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Susan Clayton * and Elizabeth Marks

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Article

Connection to Nature in a Time of Climate Change: Emotional Responses and Mental Health

Susan Clayton [1,*] and Elizabeth Marks [2]

[1] The College of Wooster
[2] University of Bath
* Correspondence: sclayton@wooster.edu

Abstract

Connection to nature is typically a good thing, with benefits for mental health and wellbeing, as well as an association with environmentally sustainable behavior. However, it could also increase vulnerability to negative emotions associated with environmental degradation. This paper investigates the possible downside of a strong nature connection in two ways: by exploring the nature of climate-related moral distress, and by examining the relationship between nature relatedness and a range of moral and emotional responses to climate change. Data from an online study of 250 U.S. residents showed a positive correlation between relatedness to nature and moral distress associated with climate change, as well as with general anxiety, and replicated previous findings of a correlation between connection to nature and climate anxiety. There was some evidence that nature relatedness could protect against depression among those who are experiencing climate-related distress. These findings are discussed within a context of a generally positive relationship between nature connection and wellbeing, and possible moderators of the relationship are considered. Although both climate anxiety and connection to nature are associated with more sustainable behavior, the implications for mental health deserve further exploration.

Keywords: climate change; connection to nature; moral distress; climate moral distress; mental health; climate anxiety; environmental identity; sustainable behavior

1. Introduction

Connectedness to nature, the focus of this special issue, can be conceptualized in a variety of ways, encompassing cognitive, emotional, and behavioral aspects [1,2]. Cognitively, a connection to nature can be described as a person's perception that they are conceptually close to nature; perhaps that an association with nature is a necessary part of the self-image, or that the self-concept overlaps with nature. Emotionally, connection to nature tends to imply an emotional response to nature and to topics that involve nature; for example, feelings of happiness or contentment while in natural settings and feelings of concern or distress when reading about environmental threats or damage [3]. Behaviorally, people who feel connected to nature are more likely to spend time in natural settings, to represent nature with objects in the spaces they control, such as by putting plants, or artwork depicting nature, in their offices or homes, and, importantly, to act in ways that promote environmental sustainability [4]. When the natural environment is threatened by climate change, do these cognitive, emotional, and behavioral tendencies increase psychological vulnerability?

1.1. Connecting to Nature

Various measures have been developed to assess connectedness to nature, all of which are positively correlated [5,6]. This paper focuses on two in particular: the Environmental Identity Scale (EID) [4,7] and the Nature Relatedness Scale [2,8], as these have been shown to have some of the strongest convergent validity scores [5,6].

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The concept of Environmental Identity (EID) [4,7,9] was developed in reference to identity theories and other types of identity, such as national or ethnic identity. It suggests that, like nationality or ethnicity, everyone has an environmental identity, but the strength and specific content of that identity will vary, determined primarily by an individual's context and life experiences. The measure incorporates cognitive, emotional, and behavioral aspects of identity, drawing on the idea that we have stable self-concepts that organize self-knowledge and guide the processing of information that is relevant to the self.

The Nature-Relatedness Scale [2,8] is similar to the EID and has similarly strong correlations with environmental concern [5], but focuses in particular on the link between nature connection and positive affect. A short form of the scale, the NR-6, was developed for use when concerns about survey length are significant, and again shows strong associations with environmental concern [8].

By helping to satisfy core needs for self-knowledge, belonging, and a sense of meaning, an environmental identity or perceived relationship with nature has the potential to provide psychological benefits [4]. A 2014 meta-analysis (n=8523) found a small but significant effect of nature connectedness on vitality, positive affect and life satisfaction [10]. However, nature connectedness can also increase the possibility of negative consequences. When an identity is salient, it can have the cognitive effect of increased attention to relevant topics and entities, and when events are linked to identity and thus self-relevant, they gain more emotional significance [1]. This would suggest that people with a strong connection to nature would be likely to pay more attention to environmental issues; to have a stronger emotional response to environmental problems; and to anticipate more harm from environmental threats. Indeed, EID score is positively correlated with environmental concern [7,11]. A 2018 Australian survey also found that although some aspects of nature connection as measured with the Nature Relatedness Scale (specifically, attraction to and physical familiarity with nature) were associated with higher self-reported health, those aspects more focused on self-identification with nature were positively correlated with depression, anxiety, and stress [12].

1.2. Emotional Distress in Response to Climate Change

Today, environmental threats are very salient, and climate change is particularly concerning to most people globally [13]. Psychological consequences of climate change can include PTSD, depression, and anxiety, among other responses [14]. In this context, where climate change is only set to worsen, a sensitivity to environmental conditions, characterizing a strong EID or sense of nature connection, might be a mixed blessing [15,16]. Emotional responses to climate change can be strong and painful [17] and may be more prominent among those who feel connected to the natural world [18,19]. Awareness of the interdependence between human and environmental well-being might lead to greater recognition of one's personal vulnerability to the effects of climate change.

