ECOSPiritualitY: CONTENT, CORRELATES AND MORAL CONCERN
FOR NATURE

by

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**Ecospirituality: Content, Correlates and Moral Concern for Nature**

submitted by Matthew Ira Billet in partial fulfillment of the requirements for the degree of Master of Arts in Psychology

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Abstract

We are in the midst of a global ecological crisis. There is a strong argument that the current cultural view of nature as an instrumental resource is failing us, and we must learn from other cultural and religious conceptions of the human-nature relationship. Ecospirituality is the notion that nature—or humanity’s relationship with nature—has spiritual significance. In 6 samples recruited from the United States, United Kingdom, and Canada (Total N = 7213), we investigated three basic questions concerning ecospirituality: (1) what is ecospirituality, (2) who is ecospiritual, and (3) does it matter for the protection of nature? We designed and validated a 12-item measure of ecospirituality and employed self-report measures and moral trade-off scenarios to address these questions. Ecospirituality was negatively correlated with viewing nature as an instrumental and utilizable resource. Items on the Ecospirituality Scale were widely endorsed, and the scale was largely uncorrelated with political orientation and other demographic variables. Ecospirituality predicted how people made decisions in environmentally relevant domains, tending to treat nature as a sacred value. This tendency was expressed in multiple ways: placing a greater importance on deontological principles to inform environmental decisions, explicitly refusing to engage in trade-offs between nature and economic gain, and unconditionally voting for the Green Party. Ecospirituality is a novel topic in psychology and may be important in explaining why some people are willing to make the sacrifices required to live a more sustainable lifestyle.
Lay Summary

Ecospirituality is the notion that nature—or humanity’s relationship with nature—has spiritual significance. Although spiritual and religious beliefs motivate great acts of environmental preservation across the world, ecospirituality remains an unexplored topic in psychology. We developed and validated a 12-item measure of ecospirituality and used this measure to explore three questions: what is ecospirituality, who is ecospiritual, and does ecospirituality matter to environmental preservation. Results from six samples drawn from the United States, United Kingdom, and Canada suggest that ecospiritual beliefs are widely endorsed, largely uncorrelated with political orientation, and uniquely predict moral concern for nature. Efforts to motivate people to preserve nature may benefit from considering the role that people’s spiritual beliefs play in how they view and relate to their natural environment.
Preface

This is the original, unpublished work of the author, Matthew I. Billet. I was responsible for identifying and designing the research program, in consultation with Ara Norenzayan. I conducted all research, including creating and administering online questionnaires and analyzing the data. I was primarily responsible for writing the manuscript, with manuscript edits contributed by Ara Norenzayan, Cindel J.M. White, Brent A. Stewart, and Tessa E.S. Charlesworth. This research was approved by UBC’s Behavioural Research Ethics Board (certificate #H16-02712).
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Introduction

The current ecological crisis has been marked by massive natural resource extraction, widespread environmental contamination, and global biodiversity loss. There is a growing view that cultural beliefs about the human-nature relationship are failing us, and it has become increasingly clear that sustainability requires a shift in the cultural mindset. One powerful source of meaning comes from how various religious and spiritual traditions frame the human-nature relationship. A theme across cultures linked to great acts of environmental protection is that humanity and nature are spiritually connected. Although researchers often discuss the importance of the spiritual orientation towards the natural environment, very little research has been done to examine this orientation, which we call ecospirituality. Thus, we have two aims in the current research: (1) to promote the study of ecospirituality as a psychological construct with theoretical and practical significance, and (2) to investigate the relationship between ecospirituality and moral concern for the environment.

The Spiritual Orientation Towards Nature

Ecospirituality describes beliefs and behaviours that represent nature as having spiritual significance or represent the relationship between humans (or oneself) and the natural world as an essentially spiritual one. In other words, ecospirituality is viewing nature through the lens of spirituality. Spirituality is typically associated with two sentiments: a sense of connection to something greater than oneself (i.e., transcendence) and a sense of purpose and meaning in one’s life. Although these sentiments are often embedded in religious structures, spirituality is a distinct construct from religiosity, which is more concerned with identity, belief, and ritual with
respect to a religious tradition (Fuller, 2001; Saucier & Skrzypińska, 2006; Willard & Norenzayan, 2017). Likewise, ecospirituality is not identified with any particular cultural, moral, philosophical, or religious tradition, but rather describes beliefs and behaviours across a number of traditions (and non-traditions).

To include the broad set of culturally diverse “ecospiritual” phenomena, the definition of ecospirituality must be relatively vague and imprecise; catching many fish at once requires a large net. However, vague and imprecise definitions pose challenges to the development of good psychological measurement tools (Clark & Watson, 2019). Rather than generating items directly from the definition of ecospirituality, we have instead opted to “crowdsource” the operationalization of ecospirituality to individuals, groups, and philosophies that are prototypically ecospiritual (e.g., Booth, 1999; Crockford, 2017; Emerson, 2015; Hubert, 1994; Taylor, 2009). To do this, we have grouped the beliefs that are commonly found in ecospirituality—and might be sensibly used to create a measure of it—into four themes, and we leave as an open empirical question how well these themes fit as a single measure. The themes that typify ecospirituality are: (1) anthropomorphism of nature, (2) powerful experiences in nature, (3) nature as a spiritual resource, and (4) connectedness to nature. We will introduce and briefly illustrate each theme in turn.

Anthropomorphizing—or extending human qualities (chiefly mental qualities) to nature is a recurrent feature of ecospirituality. Anthropomorphism of the natural environment characterizes perhaps the earliest kind of religion in animism (Guthrie, 1993). It continues to be a common theme of people’s relationships with nature, whether in a religious or nonreligious context. In some instances, natural objects are taken to literally be imbued with mental
capabilities and agency, a recurrent theme in a diversity of indigenous communities (Pierotti, 2010), such as the Ngöbe of Panama who characterize plants as social agents to a greater degree than the American university student might (Ojalehto et al., 2017). Literal anthropomorphism of nature is also observed outside of the traditional religious context, as in the New Age spiritualists who attribute intention and agency to the massive rock and crystal formations in Sedona, Arizona (Crockford, 2017). In other instances, these human features are implicitly or metaphorically used to convey supernatural qualities about the natural world, as in, “the stars are like the trees in the forest, alive and breathing. And they're watching me.” (Murakami, 2006). To disentangle the literal and metaphorical mode of anthropomorphism in individuals’ spiritual beliefs about nature is beyond the scope of the current research; for our purposes, they will be treated as one theme.

A second common theme in ecospirituality is the emotional and aesthetic impressions that result from powerful experiences in nature. Direct experience is an important aspect of the spiritual orientation in general (e.g., Willard & Norenzayan, 2017); experiences of the sublime (as in Burke, 1958) and of awe facilitate feelings of spiritual unity and enlightenment (Hendricks, 2018; Keltner & Haidt, 2003). In ecospirituality, the appropriate location for these experiences is within nature. Take, for example, the vision quests that are practiced in a number of contemporary indigenous communities, in which fasting is used to facilitate the occurrence of emotionally intense and spiritually significant experiences (Arbesmann, 1951; Blumensohn, 1933; Brown, 2012). This theme is also expressed in the work of the American transcendentalists, who retreated to nature for spiritual renewal (Emerson, 2015; Thoreau, 1981), and by outdoor recreationalists who report experiencing a spiritual connection to nature through
activities like surfing and mountaineering (e.g., Heintzman, 2009; Taylor, 2007). In such cases, spiritual appraisals of nature are catalyzed by powerful emotional and aesthetic experiences in the outdoors, which, in themselves, may also be considered spiritual.

The third common theme is viewing nature as a spiritual resource. A spiritual resource helps one connect with the sacred and satisfy one’s spiritual needs (Ferguson & Tamburello, 2015). Spiritual resources may be attached to a group’s religious or cultural identity (Durkheim, 1995) and/or facilitate individuals’ relationship to the divine (James, 1985). Nature has been cast in both roles across cultures. The identities of many indigenous peoples across the world are intimately connected to the land and with specific sacred sites—like burial sites—connecting them with their histories and their mythologies (Hubert, 1994). A more individualistic notion, expressed by the likes of John Muir (2010), holds nature as the provider of spiritual nourishment, “no holier temple has ever been consecrated by the heart of man” (p.262). Recent research in the United States suggests that natural amenities do indeed compete with local religious institutions for participants, controlling for other forms of recreation and entertainment available in the region (Ferguson & Tamburello, 2015). The spiritual orientation is thus often accompanied by appraisals of nature’s spiritual value, which is to say, natural sites connect one with the transcendent and give the life of the individual or the community meaning and context.

The fourth common theme in ecospirituality is that humans share an intimate connection with the natural world. This is perhaps the most well-studied aspect of ecospirituality in the extant psychological literature, with multiple lines of work devising measures of the construct and demonstrating the relationship between connectedness to nature and pro-environmental behaviour (Klain et al., 2017; Mayer & Frantz, 2004; Nisbet et al., 2009; Schultz, 2001; St. John
& MacDonald, 2007). Expressed in psychological terms, connectedness to nature can be understood as “the extent to which an individual includes nature within his/her cognitive representation of self” (Schultz, 2002, p.67). This theme manifests in the personal, as a sense of one’s own connection with nature, as well as the philosophical, as exemplified by Gaianism’s belief that Earth is a superorganism of which humans constitute only one part (Lovelock, 2000).

The extent to which these themes constitute a single psychological construct is an open question, but it is often the case that, in anecdotal examples, these themes co-occur and mutually reinforce each other. Take, for example, Julia Hill, who protested deforestation by living atop a 180-foot California redwood for two years. She states being motivated by a spiritual connection to the redwood forest and recounts many intense experiences atop the tree which heightened her sense of nature’s apparent consciousness and relatedness, “I was making a spiritual connection...I found myself crying a lot and hugging Luna [the tree] and telling her I was sorry” (as quoted in Taylor, 2009, p.94). In quite a different cultural context, Australian indigenous peoples believe that living spirits dwell within their sacred sites and the active care for these spirits through the maintenance of the sites ensures the well-being of life in the region (Hubert, 1994). Likewise, the perception that deities (and ancestors in some cases) reside in the sacred groves of India motivates the treatment of these groves as spiritual resources, and appropriate places for ritual sacrifice, ceremony, vow-taking, and prayer (Malhotra et al., 2001). These examples also hint at how the spiritual orientation towards nature may elevate natural sites to places of moral concern and protection, even when those sites may otherwise be utilized for resources and economic gain.
Moral Concern for Nature

The Sacred Frame

When something possesses transcendental significance, it is considered to be sacred (Atran, 2016; Baron & Spranca, 1997; Tetlock et al., 2000). Sacred values have certain properties that separate them from things that are simply highly valued. For one, they cannot be exchanged for, or even equated with, things that are not sacred, such as money. Second, people are willing to endure immense costs, like torture and death, to preserve what they hold sacred.

