality as a basic aspect of personality: A cross-cultural verification of Piedmont's model. *International Journal for the Psychology of Religion*, *20*(1), 2–13. https://doi.org/10.1080/10508610903418053

Rickard, L. N., Yang, Z. J., & Schuldt, J. P. (2016). Here and now, there and then: How "departure dates" influence climate change engagement. *Global Environmental Change*, *38*, 97–107. https://doi.org/10.1016/j.gloenvcha.2016.03.003

Rottman, J., Kelemen, D., & Young, L. (2015). Hindering harm and preserving purity: How can moral psychology save the planet?: Harm, Purity, and Environmentalism. *Philosophy Compass*, *10*(2), 134–144. https://doi.org/10.1111/phc3.12195

Sacchi, S., Riva, P., Brambilla, M., & Grasso, M. (2014). Moral reasoning and climate change mitigation: The deontological reaction toward the market-based approach. *Journal of Environmental Psychology*, *38*, 252–261. https://doi.org/10.1016/j.jenvp.2014.03.001

Sachdeva, S. (2017). The influence of sacred beliefs in environmental risk perception and attitudes. *Environment and Behavior*, *49*(5), 583–600. https://doi.org/10.1177/0013916516649413

Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, *21*(4), 327–339. https://doi.org/10.1006/jevp.2001.0227

Searle, J. R. (1995). *The construction of social reality*. Simon and Schuster.

Selin, H. (Ed.). (2003). *Nature Across Cultures* (Vol. 4). Springer Netherlands. https://doi.org/10.1007/978-94-017-0149-5

Sheikh, H., Ginges, J., & Atran, S. (2013). Sacred values in the Israeli-Palestinian conflict: Resistance to social influence, temporal discounting, and exit strategies: Sacred values in intergroup conflict. *Annals of the New York Academy of Sciences*, *1299*(1), 11–24. https://doi.org/10.1111/nyas.12275

Sheikh, H., Gómez, Á., & Atran, S. (2016). Empirical evidence for the devoted actor model. *Current Anthropology*, *57*(S13), S204–S209. https://doi.org/10.1086/686221

Sherkat, D. E., & Ellison, C. G. (2007). Structuring the religion-environment connection: Identifying religious influences on environmental concern and activism. *Journal for the Scientific Study of Religion*, *46*(1), 71–85. http://www.jstor.org/stable/4621953

Singh, A. S., Zwickle, A., Bruskotter, J. T., & Wilson, R. (2017). The perceived psychological distance of climate change impacts and its influence on support for adaptation policy. *Environmental Science & Policy*, *73*, 93–99. https://doi.org/10.1016/j.envsci.2017.04.011

Skitka, L. J., Bauman, C. W., & Sargis, E. G. (2005). Moral conviction: Another contributor to attitude strength or something more? *Journal of Personality and Social Psychology*,

88(6), 895. https://doi.org/10.1037/0022-3514.88.6.895

Skitka, L. J., Hanson, B. E., Morgan, G. S., & Wisneski, D. C. (2021). The psychology of moral conviction. *Annual Review of Psychology*, *72*, 347–366. https://doi.org/10.1146/annurev-psych-063020-030612

Sparkman, G., Lee, N. R., & Macdonald, B. N. J. (2021). Discounting environmental policy: The effects of psychological distance over time and space. *Journal of Environmental Psychology*, *73*, 101529. https://doi.org/10.1016/j.jenvp.2020.101529

Spence, A., & Pidgeon, N. (2010). Framing and communicating climate change: The effects of distance and outcome frame manipulations. *Global Environmental Change*, *20*(4), 656–667. https://doi.org/10.1016/j.gloenvcha.2010.07.002

St John, D., & MacDonald, D. A. (2007). Development and initial validation of a measure of ecopsychological self. *Journal of Transpersonal Psychology*, *39*(1).

Stokols, D. (1990). Instrumental and spiritual views of people-environment relations. *American Psychologist*, *45*(5), 641–646. https://doi.org/10.1037/0003-066X.45.5.641

Suganthi, L. (2019). Ecospirituality: A scale to measure an individual's reverential respect for the environment. *Ecopsychology*, *11*(2), 110–122. https://doi.org/10.1089/eco.2018.0065

Swann, W. B., Jetten, J., Gómez, Á., Whitehouse, H., & Bastian, B. (2012). When group membership gets personal: A theory of identity fusion. *Psychological Review*, *119*(3), 441–456. https://doi.org/10.1037/a0028589

Tam, K.-P. (2019). Anthropomorphism of nature, environmental guilt, and pro-environmental behavior. *Sustainability*, *11*(19), 5430. https://doi.org/10.3390/su11195430

Tam, K.-P., & Milfont, T. L. (2020). Towards cross-cultural environmental psychology: A state-of-the-art review and recommendations. *Journal of Environmental Psychology*, *71*,

101474. https://doi.org/10.1016/j.jenvp.2020.101474

Tarakeshwar, N., Swank, A. B., Pargament, K. I., & Mahoney, A. (2001). The sanctification of nature and theological conservatism: A study of opposing religious correlates of environmentalism. *Review of Religious Research*, *42*(4), 387. https://doi.org/10.2307/3512131

Taylor, B. (2001a). Earth and nature-based spirituality (part I): From deep ecology to radical environmentalism. *Religion*, *31*(2), 175–193. https://doi.org/10.1006/reli.2000.0256

Taylor, B. (2001b). Earth and nature-based spirituality (part II): From Earth First! and bioregionalism to scientific paganism and the new age. *Religion*, *31*(3), 225–245. https://doi.org/10.1006/reli.2000.0257

Taylor, B. (2009). *Dark green religion*. University of California Press.

Taylor, B., Van Wieren, G., & Zaleha, B. D. (2016). Lynn White Jr. and the greening-of-religion hypothesis: Lynn White Jr. and the greening-of-religion. *Conservation Biology*, *30*(5), 1000–1009. https://doi.org/10.1111/cobi.12735

Tetlock, P. E. (2003). Thinking the unthinkable: Sacred values and taboo cognitions. *Trends in Cognitive Sciences*, *7*(7), 320–324. https://doi.org/10.1016/S1364-6613(03)00135-9

Tetlock, P. E., Kristel, O. V., Elson, S. B., Green, M. C., & Lerner, J. S. (2000). The psychology of the unthinkable: Taboo trade-offs, forbidden base rates, and heretical counterfactuals. *Journal of Personality and Social Psychology*, *78*(5), 853–870. https://doi.org/10.1037/0022-3514.78.5.853

Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, *30*(3), 305–314.

https://doi.org/10.1016/j.jenvp.2010.01.003

Ysseldyk, R., Matheson, K., & Anisman, H. (2010). Religiosity as identity: Toward an understanding of religion from a social identity perspective. *Personality and Social Psychology Review*, *14*(1), 60-71. https://doi.org/10.1177/108886830934969