Several studies have shown a relationship between feeling connected to nature and emotional distress related to environmental threats such as climate change. In one study, EID was associated with a greater perception of harm from climate change among American respondents [3]. In a more recent national survey of Australians following a severe bushfire season, the Nature Relatedness Scale was correlated with worry about climate change as well as with measures of depression, anxiety, and stress [20]. A Portuguese sample showed a relationship between connectedness to nature and climate anxiety [21]. Among Turkish earthquake survivors, EID was associated with eco-anxiety, although it also predicted wellbeing [22].

1.2.1. Climate Anxiety

Anxiety is one of the most common emotions associated with climate change [17,23]. Several measures assess climate anxiety, and to date the most widely used is the Climate Change Anxiety Scale (CCAS) [18]. Climate anxiety has been demonstrated in countries around the world; it tends to be associated with increased pro-environmental behavior, but also with mental health problems such as general anxiety and depression [24,25]. In previous research, climate anxiety has been positively correlated with EID score [18], suggesting that a perceived connection to the natural world was linked

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to greater distress about the threat of climate change. A recent meta-analysis of 25 studies showed a moderate negative correlation between climate anxiety and psychological well-being [26].

1.2.2. Moral Distress

In addition to anxiety, increasing attention is being given to a broad range of emotional responses to climate change, including grief and anger as well as hope [27]. Such emotions point towards the importance of a moral component. Morally relevant emotions are based on a sense that actions of self or other have violated (or upheld) moral standards. When others behave in ways that seem immoral, responses generally include anger, disgust, and contempt; when one's own behavior is immoral, responses include shame and guilt. The moral aspects of climate change are widely recognized and in 2024, 44% of Americans said climate change was a moral issue [28].

Morally relevant emotions are worth singling out because they open the door to the possibility of leading to moral distress and even moral injury. Moral injury was originally studied in combat veterans, many of whom either observed or engaged in acts of cruelty and violence in the heat of battle that were at odds with their personal beliefs; it has more recently been discussed as pertaining to healthcare workers, particularly during the Covid-19 pandemic [29,30]. In both cases, there is a perception of ethical violation which leads to a loss of trust and meaning, struggles with religious faith, and potentially mental health challenges such as PTSD, relationship difficulties, depression, substance abuse, and suicidality.

Moral injury falls on the extreme end of a spectrum that also includes milder experiences termed moral distress [31]. Moral injury is typically considered to result from more direct experience, and potentially to lead to deeper, longer-lasting harm [32], but both moral injury and moral distress involve painful cognitions and feelings, and a possible decrease in mental health. A large global study of responses to climate change found that beliefs with a moral aspect (about failures of government action on climate change) were associated with higher levels of climate anxiety and feelings such as betrayal, anguish and shame [17]. In addition, there is preliminary evidence that moral distress may have behavioral implications. In one study, people higher in moral distress were more likely to defend victims of bullying [33]; however, in another study, nurses who scored higher on moral distress were more likely to report avoidance behaviors [34].

Climate change represents a potential source of moral distress. When respondents in four European countries were asked whether they had moral concerns about climate change, stronger moral concerns were positively correlated with ratings of outrage and guilt [35]. Among young people, moral emotions (e.g., anger, shame, guilt) and beliefs are associated with climate anxiety [36]. And a study of more than 600 Swedish high school students found that those who reported a stronger connection to nature also felt a stronger moral responsibility for addressing climate change [37].

1.3. The Present Study

Given the association between connection to nature and environmental concern, the potential impacts of environmental concern on mental health, and deteriorating planetary health, can there be a mental health risk attached to nature connectedness? The goal of the present study was to examine threats to mental health, including climate anxiety, anxiety and depression, and particularly reactions of moral distress, that might be linked to a feeling of connection to the natural world. We predicted that people with a stronger sense of nature relatedness would also report higher levels of climate anxiety and climate moral distress. We were curious about the potential for a direct association between nature relatedness and general anxiety or depression.

2. Materials and Methods

2.1. Participants

Participants were recruited online, via CloudResearch. Participation was limited to U.S. residents, over 18 years old, with access to a computer or smartphone, regardless of concern about

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climate change. Informed consent was obtained online after reading a participant information sheet. All information was anonymised, and participants could withdraw at any time by closing their browser before completion. Participants were paid USD $2.50 for the survey, estimated to take about 20 minutes. In January 2023, 255 participants consented to take part. After deleting those who took less than three minutes to complete the survey, we retained a sample of 250.