With the use of moral trade-off paradigms, in which participants consider the material benefits of transgressing against a sacred value, researchers have identified several indicators of sacred values, including intense negative moral emotions and cognitive biases like quantity insensitivity, moral universalism, and the denial of benefits through wishful thinking (Baron & Spranca, 1997; Graham & Haidt, 2012; Tetlock et al., 2000). Sacred values thus exist beyond any rational consideration of costs and benefits, leading some scholars to posit a psychology of the “devoted actor” distinct from the traditional psychology of the “rational actor” (Atran, 2016).

Unlike utility-maximizing rational actors, devoted actors act in defense of sacred values in ways that cannot be explained by the relative balance of material risks and rewards that are associated with a given decision (Atran, 2016).

Our previous examples help illustrate the relationship between ecospirituality and holding nature sacred. Land may possess spiritual value for a community or individual through its relation to the holy and the divine (e.g., deities and ancestors in Indian sacred groves) or through people’s lived connection with it (e.g., the American National Parks system). Land that possesses these qualities becomes sanctified and separated from land that does not (Cohen, 1976). This
process of sanctification alters the kind of moral concern allotted to the land (though it may not always lead to the actual protection of the land—see Sachdeva, 2017). Whereas non-sacred land is governed by the moral of harm—cutting down 10 trees is worth saving 100 lives—land that is sacred is instead governed by the moral of purity—profane use of this land desecrates it. In this way, the spiritual orientation towards nature is a pathway to moral concern for nature that may be better characterized by the devoted actor model than the rational actor model.

Identity fusion is another pathway to devoted actor psychology (Atran, 2016; Swann et al., 2012). People are sensitive to transgressions against the values that define who they are and what groups they identify with. Studies in places of political and religious conflict demonstrate that people who have identities fused with their groups express a greater willingness to make costly sacrifices—sometimes in terms of their own lives or the safety of their families—in the service of what they hold sacred (Atran, 2021; Sheikh et al., 2013, 2016). Strongly identifying as an “environmentalist” may facilitate a willingness to endure costs and forego benefits in the service of preserving nature through a similar mechanism. This may also help explain the empirical relationship between identifying as an environmentalist and pro-environmental attitudes and behaviours (Brick et al., 2017; Kashima et al., 2014; Whitmarsh & O’Neill, 2010).

Theoretically, ecospirituality and identifying strongly with other environmentalists may act as two complementary pathways to treating nature as a sacred value. Conceptually speaking, the two constructs are quite different. Ecospirituality is centered on people’s relationship with nature, while environmentalist identity is centered on people’s relationship with their group (i.e., environmentalists). Furthermore, the identity of “environmentalist” contains additional culturally specific notions about what it means to be an environmentalist that are not necessarily associated
with ecospirituality (Kashima et al., 2014). These notions may include political beliefs and behaviours that define the prototypical environmentalist. Ecospirituality does not define an in-group identity in the same way that being an “environmentalist” does. For this reason, it is possible that ecospiritual beliefs may be endorsed more freely by people who hold other potentially conflicting group identities (religious, political). It is also possible that environmentalist identity is associated to a greater extent with the pro-environmental behaviours that are generally associated with environmentalism, namely those involving political activism.

The Instrumental Frame

The sacred framing of nature is not the predominant view in the West. Rather, scholars have argued that the West has historically framed nature “merely as a means or medium for the achievement of individual or collective ends, and not as a value in itself” (Cohen, 1976, p.54; Heidegger, 1954; Milfont et al., 2013; Preston & Baimel, 2021; White, 1967). In other words, nature is categorized amongst other instruments—material, food, fuel—and is valued to the extent it helps achieve desired ends—construction, consumption, energy production. As a consequence, destroying a pristine forest to produce lumber of greater value (for the shelters it can build and the biofuel it can provide) may be justified on the basis of an economic utility calculation. The instrumental frame does not exclude the possibility that nature provides spiritual value, only it argues that spiritual value can ultimately be quantified in dollar terms (Costanza et al., 1997).

The instrumental frame is widespread in the West, and is used by governments, corporations, scientists (e.g., Bradbury et al., 2021), and even conservation foundations (e.g., Baker & Macdonald, 2004). Why is this the case? Cultural conceptions of the human-nature relationship are inextricably linked to a culture’s religious heritage (Kristensen, 1960; White,
Religious ideas inherited from Western Christianity, namely, that humanity has dominion over nature and that nature does not possess spirit nor consciousness, seemed to have had a profound influence on how we relate to the natural world (White, 1967). When nature is an equal to humanity and possesses a thinking, feeling mind, people are more likely to extend their moral concern to it (Gray et al., 2012; Milfont et al., 2013, 2017; Tam, 2019). The absence (reversal?) of these beliefs makes the objectification of nature more accessible and therefore lifts the moral burden of exploiting nature. Growing evidence shows that a culture’s religious history can continue to exert influence over the moral psychology of its people even centuries after formal laws and norms have changed (Henrich, 2020; Norenzayan, 2013; Valencia Caicedo, 2019), suggesting that the instrumental frame is likely to persist despite the gradual decline of the explicit religious beliefs that scaffolded its development.

The pervasiveness and persistence of the instrumental frame of nature in Western culture poses a challenge for realizing a sustainable future. This is because choosing to preserve nature often involves (or is perceived to involve) heavy social and personal economic costs, like lower opportunity for employment and higher consumer prices for goods like gasoline. When nature is viewed instrumentally, the immediate sacrifices required to protect it may be judged as not worth the delayed benefits. Although there are examples of environmental protection motivated by instrumental concerns for nature (e.g., sport hunters and the American national parks and forest reserves; Dunlap, 1988), the instrumental frame fails when the purposes for which nature is to serve can be more easily satisfied by alternative solutions. The sacred frame differs from the instrumental frame because something of spiritual, cultural, or moral value is valued in and of itself—it cannot be replaced by alternatives. For this reason, ecospirituality—the belief that nature
possesses spiritual significance—may be an under-appreciated determinant in decision-making that involves economic sacrifices to preserve nature.

**The Current Research**

Little is known about ecospirituality in the psychological literature. The fundamental questions about what ecospirituality is, who is ecospiritual, and in what ways ecospirituality matters for the preservation of nature all remain open to empirical inquiry. The present research has three aims. First, we investigate the relationship between ecospirituality and other relevant constructs. Second, we investigate the distribution and demographic correlates of ecospirituality. Third, we investigate if ecospirituality uniquely predicts pro-environmental attitudes and the propensity to treat nature as a sacred value.

The gap in the psychological literature on ecospirituality is perhaps due, in part, to the lack of a viable measurement tool. Some scales have been proposed to measure ecospirituality (Delaney, 2005; Kaufman & Mock, 2014; Rican & Janosova, 2010; Suganthi, 2019), while others capture specific aspects that we consider a subpart of ecospirituality (e.g., Tam, 2019; Waytz et al., 2010). There is still a need for an ecospirituality scale that captures the complexity of the construct, is face valid, and not conflated with potential outcome variables. For these reasons, we construct a multifactor measure for ecospiritual beliefs in Study 1 using a top-down method and continue to validate the measure across all samples.

**Overview of Studies**

In Study 1, using an online American census-matched sample and a Canadian university student sample, we develop a measure for ecospiritual beliefs—the “Ecospirituality Scale”—and examine its convergent, discriminant, and incremental validity in predicting environmental
citizenship and moral concern for nature. In the Canadian university sample, which was collected at two time points, we also assess the test-retest reliability of the Ecospirituality Scale.

In Study 2, drawing on 2 online American samples, we examine the explanatory potential of ecospirituality in response to trade-offs between economic gain and environmental protection. Using these moral trade-off scenarios, we assess willingness to sacrifice societal and personal gains to protect nature, moral emotion, and cognitive biases associated with treating nature as a sacred value. Additionally, in line with key features of sacred values known from previous work (Atran, 2016; Atran & Ginges, 2012; Böhm & Pfister, 2005; Tetlock et al., 2000), we investigate how response patterns to the trade-off scenarios vary as a function of temporal and spatial distance. Specifically, we examine if ecospirituality uniquely predicts the refusal to “put a price on nature” (i.e., refusing to engage in a taboo trade-off), and if this relationship displays insensitivity to variation in time and space.

In Study 3, we recruit an online Canadian sample of nature club members and a general club member comparison group, as well as an online United Kingdom sample of Green Party affiliated voters. In the Canadian club member sample, we replicate trade-off findings from Study 2 and investigate if ecospirituality also predicts belonging to a nature club. In both the Canadian and UK samples, we investigate if ecospirituality predicts an unconditional (rather than strategic/instrumental) voting style in favor of the Green Party and examine the discriminant validity of the Ecospirituality Scale with respect to attitudes about utilizing nature (i.e., the instrumental frame).  

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1 Pre-registered methodological and analytical plans for Studies 2 and 3 were uploaded in time-stamped files to the Open Science Framework (https://osf.io/sv439/?view_only=2d6bc0849e354301ae0b1b02300e26ce &
Study 1: Developing and Validating the Ecospirituality Scale

Method

Participants and Measures

For Study 1, we collected a census-matched sample of N = 493 American Turk Prime survey workers using the Cloud Research Prime Panels service, as well as a religiously diverse Canadian university student sample of N = 4520. The Canadian university sample was collected using the university human research subject pool pre-testing surveys, which were administered at the beginning of the fall and winter semesters of the 2020-2021 academic year. Students could complete the prescreening survey at any point in the semester. Demographics details for all samples can be found in Table 1. Participants in Sample 1 (USA Census-Matched) completed the following measures:

Ecospirituality Items. We developed 38 self-report items (Table 2) based on the four common themes of ecospiritual beliefs derived from a survey of sources on ecospirituality (e.g., Booth, 1999; Crockford, 2017; Emerson, 2015; Hubert, 1994; Taylor, 2009). Nine items assessed anthropomorphism of nature. Ten items assessed powerful experiences in nature. Eleven items assessed the belief that nature is a spiritual resource. Eight items assessed a sense of connectedness with nature. Respondents reported their agreement with these statements on a seven-point scale.