2.2. Measures

The perception of nature connectedness was assessed with the six item Nature Relatedness scale (NR-6), where a five-point Likert scale indicates agreement with statements about a person's relationship with nature. It has shown good internal consistency and temporal reliability (Nisbet & Zelenski, 2013).

Climate-related moral distress was assessed by 23 items assessing participants' moral responses to climate change. These items were generated based on a review of the literature including 12 existing scales assessing moral injury, adapted for a climate change context. We then consulted with several experts in the field, and finally obtained feedback from 14 young people in the UK or USA (age ranging from 18-27) recruited from networks concerned about climate change in order to refine and finalize the items. Items and scale reliability are shown in Table 1.

Table 1. Means and correlations for moral distress items and NR6.

Item	Mean	SD	Corr with NR6
1. Human actions that drive species to extinction are immoral.	4.22	1.03	.33***
2. Big business and industry are violating ethical standards by failing to protect the environment.	4.17	1.17	.23***
3. It is wrong for people to behave in ways that harm the planet when less harmful alternatives are available.	4.08	1.08	.28***
4. It is unfair that future generations will have to cope with climate changes caused by previous generations.	4.08	1.24	.26***
5. By failing to take sufficient action to address climate change, governments are failing in their responsibility to protect their citizens.	3.98	1.33	.23***
6. It is unjust that people who have done the least to contribute to climate change, such as those in poorer neighbourhoods or lower income countries, are experiencing some of the worst impacts.	3.93	1.32	.25***
7. Because some people are not doing their share to reduce climate change, other people have to bear more of the burden.	3.91	1.22	.26***
8. I don't trust those in charge to tell the truth about climate change	3.74	1.28	.05
9. Society's inadequate response to climate change makes me feel sad.	3.71	1.42	.34***
10. I am disgusted by the moral failure of leaders who are responsible for addressing climate change.	3.69	1.40	.28***
11. I am bewildered that those in charge are failing to act to limit climate change.	3.64	1.43	.26***
12. I am angry that people are failing to take action on climate change.	3.47	1.42	.31***
13. I feel anguished by government inaction on climate change	3.44	1.48	.33***

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14. I am exhausted by the ongoing lack of effective action on climate change.	3.25	1.49	.29***
15. I feel helpless because I can't protect the people and things I care about from the effects of climate change.	3.19	1.46	.24***
16. Climate change leads me to feel betrayed by those who I trust to protect my health and my future.	3.16	1.44	.35***
17. I feel guilty about the ways in which I have contributed to climate change.	2.93	1.39	.32***
18. Our collective failure to address climate change has caused me to lose faith in the basic goodness of humanity.	2.77	1.41	.20**
19. I am ashamed of myself for the way in which my behaviours are contributing to climate change.	2.68	1.35	.26***
20. I am troubled because my contributions to climate change violate my own morals or values.	2.58	1.38	.17**
21. I feel like nature or a higher power is punishing humanity for how we have treated the earth.	2.38	1.42	.26***
22. I feel alienated from other people because of the way human behaviour in general has contributed to climate change.	2.36	1.27	.27***
23. My knowledge that the climate is changing leads me to think that life has no meaning.	1.79	1.05	.10

Note: Scores could range from 1-5, with higher scores indicating greater agreement.

Mental health implications were assessed by the following scales: the 13-item Climate Change Anxiety Scale (CCAS), which measures cognitive-emotional and behavioral impairment associated with climate change (Cronbach α > .8)[18]. The PHQ-9 is a nine-item measure of depression (Cronbach α = 0.86-0.89) [38]. The GAD-7 is a seven-item measure of general anxiety (Cronbach α = 0.92) [39].

2.3. Data Analysis

Correlations were calculated between the NR6 scale and each of the individual moral distress items, as well as with a total Climate Moral Distress (CMD) score obtained by adding together all the individual items. Correlations with the NR6 were also calculated for the CCAS, PHQ-9, and GAD7. Relationships with age and with gender were also examined. Linear regression analyses examined the relationship between the NR6 and the outcome variables of CCA, PHQ-9, and GAD7 when controlling for moral distress (for CCA) and for climate anxiety (for the PHQ-9 and GAD7). All analyses were conducted in SPSS version 29.

3. Results

3.1. Participant Demographics

All participants identified as either male (49.6%) or female (48.8%), with a few who left the question unanswered. They were evenly represented across three age categories: 25-34 (32.5%), 35-44 (32.3%), and 45-64 (28.2%), with 3.2% reporting that they were younger than 25 and 3.2% reporting that they were older than 64. The majority (76%) were white, with similar numbers identifying as Black or African (8%) and Asian (8%), 5% as Latino/Latina, and only 2 people in other categories. The modal amount of education was a 4-year degree (39%); between 10-20% had a high school degree, some college, a 2-year degree, or a graduate degree. One respondent had not completed high school.