Environmentalist Identity. Participants completed the four-item scale from Brick et al., (2017), which included the following items: “I see myself as pro-environmentalist”; “I am

https://osf.io/zz62f/?view_only=5571b0d8366d4ad6bc22c1312ac37c82). Due to human error, these files were not formally uploaded as registered documents. In the interest of presenting our results succinctly, and in the way most representative of the data, we do not strictly adhere to the analytical details of our pre-registrations.
pleased to be pro-environmentalist”; “I feel strong ties with pro-environmentalist people”; and “I identify with pro-environmentalist people”. Respondents reported their agreement with these statements on a five-point scale, and the items were combined into a composite (α = 0.95).

**New Ecological Paradigm (NEP).** Participants completed Dunlap et al.’s (2000) 15-item scale assessing attitudes about environmental issues such as human domination over nature (e.g., “Humans were meant to rule over nature”) and the state of the ecological crisis (e.g., “If things continue on their present course, we will soon experience a major ecological catastrophe”). Respondents reported their agreement with these statements on a five-point scale, and the items were combined into a composite (α = 0.83).
### Table 1. Demographic Composition of Each Sample.

<table>
<thead>
<tr>
<th></th>
<th>Study 1 (USA Census-matched)</th>
<th>Study 2 (Canadian University)</th>
<th>Study 2 (USA)</th>
<th>Study 3 (Canadian Club Members)</th>
<th>Study 2 (UK Green Party Affiliated)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total N</strong></td>
<td>493</td>
<td>4520</td>
<td>468</td>
<td>469</td>
<td>702</td>
</tr>
<tr>
<td><strong>Sex: Female</strong></td>
<td>267 (54%)</td>
<td>3281 (73%)</td>
<td>234 (50%)</td>
<td>247 (53%)</td>
<td>418 (60%)</td>
</tr>
<tr>
<td><strong>Age: Mean (SD)</strong></td>
<td>45-54 [18-24, 85+]*</td>
<td>20.3 (3.28)</td>
<td>37.6 (13.0)</td>
<td>39.3 (13.6)</td>
<td>45.2 (16.5)</td>
</tr>
<tr>
<td><strong>Household Income: Median</strong></td>
<td>$40k - $69k</td>
<td>$100k - $150k</td>
<td>$40k - $69k</td>
<td>$40k - $69k</td>
<td>$70k - $99k</td>
</tr>
<tr>
<td><strong>Ethnicity: White</strong></td>
<td>303 (62%)</td>
<td>1100 (24%)</td>
<td>323 (69%)</td>
<td>317 (68%)</td>
<td>543 (77%)</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Christian</strong></td>
<td>289 (59%)</td>
<td>951 (21%)</td>
<td>270 (58%)</td>
<td>266 (57%)</td>
<td>307 (44%)</td>
</tr>
<tr>
<td><strong>Non-Religious</strong></td>
<td>139 (28%)</td>
<td>2186 (48%)</td>
<td>157 (34%)</td>
<td>159 (34%)</td>
<td>315 (45%)</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>64 (13%)</td>
<td>289 (6%)</td>
<td>41 (9%)</td>
<td>44 (9%)</td>
<td>79 (11%)</td>
</tr>
<tr>
<td><strong>Political Orientation</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Liberal</strong></td>
<td>189 (38%)</td>
<td>2580 (57%)</td>
<td>234 (50%)</td>
<td>225 (48%)</td>
<td>350 (50%)</td>
</tr>
<tr>
<td><strong>Centrist</strong></td>
<td>158 (32%)</td>
<td>938 (21%)</td>
<td>102 (22%)</td>
<td>106 (23%)</td>
<td>190 (27%)</td>
</tr>
<tr>
<td><strong>Conservative</strong></td>
<td>145 (29%)</td>
<td>383 (9%)</td>
<td>132 (28%)</td>
<td>137 (29%)</td>
<td>160 (23%)</td>
</tr>
<tr>
<td><strong>Education: Post-Secondary Degree</strong></td>
<td>217 (44%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Age was measured in bins rather than free response in Study 1 (Sample 1), so we present the median [min, max] age in years.

**Reasoning Style about the Environment.** Participants completed the eight-item scale from Sacchi et al., (2014) assessing the degree to which participants believed that decisions about environmental issues should be made based on deontological values (i.e., principles and duty) or utilitarian values (i.e., consequences and net-value). Respondents rated how important...
each of these values were on a five-point scale. We made a composite of the four items that assessed a deontological orientation (α = 0.78) and a composite of the four items that assessed a utilitarian orientation (α = 0.71).

**Consumerism.** Participants completed the 17-item scale from Richins & Dawson (1992) assessing the perceived importance of acquisition and possession of material goods and luxury products (e.g., “Some of the most important achievements in life include acquiring material possessions”). Respondents reported their agreement with these statements on a seven-point scale, and the items were combined into a composite (α = 0.89).

**Inclusion of Nature in Self Scale (INS).** Participants completed Schultz’s (2001) single item graphical measure of connectedness to nature. Participants selected from a set of seven pairs of circles—one representing the self and the other representing the natural environment—the pair that best captured how closely related humans are to the natural world. The greater the overlap between the two circles, the more closely the participant identified humanity with the natural environment. This item was scored on a seven-point scale from no overlap to complete overlap. Due to a strong negative skew, the scores were log corrected (skeworiginal = -1.13; skewlog corrected = -0.45).

**Environmental Citizenship.** We used Stern et al.’s (1999) eight-item scale to assess support for the environmental movement and engagement in pro-environmental civic behaviour, such as signing petitions to protect the environment, writing letters to Congress, or avoiding buying products from companies that harm the environment. Participants indicated Yes/No for the first seven items inquiring about their participation in various civic activities, and then rated
how much they support the environmental movement on a four-point scale which was rescaled to 0, 0.33, 0.67, and 1. Items were summed to form a composite ($\alpha = 0.82$).

**Moral Expansiveness for Nature.** As a measure of moral concern for the environment, we modified the Moral Expansiveness Scale (Crimston et al., 2016) to include, amongst other targets, five nature targets (old-growth forest, desert, mountains, ocean, Yosemite National Park). Participants viewed a graphical prompt describing four concentric circles of moral concern that extend out from the self and were asked to place various targets from a list into these moral circles. Circles nearer to the self indicated greater moral concern. The nature targets were scored on a scale of one (no moral concern) to four (highest level of moral concern), and then combined into a composite ($\alpha = 0.94$). The six non-nature targets were combined into a general moral concern composite ($\alpha = 0.73$).

**Religious Beliefs.** Participants completed items assessing belief in god (“How important is God in your life?”), their level of religiosity (“How religious are you?”), and their level of spirituality (“How spiritual are you?”). All three items were scored on a seven-point scale from “Not at all” to “Very”. Participants also indicated their religious affiliation from a list of religions, for which a religious affiliation dummy variable was generated (0 = no religious affiliation, 1 = religious affiliation). The belief in god item, religiosity item, and religious affiliation dummy scores—but not the spirituality item—were standardized and combined into a religiosity composite ($\alpha = 0.87$).

**Other Variables.** Participants also provided demographic information, including age, gender, household income, level of education, and ethnicity. They also reported their political orientation on a seven-point scale from “Very liberal” to “Very conservative”.
Due to time constraints, participants in Sample 2 (Canadian University) completed only the reduced 12-item Ecospirituality Scale, the four-item environmentalist identity measure, and basic demographic items.

Table 2. All 38 Ecospirituality Items Assessed in Study 1 (Sample 1: USA Census-Matched).

<table>
<thead>
<tr>
<th>Anthropomorphism of Nature</th>
<th>Powerful Experiences in Nature</th>
<th>Nature as a Spiritual Resource</th>
<th>Connectedness to Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature, in general, possesses human qualities</td>
<td>When I am in nature, I have spiritual experiences</td>
<td>Nature is alive with consciousness</td>
<td>I have had the experience of feeling at one with nature$^a$</td>
</tr>
<tr>
<td>Mountains are imbued with consciousness</td>
<td>When I am in nature, I feel a sense of awe</td>
<td>There is sacredness in nature</td>
<td>I feel I am part of a larger whole that is nature</td>
</tr>
<tr>
<td>Oceans have intention</td>
<td>When I am in nature, I feel harmony</td>
<td>Everything in nature has a soul</td>
<td>Humans are embedded in the web of life</td>
</tr>
<tr>
<td>The sky has personalities</td>
<td>Sometimes I am overcome with the beauty of nature</td>
<td>Nature is a spiritual resource</td>
<td>When I think of my life, I imagine myself to be part of a larger cyclical process of living$^b$</td>
</tr>
<tr>
<td>Jungles experience moods</td>
<td>I experience the holy when I am in the natural world</td>
<td>Everything in the natural world is spiritually interconnected</td>
<td>I often feel kinship with animals and plants$^b$</td>
</tr>
<tr>
<td>Deserts have their own languages</td>
<td>I feel intense wonder towards nature</td>
<td>There is a spiritual connection between human beings and the natural environment</td>
<td>I feel that all inhabitants of Earth--human and non-human--share a common &quot;life force&quot;$^b$</td>
</tr>
<tr>
<td>Forests can have thoughts</td>
<td>I have been healed by nature</td>
<td>Nature deserves worship</td>
<td>I often feel like I am only a small part of the natural world around me, and that I am no more important than the grass on the ground or the birds in the trees</td>
</tr>
<tr>
<td>Ecosystems can feel pain</td>
<td>I have a deep emotional connection to nature</td>
<td>Nature is innocent and uncorrupt</td>
<td>Earth is a single living organism</td>
</tr>
<tr>
<td>Nature can be vengeful</td>
<td>There is nothing like the feeling of being in nature</td>
<td>Nature, for me, is like god for religious people</td>
<td></td>
</tr>
</tbody>
</table>

$^a$ Items from St. John & MacDonald (2007)
$^b$ Items from Mayer & Frantz (2004)
Results

Ecospirituality Scale Item Reduction and Factor Structure

In the USA census-matched sample (N = 493), we conducted parallel factor analysis with the maximum likelihood method of estimation to reduce the initial pool of 38 ecospirituality items. Parallel analysis suggested five factors or three components. We tested the three- and five-factor solutions using an oblimin rotation and maximum likelihood method. Both solutions offered adequate fit, and we decided to continue with the three-factor solution to maintain greater parsimony (collapsing the powerful experiences and connectedness to nature items into one factor, rather than dividing the powerful experiences items into two factors). The three factors generally corresponded to the conceptual distinctions we used to generate the items and can be summarized as follows: 1) Anthropomorphism of Nature, 2) Powerful Experiences in Nature, and 3) Viewing Nature as a Spiritual Resource. The four highest loading items for each of the three factors were selected to constitute the final Ecospirituality Scale.

No items from the original connectedness to nature item set were included in the final scale. These items were largely accounted for by the experiences in nature items: they belonged to the same factor in the three-factor solution and generally had lower factor loadings than the experience items. Notably, the connectedness to nature items did not factor with the spiritual connection items as one might have expected (e.g., “There is a spiritual connection between human beings and the natural environment”). This empirically highlights the conceptual

2One item in the powerful experiences factor was found to have high residual correlations (greater than .1) with items in the anthropomorphism factor, and was thus replaced with the next highest factor loaded item that did not have high residual correlations.
distinction between the sorts of connectedness beliefs previously assessed in the psychological literature and a distinctly spiritual flavour of connectedness. Therefore, we also drop the original connectedness to nature items to increase the capacity for the scale to discriminate spiritual environmental sentiments from environmental sentiments more generally.

An exploratory factor analysis in the same sample on the selected 12 items using a maximum likelihood method of extraction and an oblimin rotation revealed three eigenvalues greater than 1 (6.40, 2.01, 1.13) corresponding to three factors that cumulatively accounted for 70.4% of variance in the scores. Table 3 presents the 12 items and their factor loadings, as well as the proportion of variance accounted for by each factor. The factors were moderately correlated; anthropomorphism correlated $r = 0.38$ with viewing nature as a spiritual resource and $r = 0.59$ with powerful experiences in nature, while powerful experiences correlated $r = 0.60$ with viewing nature as a spiritual resource.

**Test-Retest Reliability and Psychometric Properties in Canadian University Students**

In a large sample of Canadian university students, the 12-item Ecospirituality Scale demonstrated high internal consistency reliability (Cronbach’s $\alpha = 0.88$). The test-retest reliability was assessed in the subset of students who completed the pre-testing survey in both semesters of the school year ($n = 979$). The test-retest correlation was $r = 0.79$, 95% CI [0.75, 0.82]. This was comparable to the well-established environmentalist identity measure that was also administered in this sample ($r = 0.76$, [0.73, 0.80]).
Confirmatory factor analysis (n = 4357\(^3\)) indicated the three-factor solution had good fit, \(\chi^2(51) = 1066.95, p < 0.001, \text{CFI} = 0.97, \text{RMSEA} = 0.068 (90\% \text{ CI} = [0.064, 0.071]), \text{SRMR} = 0.044.\) Factor loadings are presented in Table 3. The three factors were all positively correlated: anthropomorphism correlated with powerful experiences \((r = 0.30)\) and nature as a spiritual resource \((r = 0.53)\), while powerful experiences and nature as a spiritual resource correlated \((r = 0.52).\)^4

\(^3\) For participants who completed the survey at both time points, only responses at time one were included to avoid double counting.

\(^4\) One item (“There is sacredness in nature”) was removed from the spiritual resource subscale of the Ecospirituality Scale for all analyses henceforth due to its similarity to dependent variables of interest. This did not change results in any meaningful way; the total scale with and without the item shared a perfect correlation of \(r = 1.00\), and the spiritual resource subscale with and without the item shared a correlation of \(r = .98\).
Table 3. Three-Factor EFA Loadings Study 1.

<table>
<thead>
<tr>
<th>Item</th>
<th>USA Census-Matched</th>
<th>Canadian University Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Jungles experience moods</td>
<td>.95</td>
<td>.86</td>
</tr>
<tr>
<td>2. Deserts have their own languages</td>
<td>.93</td>
<td>.82</td>
</tr>
<tr>
<td>3. The sky has personalities</td>
<td>.92</td>
<td>.80</td>
</tr>
<tr>
<td>4. Forests can have thoughts</td>
<td>.86</td>
<td>.77</td>
</tr>
<tr>
<td>5. I feel intense wonder towards nature</td>
<td>.84</td>
<td>.72</td>
</tr>
<tr>
<td>6. When I am in nature, I feel a sense of awe</td>
<td>.89</td>
<td>.86</td>
</tr>
<tr>
<td>7. Sometimes I am overcome with the beauty of nature</td>
<td>.74</td>
<td>.75</td>
</tr>
<tr>
<td>8. There is nothing like the feeling of being in nature</td>
<td>.66</td>
<td>.67</td>
</tr>
<tr>
<td>9. There is a spiritual connection between human beings and the natural environment</td>
<td>.90</td>
<td>.77</td>
</tr>
<tr>
<td>*10. There is sacredness in nature</td>
<td>.71</td>
<td>.58</td>
</tr>
<tr>
<td>11. Everything in the natural world is spiritually interconnected</td>
<td>.78</td>
<td>.87</td>
</tr>
<tr>
<td>12. Nature is a spiritual resource</td>
<td>.77</td>
<td>.88</td>
</tr>
<tr>
<td>Variance explained by factor</td>
<td>28%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>21%</td>
<td></td>
</tr>
</tbody>
</table>

Note: Factor loadings below .32 are suppressed.
*Item 10 was removed from all subsequent analyses due to possible confounding with dependent variables of interest.

What is Ecospirituality: Convergence with Other Environmental Attitudes

Table 4 presents the bivariate correlations in the US census-matched sample. Ecospirituality was positively correlated with environmentalist identity ($r = 0.59$), a relationship that was weaker in the Canadian University sample ($r = 0.36$; $n=4262$). Ecospirituality was also positively correlated with the NEP and INS only moderately ($r = 0.26$ and $0.31$, respectively), suggesting that the scale is not completely accounted for by pro-environmental attitudes nor connectedness to nature.
Ecospirituality was uncorrelated with consumerism, which may be conceptualized as an anti-environmental attitude. Ecospirituality did not discriminate between the two moral reasoning styles for environmental decisions. Instead, we found that ecospirituality moderately positively predicted the endorsement of the importance of both deontological and utilitarian principles for environmental decisions. This may be an artefact of the high collinearity between the two reasoning styles observed in this sample ($r = 0.56$).

**Table 4. Bivariate Correlations Study 1 Sample 1 (US census-matched; N=493).**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Ecospirituality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Environmental Identity</td>
<td>0.59***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Deontology</td>
<td>0.39***</td>
<td>0.40***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Utilitarianism</td>
<td>0.35***</td>
<td>0.26***</td>
<td>0.56***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) New Ecological Paradigm</td>
<td>0.26***</td>
<td>0.33***</td>
<td>0.21***</td>
<td>-0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Consumerism</td>
<td>0.04</td>
<td>0.02</td>
<td>-0.04</td>
<td>0.04</td>
<td>-0.29***</td>
<td></td>
</tr>
<tr>
<td>(7) Inclusion of Nature in Self Scale</td>
<td>0.31***</td>
<td>0.34***</td>
<td>0.18***</td>
<td>0.16***</td>
<td>0.26***</td>
<td>-0.10*</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01  ***p<.001

**Who is Ecospiritual: Distribution, Demographics, and Religiosity**

Next, we examined the prevalence of ecospiritual beliefs and their association with demographic characteristics. Our results suggest that ecospiritual beliefs were fairly common in the American sample (which was sampled to be somewhat representative of the American population at large). Average agreement with the scale was found to be above the scale’s midpoint of 4.0 ($M = 4.90$, $SD = 1.20$), and each of the three subscales were negatively skewed. Powerful experiences was the most well-endorsed factor ($M = 5.51$, $SD = 1.15$), followed by
nature as a spiritual resource ($M = 5.13$, $SD = 1.43$) and anthropomorphism ($M = 4.13$, $SD = 1.77$). Similar trends were found in the Canadian University sample, with a total scale mean of 4.77 ($SD = 1.03$).

In both samples, ecospirituality was significantly negatively correlated with conservative political orientation ($r = -0.15$ and -0.13 for US and Canadian samples, respectively). The magnitudes of these correlations are small compared to those found between environmentalist identity and political conservatism ($r = -0.25$ and -0.35 for US and Canadian samples, respectively), as well as the correlation between the NEP and political conservatism ($r = -0.35$). Ecospirituality also shared a small correlation with female gender in the Canadian University sample ($r = 0.18$), which was not found in the American sample. Overall, ecospirituality was not robustly significantly correlated with most demographic variables across samples, such as household income, age, and level of education.

Only the American sample responded to measures of religiosity and spirituality. People who held ecospiritual beliefs tended to report being more spiritual ($r = 0.36$) but not more religious, despite the strong correlation between religiosity and spirituality ($r = 0.62$). Furthermore, when controlling for the mutual effects of religiosity and spirituality on ecospirituality, we found that spirituality was a significant positive predictor ($\beta = 0.50$), while religiosity was a significant negative predictor ($\beta = -0.23$). These findings suggest that ecospirituality may appeal to the “spiritual-but-not-religious” population.

**Does Ecospirituality Matter: Environmental Citizenship and Moral Concern for Nature**

In the American sample, we investigated ecospirituality’s predictive validity by assessing two conceptually distinct dependent variables. The first, environmental citizenship, is a measure
of civic involvement and activism for the environment. The second, moral expansiveness for nature, captures how close to one’s innermost moral circle one places nature. Ecospirituality was regressed onto each dependent variable, controlling for environmentalist identity, political orientation, religiosity, age, gender, household income, and educational attainment (see Table 5). The average moral expansiveness ratings for the six non-nature targets were also used as a control variable when predicting moral expansiveness for nature. Ecospirituality remained a unique predictor of moral expansiveness for nature (β = 0.26), while its relationship with environmental citizenship was accounted for by environmentalist identity. Follow-up analyses assessing the relative contribution of each subscale of the Ecospirituality Scale suggested that anthropomorphism and powerful experiences were driving the effect of ecospirituality on citizenship and expansiveness for nature.

This study provided evidence for the three-factor structure and test-retest reliability of the Ecospirituality Scale. In American survey workers and Canadian university students, ecospirituality scores were above the scale’s midpoint, suggesting these beliefs are fairly common (bracketing the possibility of response bias). Ecospirituality positively correlated with both a deontological and utilitarian reasoning style about the environment, which may be attributed to the high collinearity between the two reasoning styles in this sample. Ecospirituality was highly correlated with identifying as an environmentalist; still, both were unique predictors of having moral concern for nature. Unlike moral concern for nature, the relationship between ecospirituality and environmental citizenship was fully accounted for by other variables. Study 2 follows up on these results and extends our investigation to focus more directly on the relationship between ecospirituality and treating nature as a sacred value.
**Table 5. Predicting Concern for Nature Study 1 Sample 1 (US census-matched; N=493).**

<table>
<thead>
<tr>
<th>Predictors</th>
<th>β</th>
<th>95% CI</th>
<th>β</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecospirituality</td>
<td>0.04</td>
<td>-0.05,0.13</td>
<td>0.26</td>
<td>0.15,0.37</td>
</tr>
<tr>
<td>Environmentalist Identity</td>
<td>0.49</td>
<td>0.39,0.58</td>
<td>0.18</td>
<td>0.06,0.29</td>
</tr>
<tr>
<td>General Moral Expansiveness</td>
<td></td>
<td></td>
<td>0.16</td>
<td>0.07,0.25</td>
</tr>
<tr>
<td>Conservatism</td>
<td>-0.07</td>
<td>-0.15,0.00</td>
<td>-0.10</td>
<td>-0.19,-0.01</td>
</tr>
<tr>
<td>Religiosity</td>
<td>-0.03</td>
<td>-0.10,0.05</td>
<td>-0.13</td>
<td>-0.22,-0.04</td>
</tr>
<tr>
<td>Age</td>
<td>-0.06</td>
<td>-0.13,0.01</td>
<td>0.10</td>
<td>0.01,0.19</td>
</tr>
<tr>
<td>Female Gender</td>
<td>-0.07</td>
<td>-0.14,0.01</td>
<td>0.02</td>
<td>-0.07,0.10</td>
</tr>
<tr>
<td>Household Income</td>
<td>0.13</td>
<td>0.05,0.21</td>
<td>0.04</td>
<td>-0.06,0.13</td>
</tr>
<tr>
<td>Education</td>
<td>0.09</td>
<td>0.01,0.18</td>
<td></td>
<td>-0.08,-0.17,0.02</td>
</tr>
<tr>
<td>Observations</td>
<td>483</td>
<td></td>
<td>418</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.386</td>
<td></td>
<td>0.356</td>
<td></td>
</tr>
</tbody>
</table>
Study 2: Ecospirituality & Economic/Nature Trade-offs

In Study 1, we investigated the psychometric properties of the Ecospirituality Scale, its demographic correlates, and its predictive validity. Study 1, however, did not investigate the relationship between ecospirituality and treating nature as a sacred value. In a larger sample of Americans, Study 2 includes moral trade-off scenarios that weigh the economic benefits of industrial expansion against the protection of an ecosystem. Moral trade-off scenarios allow us to capture the moral reasoning style of “devoted actors” (Atran, 2016), chiefly by their unwillingness to equate the protection of nature with any amount of material gain and their willingness to endure costs to protect nature. Ecospirituality and environmentalist identity represent complementary pathways to treating nature as sacred and should uniquely predict this reasoning style when faced with a moral trade-off scenario.

Study 2 also investigates if ecospirituality predicts treating nature as sacred, even when the trade-off scenarios involve costs to nature that are faraway or in the future. The environmental psychological literature demonstrates that motivation to protect nature is susceptible to temporal and spatial discounting, which is especially problematic because much of the destruction caused by our current lifestyles will mainly affect people faraway and in the future (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). However, the sacred values literature suggests that sacred values are immune to temporal and spatial discounting (Atran, 2016; Sheikh et al., 2013). If this is the case, sacred values (and ecospirituality) may represent an antidote to the environmental apathy caused by discounting biases.
Methods

Participants and Measures

We collected two samples (Sample 1: N = 468; Sample 2: N = 469) of American survey workers using the Amazon Mechanical Turk service. Both samples completed identical surveys, with a slight variation in the trade-off scenarios presented to them. Sample 1 responded to trade-offs that varied in temporal distance to the self and Sample 2 responded to trade-offs that varied in spatial distance to the self. Where possible, these samples will be combined for analysis.

All participants completed the Ecospirituality Scale (α = 0.89), environmentalist identity items (α = 0.95), the reasoning style about the environment items (deontology: α = 0.67; utilitarianism: α = 0.71), and the environmental citizenship items (α = 0.79) used in Study 1. Christian participants were also asked to indicate their denomination.

To further probe the relationship between ecospirituality and environmentalist identity, participants also completed the four-item Environmental Strivings scale (Emmons, 1986; Kashima et al., 2014), which captures the extent to which participants consider caring for the environment to constitute their life’s purpose, (e.g., “One of the objectives that I try to accomplish or attain in my life is to sustain or improve the natural environment and the condition of the planet Earth for future generations”). Kashima et al. (2014) argue for the importance of

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5 One of the multiple choice responses to the Christian denomination item was “I am not Christian”. A large proportion of participants across Studies 2 and 3 (n = 359 out of a total 932) selected this response, effectively indicating they were Christian but not Christian. A proportion this large makes it unlikely that these participants merely suffered from selective inattention (i.e., lazily selecting “Christian” as their religion, then realizing their mistake when asked to report their denomination). A cursory inspection of the responses from this group indicate they tend to be liberal-leaning men and women who do not believe in God, do not find religious belief important to their life, nor feel particularly spiritual. Future research that assesses religious affiliation as a focal or auxiliary variable may consider including additional continuous measures of belief in God and self-report religiosity—as we have here—to avoid confounding religiosity with religious identity.
measuring environmental strivings as a more personal aspect of identity, which is less constrained by socio-cultural context that defines what an “environmentalist” is. Participant agreement was scored on a seven-point scale, and the items were composited into a single score ($\alpha = 0.89$).

**Saying Nature is Sacred.** To assess the belief that nature is sacred, participants responded to the following prompt: “As human beings, we sometimes hold certain values or things as sacred. When someone holds a value or a thing as not able to be questioned or doubted—such as, American citizens’ unassailable human rights—that thing is considered to be sacred.” Participants were then asked to pick from a list the things they considered sacred. The list included the following items: *family, human rights, freedom, religious belief, sacraments or religious objects, the national flag, human life, your place of worship, and nature*. We dummy coded a variable that indicates if participants selected “nature” from this list (0 = nature is not sacred, 1 = nature is sacred).

**Moral Trade-off Scenarios.** We developed four vignettes that described scenarios in which an industrial project would jeopardize an ecosystem. The industrial project (waste disposal plant, four-lane highway, oil pipeline, and airport) varied to improve generalizability and to avoid priming prior concepts about any one environmental issue that may have been particularly culturally salient at the time of the study. In these vignettes, participants carefully viewed a table of economic benefits and environmental costs associated with the industrial project. Participants were first simply asked if the project is morally justified or not (0 = not morally justified, 1 = morally justified).
Participants were then asked to engage in a series of questions that implicated them in a potential “taboo trade-off” (Tetlock, 2003). A taboo trade-off is when a sacred value (i.e., protecting nature) is weighed against a material value (i.e., economic gain). Participants were implicated in a potential taboo trade-off by being asked to put a price on nature in terms of how much revenue must be made and how large of an income tax reduction must result in order for them to endorse the project (ratings made as a percentage increase in current revenue and percentage decrease in income tax on an interactive slider from 0%-100%—see Figure 1). Greater percentage values indicated that greater societal/personal economic benefits must be produced to endorse the project. Participants were also given the option to refuse to engage in the trade-off (“No amount is acceptable - On principle, I would never even consider this trade-off”). Refusal to engage in at least one of the two trade-offs (personal and social incentives) were dummy coded into two separate variables: refusal to trade-off in (1) scenarios close-to-the-self and (2) scenarios distant-to-the-self.

**Figure 1.** Sample Moral Trade-off Item (Personal Incentive to Endorse Industrial Project).
Participants were also asked how much they would be willing to sacrifice in order to cancel the industrial project. Using an interactive slider (from 0% to 100%), participants indicated how much societal benefit (i.e., jobs produced by the industrial project) and personal benefit (i.e., personal income, in terms of increasing income tax to compensate the cancellation of the project) they would be willing to sacrifice in order to cancel the industrial project.

Previous research has identified certain cognitive biases that are a telltale indicator of sacred values (Baron & Spranca, 1997). These were also assessed after each vignette was presented. Wishful thinking (“In the real world, nothing can be gained by allowing this”), quantity insensitivity (“Even if this plan did one-tenth the damage, it would still be equally immoral and wrong”), and moral universalism (“This would be wrong even in a country where everyone thought it was not wrong”) were each assessed on seven-point scales and shared high agreement across items ($\alpha = 0.83$ & 0.85 for close and distant trade-offs, respectively). These items were averaged into two “Cognitive Bias” composites, one for close trade-offs and one for distant trade-offs. Participants’ moral emotions (disgust, anger, outrage, and contempt) in response to each scenario were assessed on a five-point scale and were combined into “Moral Emotions” composites ($\alpha = 0.93$ & 0.92 for close and distant trade-offs, respectively).

Participants were randomly presented with two of the four trade-off scenarios. In Sample 1, the scenarios varied by temporal distance, with one industrial project being set for construction “immediately” and the other set for construction “at some time very far away in the future”.

---

6 Participants also had the option to not respond to the items assessing willingness to sacrifice ($n = 215$); however, it is not as obvious—compared to refusing to “put a price on nature”—what it means to choose this option. As such, we removed this choice in Sample 2, and then reframed it more clearly in the Canadian sample of Study 3, stating that if the participant did not actually wish for the project to be cancelled, they could select not to answer these items ($n = 205$ participants in Study 3 selected this option at least once).
Sample 2, 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” and 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 some participants viewed the close-to-self trade-off first and others viewed the distant-to-self trade-off first.

**Results**

**What is Ecospirituality: Discrimination from Utilitarian Reasoning Style about Nature & Convergence with Environmental Strivings**

Table 6 presents bivariate correlations between key variables in Study 2. We replicated the strong positive correlation between ecospirituality and identifying as an environmentalist in the current sample ($r = 0.51$). To further probe this relationship, we included a measure of environmental strivings, which captures a less culturally defined aspect of identity: one’s personal goals and purpose. Strivings correlated strongly with identifying as an environmentalist ($r = 0.73$) and with ecospirituality ($r = 0.58$).

Study 1 reported a positive relationship between ecospirituality and believing that environmental decisions should be made with respect to deontological principles *and* utilitarian principles. This result was not replicated. Instead, it was found that ecospirituality positively correlated with the deontological reasoning style to a similar degree as in Study 1 ($r = 0.36$), but there was no relationship between ecospirituality (nor any of its subscales) and the utilitarian reasoning style. The difference in findings may be due to the high collinearity between the reasoning styles observed in Study 1 ($r = 0.56$) that was not observed in Study 2 ($r = 0.13$).
Table 6. Bivariate Correlations Study 2 (US; N=937).

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecospirituality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmentalist Identity</td>
<td>0.51***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deontology</td>
<td>0.36***</td>
<td>0.39***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilitarianism</td>
<td>0.00</td>
<td>0.00</td>
<td>0.13***</td>
<td></td>
</tr>
<tr>
<td>Environmental Strivings</td>
<td>0.58***</td>
<td>0.73***</td>
<td>0.46***</td>
<td>-0.06*</td>
</tr>
</tbody>
</table>

*p<.05 **p<.01 ***p<.001

Who is Ecospiritual: Distribution, Religiosity, and Political Orientation

Ecospiritual beliefs were, again, found to be fairly well-endorsed by the American sample (M = 4.74, SD = 1.12). Two of three subscales displayed similar distributions as they did with the online census-matched sample in Study 1, with the exception of the anthropomorphism of nature subscale, which displayed a distinct modal response at the minimum value. In aggregate, however, all subscales were well-endorsed: powerful experiences in nature (M = 5.72, SD = 1.10), nature as a spiritual resource (M = 5.29, SD = 1.40) and anthropomorphism of nature (M = 3.20, SD = 1.90).

Replicating the findings in Study 1, ecospirituality was largely uncorrelated with demographic variables. This was also true for political conservatism, which was not found to be correlated with ecospirituality but found to be moderately negatively correlated with identifying as an environmentalist (r = -0.26) and environmental strivings (r = -0.24). In this sample, ecospirituality was found to be positively correlated with spirituality (r = 0.41) and religiosity (r = 0.22). Again, a follow up analysis regressing spirituality and religiosity on ecospirituality.
suggested that people who are spiritual ($\beta = 0.58$) but not religious ($\beta = -0.23$) tend to hold ecospirituality beliefs.

**Does Ecospirituality Matter: Environmental Citizenship & Moral Trade-offs**

To replicate the findings from Study 1, we included the same measure of environmental citizenship in this study (see Table 7). Findings were largely consistent with Study 1: environmentalist identity moderately uniquely predicted engagement in environmental citizenship ($\beta = 0.43$), while ecospirituality did not (in this larger sample, however, a marginal effect of $\beta = 0.08$ was detected).\(^7\)

The results from the moral trade-off scenarios suggested that ecospirituality and environmentalist identity were both unique predictors of treating nature as a sacred value controlling for each other and additional demographic variables (Figure 2). Across the board, both measures significantly predicted treating nature as sacred (with one exception, ecospirituality did not significantly uniquely predict believing the industrial project featured in the trade-off scenario was not morally justifiable\(^8\)). Independent of the moral trade-off scenarios, ecospirituality and environmentalist identity also uniquely predicted saying nature was sacred (Odds Ratios = 1.62 and 1.40, respectively). Follow up analyses assessing the relative contribution of each subscale of the Ecospirituality Scale suggested that having powerful experiences in nature most consistently drove the effect of ecospirituality on the various markers of treating nature as a sacred value.

\(^7\) We did not include environmental strivings as an additional predictor in this model because of its high collinearity with environmentalist identity ($r = 0.73$; VIF = 2.53). We did run a separate model where identity was exchanged for strivings. In that model, ecospirituality also remained a significant predictor of citizenship ($\beta = 0.10$).

\(^8\) It’s possible the “moral justification” item simply lacked enough variance to draw accurate inferences from these analyses; an overwhelming majority of participants reported the project to *not* be morally justifiable.
Figure 2. Predicting Markers of Treating Nature Sacred with Controls Study 2 (US; N=937).

Note: All analyses include the following covariates: ecospirituality, environmentalist identity, political conservatism, religiosity, age, gender, and household income.
*p < .05  **p < .01  ***p < .001

Temporally & Spatially Discounting Harm to Nature

We expected participants would demonstrate cost discounting by requiring fewer incentives to endorse environmental harm when it occurred in the future and in a faraway place. Participants who agreed to engage in the economic/nature trade-off (just over half of each sample) were asked to “put a price on nature” by rating how much societal and personal gains they would require in order to personally endorse the industrial project. The difference between incentive required for close versus distant trade-offs indicates the degree to which each participant discounted distant costs to the environment, with greater scores indicating greater discounting. In Sample 1, which assessed temporal discounting, participants who engaged in trade-offs (n = 250) did require less personal incentives to endorse industrial projects occurring in the future (M_Difference = 3.53, 95% CI = [0.77, 6.29]) but they did not exhibit discounting of
societal incentives ($M_{\text{Difference}} = 2.84, [-0.08, 5.76])$. In Sample 2, which assessed spatial
discounting, participants who engaged in trade-offs ($n = 230$) did not exhibit discounting of
personal ($M_{\text{Difference}} = -0.69, [-3.82, 2.43]$) nor societal incentives ($M_{\text{Difference}} = -2.61, [-5.84, 0.61]$). These findings suggest that people who do not hold nature sacred, responding to our
stimuli, do not consistently exhibit temporal or spatial discounting when considering the costs to
nature that an industrial project may have. Reasons for the observed pattern are further discussed
in the discussion section.

We also assessed if ecospirituality and environmentalist identity predicted refusing to put
a price on nature faraway in time or space—i.e., refusing to engage in moral trade-offs at a
distance to the self. Participants who refused to engage in trade-offs close to themselves also
tended to refuse to engage in trade-offs at a distance to themselves (Odds Ratios = 15.72 and
35.15, for temporal and spatial distance, respectively). To account for this, we included as a
covariate the responses from the close trade-offs when predicting trade-off behaviour at a
distance to the self (see Table 7). Results showed that ecospirituality (Odds Ratio = 1.37), but not
environmentalist identity, remained a significant predictor of refusing to engage in the distant
moral trade-off.

Study 2 attempted to replicate some analyses conducted in Study 1, and to further
examine the predictors of treating nature as a sacred value, using moral trade-off scenarios.
Contrary to Study 1, ecospirituality was not associated with the utilitarian reasoning style about
nature. In line with Study 1, we found that environmentalist identity is a greater predictor of
environmental citizenship and political orientation than ecospirituality. The results from the
moral trade-off scenarios suggested that both ecospirituality and environmentalist identity were
consistently unique and significant predictors of treating nature as a sacred value. Study 2 demonstrated that ecospirituality robustly predicts pro-environmental attitudes and “devoted actor” decision-making, while being relatively free from political ideology. These findings suggest that ecospirituality may represent a distinct pathway to environmental concern untapped by constructs like environmentalist identity.

Table 7. Predicting Concern for Nature Study 2 (US; N=937).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Environmental Citizenship</th>
<th>Refusing to Put a Price on Nature at a Distance to Self</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>95% CI</td>
</tr>
<tr>
<td>Ecospirituality</td>
<td>0.08</td>
<td>0.01,0.14</td>
</tr>
<tr>
<td>Environmentalist Identity</td>
<td>0.43</td>
<td>0.36,0.50</td>
</tr>
<tr>
<td>Refusing Trade-offs Close to Self</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservatism</td>
<td>-0.17</td>
<td>-0.23,-0.10</td>
</tr>
<tr>
<td>Religiosity</td>
<td>0.01</td>
<td>-0.05,0.07</td>
</tr>
<tr>
<td>Age</td>
<td>-0.06</td>
<td>-0.12,-0.00</td>
</tr>
<tr>
<td>Female Gender</td>
<td>-0.02</td>
<td>-0.07,0.04</td>
</tr>
<tr>
<td>Household Income</td>
<td>0.02</td>
<td>-0.04,0.07</td>
</tr>
</tbody>
</table>

Observations = 918
R² = 0.299
Study 3: Ecospirituality in Nature Clubs and Green Party Voters

Studies 1 and 2 provide evidence that ecospirituality predicts moral concern for nature, perhaps via its influence on people’s reasoning style about nature (preference for deontology versus utilitarianism) and is largely apolitical. However, the prior studies do not directly assess the instrumental frame of nature, nor include ecologically valid dependent variables. To address these two limitations, Study 3 employs a more direct measure of the instrumental frame of nature and examines the degree to which ecospirituality predicts how people spend their free time (i.e., the recreational clubs they belong to), as well as how they decide to vote for environmental policy.

Distinctions in theory on political voting style mirror, to some degree, the distinctions made in the sacred values literature. In the sacred values literature, the “rational actor” is distinguished from the “devoted actor” by their reliance on a cost-benefit analysis to inform their decision-making about a certain topic (Atran, 2016; Tetlock, 2003). In the voting literature, the “strategic voter” is distinguished from the “unconditional voter” in a similar way: The strategic voter aims to maximize the influence of their vote, while the unconditional voter will vote for their party of choice no matter what (Aldrich et al., 2018). The strategic voter may decide to vote for their second-favoured party because their first-favoured party has no chance of winning, while the unconditional voter will always vote for their first-favoured party despite the likelihood of “wasting” their vote (i.e., having no influence over the results of the election). The Green Party often has the strongest pro-environmental platform in Canadian and the United Kingdom but, in many elections, it is clear to voters that the party will not secure enough votes to win in their district/riding. Pro-environmental voters may favour the Green Party but must consider the
possibility that voting for them would be a wasted vote that could have been otherwise used to promote the victory of the party with the next best environmental platform.

This study therefore has four aims: (1) more directly examine the relationship between ecospirituality and the instrumental frame of nature, (2) examine the potential for ecospirituality to predict real life decisions like club membership and voting style, (3) further probe the relationship between political orientation and ecospirituality via policy preference, and (4) replicate findings from the moral trade-offs in Study 2.

Method

Participants and Measures

In this study, we recruited two samples. Sample 1 (N = 702) consisted of Canadians who belonged to nature clubs (n = 280) and for comparison, members of other non-nature-oriented clubs (n = 422). Part of this sample was recruited directly from nature and outdoors clubs in British Columbia (n = 64), and participants were told their participation would raise $5 for a well-regarded provincial nature conservation foundation (to which we donated a total of $675). Due to the inefficiency of this recruitment method, we then began recruiting Canadian “club members” on Cloud Research’s Prime Panels service (n = 638). Participants were directly reimbursed for their participation. The nature clubs that participants belonged to were mostly outdoors clubs (n = 257) and political/environmentalism clubs (n = 122). Participants were also from nature education clubs (n = 78), nature spirituality clubs (n = 35), and nature philanthropy clubs (n = 30). Most belonged to only one or two nature clubs (n = 232). Sample 2 (N = 561) consisted of United Kingdom Prolific survey workers who were politically affiliated with the Green Party.
Both samples completed the Ecospirituality Scale ($\alpha = 0.90$), environmentalist identity items ($\alpha = 0.94$), and indicated if they believed nature was sacred.

Both samples also completed 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 attitudes factor onto two higher order factors: Utilization and Preservation. The authors of the scale indicate that the two factors represent the instrumental frame and spiritual orientation towards nature, respectively. However, no items in the preservation factor directly assess spiritual beliefs about nature. The preservation attitudes include “enjoyment of nature”, “support for interventionist conservation policies”, “environmental movement activism”, “environmental fragility”, “personal conservation behaviour”, “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 seven-point scale, and items were combined into two composites representing preservation ($\alpha = 0.85$) and utilization attitudes ($\alpha = 0.77$).

Both samples were also asked questions about their voting preference and style. First, participants indicated which parties they would consider voting for in the next general/federal election. If participants indicated they would consider voting Green, they were then asked under what conditions they would vote Green. In Sample 1 (Canada), participants could indicate they would vote Green “No matter what” (unconditional voting style) or “Only if they were likely to win” (strategic voting style). In Sample 2 (UK), participants chose from a set 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”. Responses (2) and (3) were coded as representing strategic voting styles in this sample.

Both samples responded to additional questions about religion. Religious attendance was assessed on a five-point scale from “Less than once a year” to “More than once a week”. Participants’ identity as “spiritual but not religious” was assessed using a binary item. Participants also rated “How central to [their] views on environmentalism [were their] spiritual views” on a five-point scale from “Spirituality is not central at all to my views on the environment” to “Spirituality is central to my views on the environment”.

Additionally, Sample 1 (Canada) also responded to the economic/nature trade-off scenarios that varied by spatial distance used in Study 2 Sample 2. Due to time constraints, participants only responded to the willingness to sacrifice to protect nature items and the incentives required to endorse the industrial project items.

Results

What is Ecospirituality: Convergence with Environmental Preservation and Spiritual Environmentalism; Discrimination from Environmental Utilization

To more directly assess the instrumental frame of nature, we employed the utilization factor from the EAI-24. Results show that ecospirituality is moderately negatively associated with attitudes about utilizing nature ($r = -0.29$). We also measured participants’ responses on the preservation factor of the EAI-24, which serves as an index of common pro-environmental
attitudes used in psychological research. Ecospirituality moderately positively correlated with items in this factor ($r = 0.34$). See Table 8 for bivariate correlations from this Study.

We were also interested in examining the interaction between ecospirituality and political conservatism in predicting pro-environmental attitudes. Since ecospirituality is largely dissociated from political orientation ($r = -0.06$ in this study), it may prove to be a useful pathway to environmental concern for conservatives, who, on average, tended to endorse utilization attitudes ($r = 0.34$) but not preservation attitudes ($r = -0.43$). We found that ecospirituality interacted with political orientation in predicting both preservation ($\beta = 0.10$, $[0.06, 0.15]$) and utilization attitudes ($\beta = -0.07$, $[-0.11, -0.02]$). These interactions show that the relationship between ecospirituality and the two sets of environmental attitudes was stronger for conservatives than liberals (see Figure 3). In other words, ecospirituality helps bridge the gap in how conservatives and liberals see the natural environment.

**Figure 3.** Interaction Between Ecospirituality & Political Orientation to Predict Environmental Attitudes (Canada & UK; N=1261).

*Note: Political orientation was measured and analyzed as a continuous variable from very liberal to very conservative. Liberals and conservatives are visualized as -1 SD and +1 SD on this measure, respectively. Analyses control for which sample participants were drawn from.*
As a more direct—albeit more crude—measure of the relationship between spirituality and environmental concern, we asked participants from both samples in Study 3 how central spirituality was to their views on environmentalism using a five-point scale. There was a fair amount of variation on this item ($M = 2.52$, $SD = 1.26$), with many participants indicating that spirituality was either not at all related or only minimally related to their views on environmentalism ($n = 610; 48\%$), and fewer indicating it was very or absolutely central ($n = 302; 24\%$). A regression model indicated that ecospirituality incrementally predicted having one’s spiritual views central to one’s views on environmentalism ($\beta = 0.22$) over and above self-reported spirituality ($\beta = 0.53$), environmentalist identity ($\beta = 0.06$), as well as preservation ($\beta = -0.07$) and utilization attitudes ($\beta = 0.03$). These findings suggest that there is a distinct profile of spiritual environmentalism that is not adequately captured by other widely used environmental attitude constructs nor general spirituality.

**Table 8. Bivariate Correlations Study 3 (Canada & United Kingdom; N=1263).**

<table>
<thead>
<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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</thead>
<tbody>
<tr>
<td>(1) Ecospirituality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Environmentalist Identity</td>
<td>0.40***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Preservation (EAI-24)</td>
<td>0.34***</td>
<td>0.70***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Utilization (EAI-24)</td>
<td>-0.29***</td>
<td>-0.48***</td>
<td>-0.64***</td>
<td></td>
</tr>
<tr>
<td>(5) Spiritual Environmentalism</td>
<td>0.49***</td>
<td>0.20***</td>
<td>0.10***</td>
<td>-0.08*</td>
</tr>
</tbody>
</table>

$p<.05$ $^*p<.01$ $^***p<.001$
Who is Ecospiritual: Nature Club Membership & Religious Attendance

Replicating previous effects, ecospirituality was not substantially correlated with demographic variables, with the exception of female gender ($r = 0.17$). To further probe the relationship with religiosity, we included two new variables: (1) a measure of religious attendance, and (2) a binary item that assessed whether participants identified specifically as “spiritual but not religious”. Although religious attendance correlated with the religiosity composite (self-reported religiosity, importance of God, and religious affiliation) at $r = 0.64$, it was a weaker predictor of the environmental attitudes assessed in the study, including ecospirituality ($r = .09$ versus the correlation of $r = 0.21$ found between ecospirituality and the religiosity composite). Replicating effects observed in Studies 1 and 2, the spiritual-but-not-religious binary item positively correlated with ecospirituality ($r = 0.37$) to a greater degree than with environmentalist identity ($r = 0.14$).

Of interest in the Canadian sample was the relationship between ecospirituality and affiliating with nature clubs. To test this, we compared ecospirituality scores from Canadian nature club members with Canadians who belonged to clubs not focused on nature or the outdoors (see Figure 4). Results revealed that nature club members scored higher on the Ecospirituality Scale than non-nature club members ($M_{\text{Difference}} = 0.28, [0.11, 0.45]$). Follow up analyses showed nature club members scored higher on two of the three ecospirituality subscales: powerful experiences in nature ($M_{\text{Difference}} = 0.21, [0.06, 0.36]$) and viewing nature as a spiritual resource ($M_{\text{Difference}} = 0.40, [0.18, 0.62]$). These effects held controlling for political orientation, age, gender, and income; the addition of these covariates made the effect for the anthropomorphism subscale become significant ($b = 0.33, [0.06, 0.61]$). Nature club members
also tended to identify as environmentalists to a greater degree than non-nature club members ($M_{\text{Difference}} = 0.72$, [0.49, 0.94]).

**Figure 4.** Ecospirituality Scores for Members of Nature Clubs and Non-Nature Clubs (Canada; N=702).

![Ecospirituality Scores for Members of Nature Clubs and Non-Nature Clubs](image)

*p* <.05 **p** <.01 ***p** <.001

**Does Ecospirituality Matter: Unconditionally Voting for the Green Party & Policy Preference**

In both samples of the current study, we assessed the voting style of participants who indicated they would consider voting for the Green Party in the next general/federal election (n = 860). Results indicated that political orientation did not predict voting style, instead, ecospirituality (Odds Ratio = 1.27) and environmentalist identity (Odds Ratio = 1.21) both uniquely predicted being an unconditional voter for the Green Party (see Table 9). A different pattern of results emerged when examining the predictors of considering voting for the Green
Party in the first place: political conservatism (Odds Ratio = 0.74) and environmentalist identity (Odds Ratio = 1.74) were both unique predictors, while ecospirituality was not. These findings suggest that ecospirituality predicts how people reason about environmental decisions, which are sometimes in the context of politics, but does not predict political preference, per se.

To further probe ecospirituality’s relationship (or lack thereof) with political ideology, we assessed environmental policy preferences in both samples. The policy preference measures (population growth and environmental intervention policies) were subscales of the EAI-24 preservation factor, which was moderately positively correlated with ecospirituality. Despite the relationship with the higher-order preservation factor, we found that ecospirituality was not associated with preference for either environmental policy. In fact, there was a small suppression effect observed when introducing environmentalist identity as a covariate, such that the relationship between ecospirituality and environmental policy preferences became marginally negative (see Table 9).
Table 9. Predicting Concern for Nature Study 3 (Canada & United Kingdom; N=1263).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unconditional Voting Style</th>
<th>Support for Environmental Interventionist Policy</th>
<th>Support for Population Growth Control Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratio</td>
<td>95% CI</td>
<td>β</td>
</tr>
<tr>
<td>Ecospirituality</td>
<td>1.27</td>
<td>1.09,1.48</td>
<td>-0.09</td>
</tr>
<tr>
<td>Environmentalist Identity</td>
<td>1.21</td>
<td>1.06,1.39</td>
<td>0.34</td>
</tr>
<tr>
<td>Conservatism</td>
<td>1.10</td>
<td>0.98,1.25</td>
<td>-0.12</td>
</tr>
<tr>
<td>Religiosity</td>
<td>0.90</td>
<td>0.76,1.08</td>
<td>-0.05</td>
</tr>
<tr>
<td>Age</td>
<td>1.02</td>
<td>1.01,1.03</td>
<td>0.07</td>
</tr>
<tr>
<td>Female Gender</td>
<td>0.98</td>
<td>0.72,1.32</td>
<td>0.04</td>
</tr>
<tr>
<td>Household Income</td>
<td>1.02</td>
<td>0.92,1.13</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Observations | 860 | 1230 | 1230
R²           | 0.055 | 0.156 | 0.135

Replication of Trade-off Scenarios in Canadian Sample

The moral trade-offs that varied by spatial distance were employed in Sample 1 (Canada; N = 702) and produced results largely in agreement with those found in Study 2. Replicating the findings from Study 2, both ecospirituality (Odds Ratio = 1.24) and environmentalist identity (Odds Ratio = 1.22) were found to be unique predictors of refusing to engage in nearby moral trade-off scenarios with controls. When asked if the industrial project featured in the moral trade-off was morally justifiable, ecospirituality (Odds Ratio = 0.75) but not environmentalist identity was found to be a unique predictor. When asked how much societal and personal good participants would be willing to sacrifice to cancel the industrial project, it was found that environmentalist identity (β = 0.19) but not ecospirituality was found to be a unique predictor. Again, ecospirituality and environmentalist identity were both unique predictors of saying nature was sacred (Odds Ratios = 2.15 and 1.76, respectively). In agreement with Study 2, follow up
analyses suggested that having powerful experiences in nature most consistently drove the effect of ecospirituality on markers of treating nature as a sacred value.

We also investigated the presence of spatial discounting of harm to nature in the present sample of Canadians. Again, there was no evidence of spatial discounting. Participants required roughly the same amount of societal benefits ($M_{\text{Difference}} = 0.53$, [-2.78, 3.85]) and personal benefits ($M_{\text{Difference}} = -1.10$, [-4.06, 1.85]) to endorse environmentally harmful industrial projects that were occurring nearby or in a distant location. Consistent with Study 2, there was a strong relationship between refusing to engage in trade-offs nearby and at a distance (Odds Ratio = 20.83). Accounting for this consistency bias, we ran a model predicting refusing to engage in faraway trade-offs. Whereas Study 2 showed ecospirituality, and not environmentalist identity, was a unique predictor, we found the opposite in this sample: environmentalist identity, but not ecospirituality, uniquely predicted refusing to engage in faraway moral trade-offs (Odds Ratio = 1.25). Although this study did not perfectly replicate the patterns observed in Study 2, similar inferences are able to be made from the results: Both ecospirituality and environmentalist identity—although conceptually distinct—predict treating nature as a sacred value.
Discussion

Taken together, these findings demonstrate that our measure of ecospirituality captures a distinctly spiritual dimension of environmental concern. Although other attitudes have been found to predict moral concern for nature, ecospirituality possesses some attractive qualities: it is widely endorsed and minimally associated with political orientation. Our findings suggest that ecospirituality best predicts how people reason about the natural environment, treating it as a sacred value instead of an instrumental good. This reasoning style is especially pertinent to the current ecological crisis, which often requires individuals to make sacrifices in the here-and-now to secure the long-term protection of nature.

These studies establish ecospirituality as an important construct in environmental psychology and provide a multi-factor, face valid measure of ecospirituality suitable for research. Psychological research has tended to focus on the relationship between formal religion and environmental concern (see Taylor et al., 2016 for a review on the “greening-of-religion hypothesis”). This research addresses important questions like, what aspects of religious belief are associated with environmental attitudes. However, spirituality and religiosity are distinct constructs; people still report being spiritual independent of their affiliation with a traditional religious structure. The present research demonstrates that ecospiritual beliefs are not necessarily attached to religious identity, on the contrary, they tend to be endorsed by the spiritual-but-not-religious (Fuller, 2001; Saucier & Skrzypińska, 2006; Willard & Norenzayan, 2017). We hope that the present research will promote the study of the role spirituality plays in environmental concern and decision-making.
Implications for Promoting Environmentalism

Concern about the sustainability of current business and lifestyle practices has motivated great efforts to curb environmentally harmful behaviours. These efforts are often based on the premise of the rational actor who seeks to maximize benefits and minimize costs to herself. Protecting nature has benefits; ecosystem services sustain us and ensure the continued survival of future generations. Protecting nature also has its costs; people must make sacrifices in their level of consumption and give up some of the luxuries—extensive recreational air travel, for example—associated with it. Rational actors must calculate, for each decision, if the benefits of sustainability outweigh the costs. This is made more complicated by the fact that many benefits of destroying nature are realized much sooner than the costs, which tend to decrease in motivational value the further away from the self they occur (Markowitz & Shariff, 2012; Trope & Liberman, 2010).

To combat this, efforts aimed at motivating sustainable behaviour attempt to sway the scale of costs and benefits to favour protecting nature. There are many ways to do this, which have found varying levels of success. One solution is to increase the benefits associated with protecting nature (e.g., tax credits for electric vehicles). Another solution is to impose costs on harming nature (e.g., energy overage charges). These kinds of interventions are valuable and should continue to be developed and implemented; however, the present research suggests alternative solutions may also be effective. Consistent with the sacred values literature, our findings suggest that some people, under some conditions, are willing to protect nature regardless of the material costs and benefits (at least in a hypothetical context). It may prove
useful, with more applied research, to implement interventions that promote viewing nature as sacred.

Our findings suggest that ecospirituality and environmentalist identity represent two distinct and complementary pathways to treating nature as a sacred value. But these two pathways differ in important ways relevant to their use in media and educational intervention. Promoting ecospirituality does not require manipulating one’s identity. While manipulating identity is possible and effective in motivating commitment to a set of values (religions, armies, corporations, and fraternities all invest in building a strong group identity), there are ethical considerations that complicate the matter. These ethical considerations do not plague the promotion of ecospirituality. Furthermore, the identity “environmentalist” may conflict with other group identities held by individuals, lowering the efficacy of a potential intervention—and increasing the probability of backfire effects—in specific populations. One such population is (American) political conservatives.

Conservatives tend to be less pro-environmental than liberals (Cruz, 2017). At the same time, individuals with a conservative political orientation tend not to identify with the label “environmentalist” and may actively distrust environmentalists (Huber, 2008). Appealing to people’s environmentalist identity risks alienating the political cohort that the appeal intends to target. Ecospirituality does not suffer from the same hazards since conservatives seem to be as ecospiritual as liberals. One might imagine a 3x2 experiment investigating the relative efficacy of an ecospiritual versus environmentalist identity versus a control intervention on environmental concern for liberals versus conservatives. Such an experiment would help illuminate the practical
differences between ecospirituality and environmentalist identity and would inform the responsible and effective employment of these constructs in the sustainability initiative.

Limitations

Discounting Measure

Research has demonstrated that people tend to discount benefits and costs that are distant to the self, and that discounting thwarts motivation to protect nature (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). Yet in our studies we did not consistently find evidence for temporal or spatial discounting harm to nature—why? The likely answer is that our manipulation and/or measure of discounting was limited in some critical way. We employed a within-subjects design that manipulated the distance to the self that potential harm to nature would occur and assessed using a slider how much personal and societal benefit would have to be gained in order to endorse this harm to nature. This design was replicated in three different well-powered samples (Study 2: Samples 1 & 2, and Study 3: Sample 1), providing a clear indication of its efficacy and effect size (or lack thereof). In all but one mean difference test (Study 2: Sample 1 - personal incentive) there was no difference in the incentive required to endorse harm to nature occurring close versus distant to the self. This suggests to us two possibilities: (1) the manipulation was not powerful enough to elicit a sense of closeness versus distance to the self, and/or (2) the measures were not appropriate or not sensitive enough to capture the discounting effect. We will briefly unpack these possibilities in turn.
The manipulation may have failed for two reasons. First, administering the manipulation within-subjects may have motivated a consistency bias in participants. Participants may have been compelled to respond to both trade-off scenarios similarly for social desirability reasons, leading to less variance within participant responses. Follow up analyses suggest this is not the case. Since trade-off scenarios were administered randomly such that some participants responded to close scenarios first while others responded to distant scenarios first, we were able to compare responses to close versus distant trade-offs between-subjects. Within each sample, and even across all three samples combined to achieve greater power, no discounting effects were detected using between-subjects analyses, ruling out the consistency bias explanation. A second reason why the manipulation might have failed may be because the costs associated with the scenario were framed in terms of harm to nature, rather than harm to humans. Böhm & Pfister (2005) found that perceptions of risks associated with coastal erosion or oceanic oil pollution only decreased with temporal distance (1 - 10 years) when the risks concerned harm to humans, not harm to nature.

It may also have been the case that the measures employed were flawed, such that a discounting effect—if produced by the manipulation—could not have been detected. Our measure of discounting assessed how great an incentive, in percentage values, was required to personally endorse potential harm to nature. The measure may have been flawed in two ways: (1) it assessed an ethical evaluation rather than a consequentialist evaluation, and (2) it did not measure responses on a concrete rating scale. Personal endorsement is essentially an ethical evaluation—*what must I receive in order to speak in favour of something I do not believe in?* This is especially the case because most participants morally objected to the industrial projects.
featured in the trade-off scenarios (more than 70% stated that the industrial project was not morally justifiable). In line with the literature on sacred values, Böhm & Pfister (2005) found that ethical evaluations of environmental harm did not vary across temporal distance. Employing a consequentialist evaluation of the industrial project, like an assessment of environmental risk associated with the project, may have been better suited to capture a discounting effect. It may also have been the case that using percentage values rather than concrete dollar values also affected the results. Percentage values are more abstract than dollar values, requiring participants to convert values from the former to the latter. This cognitive load may have increased the likelihood of selecting imprecise values, decreasing the signal-to-noise ratio of the measure.

**Ecospirituality Scale**

The measure for ecospirituality designed and employed in the present research is necessarily limited. The scale items were derived via an informal top-down method, where we freely generated items based on readings of nature spirituality from a variety of sources. This methodology makes the scale items susceptible to a number of flaws. For instance, we may not have consulted a representative set of sources, potentially introducing a conceptual bias into the set of items (e.g., a eurocentric bias). Furthermore, even if the items are conceptually accurate, they may be articulated in ways that do not mimic how ecospiritual people think or speak about their beliefs. Future research may address these limitations in two ways. First, by introducing a bottom-up scale construction method, where free responses from ecospiritual people or a representative set of ecospiritual texts are content analyzed. And second, by employing the Ecospirituality Scale across countries that vary by religious and cultural background. Together,
these methods would better ensure that ecospirituality is being accurately and comprehensively captured by our measurement tools.

**Future Directions**

There are many opportunities for future research on ecospirituality from a psychological perspective. Earlier discussion noted the value of future research that investigates the potential for ecospirituality to promote pro-environmental attitudes in conservatives, as well as the need to investigate ecospirituality across cultures and using qualitative methods. In addition to these directions, future research should also investigate the potential negative effects of ecospirituality. Research on sacred values suggests that many of the properties of sacred values may backfire and produce harmful consequences in certain contexts (Baron & Spranca, 1997; Sacchi et al., 2014; Sachdeva, 2017; Tetlock et al., 2000).

For 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 of the Ganges river, or if they are diagnostic of the broader psychology of purity. Sacred values may also backfire in political decision-making contexts because people may not even *consider* solutions that compromise on the sacred. In order to promote sustainable practices, pro-environmentalists must be willing to negotiate and find compromises with others who do not share their values (see popular press article by Roberts, 2018 for examples). 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.
Conclusion

Ecospirituality describes beliefs or behaviours that represent nature (or humanity’s relationship with nature) as possessing spiritual significance. This concept is widespread across cultures and its expression is typified by a set of common themes including anthropomorphizing nature, having powerful experiences in nature, and viewing nature as a spiritual resource. The current research demonstrates that ecospirituality represents a conceptually and empirically unique pathway to moral concern for nature. Our findings suggest that ecospirituality predicts reasoning about environmental decisions as if nature was a sacred value, which is expressed in how people evaluate industrial projects that pose risks to nature and in their political voting style. Ecospirituality is distinct from other previously researched constructs that also predict concern for nature because it captures a spiritual dimension of environmental concern absent from other constructs and is only minimally correlated with political orientation. Ecospirituality is a novel topic in psychology and is important in explaining why some people are willing to make the sacrifices often required to live a more sustainable lifestyle.


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