3.2. Correlational Analyses

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Item means and standard deviations are shown in Tables 1 and 2. Notably, most of the climate moral distress items scored above the midpoint of the scale, with especially strong support for overall statements about right or wrong behavior. Only seven of the items got overall disagreement; these seemed to be items in which people judged their own behavior negatively or items that reflected a more existential distress rather than one that was specifically targeted at the actions of specific entities. The NR6 was positively and significantly correlated with all moral distress items except "My knowledge that the climate is changing leads me to think that life has no meaning" and "I don't trust those in charge to tell the truth about climate change;" it also correlated with the overall CMD score. The NR6 was also moderately correlated with climate anxiety and weakly correlated with general anxiety. It was not significantly correlated with depression.

Table 2. Reliabilities and zero-order correlations among principal variables.

Scale	M (SD)	NR6	CCA	GAD	PHQ	CMD
1. NR6	3.38 (0.90)	.84				
2. CCA	1.39 (0.54)	.33**	.93			
3. GAD-7	1.70 (0.78)	.14*	.39**	.94		
4. PHQ-9	1.63 (0.69)	.07	.38**	.86**	.92	
5. CMD	3.38 (0.93)	.36**	.49**	.34**	.35**	.95

Note. Scale reliabilities are presented on the main diagonal. 1 = Nature Relatedness, 2 = Climate Anxiety, 3 = General Anxiety, 4 = Depression, and 5 = Climate Moral Distress. Score options were 1-5 for the CCA and NR6 scales, 1-4 for the PHQ-9 and GAD-7, and 1-5 for the CMD. * $p < .05$. ** $p < .001$.

Age was negatively associated with depression (r = -.25), anxiety (r = -.25), climate anxiety (r = -.23), and climate moral distress (r = -.24). Gender (male) was negatively correlated with NR-6 (r = -.15) and with general anxiety (r = -.15).

3.3. Regression Analyses

Linear regressions looked at the predictors of climate anxiety, general anxiety, and depression. Because age and gender are associated with these variables, they were included in a first block, with other predictors entered subsequently. NR6 predicted climate anxiety even after including the moral distress score, although CMD was a stronger predictor of climate anxiety. NR6 was not related to general anxiety after including climate anxiety and CMD. Importantly, after including climate anxiety and CMD as predictors, NR6 was a negative predictor of depression; that is, it appeared to have a protective effect when combined with the other predictors. Regression results can be seen in Table 3.

Table 3. Regression analyses.

Predictor	beta coefficient	t	p	95% confidence interval
Predicting CCA				
Block 1				
Age	-.16	-2.51	.013	-0.16- -0.02
Gender	.12	1.93	n.s.	-0.00- 0.25
Block 2				
NR6	.21	3.13	.002	0.04- 0.20
CMD	.39	5.56	<.001	0.14- 0.29

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Predicting GAD				
Block 1				
Age	-.14	-2.03	.044	-0.23--0.00
Gender	-.19	-2.92	.004	-0.51--0.10
Block 2				
NR6	-.04	-.52	n.s.	-0.16-0.10
CMD	.14	1.76	n.s.	-0.01-0.25
CCA	.34	4.42	<.001	0.29-0.75
Predicting PHQ				
Block 1				
Age	-.13	-1.87	n.s.	-0.20-0.00
Gender	-.12	-1.82	n.s.	-0.35-0.01
Block 2				
NR6	-.18	-2.45	.015	-0.25--0.03
CMD	.22	2.86	.005	0.05-0.29
CCA	.34	4.32	<.001	0.24-0.66

Note: CCA = climate anxiety; NR6 = connection to nature; GAD = general anxiety; PHQ = depression; CMD = climate moral distress. Gender is coded as 0 = female, 1 = male.

4. Discussion

As predicted, nature relatedness was significantly and moderately associated with both climate moral distress and climate anxiety. Furthermore, the association between connection to nature and climate anxiety was not accounted for by moral distress. Connection to nature was also significantly associated with general anxiety, although this relationship was eliminated when climate anxiety and climate moral distress were controlled. Strikingly, when climate anxiety and climate moral distress were included in the model, nature connectedness was in fact associated with lower ratings of depression. This suggests that although nature connectedness may create a vulnerability to negative thoughts and feelings about climate change, it may protect mental health amongst those who are already feeling anxious about contemplating environmental degradation. The latter finding was not predicted and should be further investigated. We postulate this indicates that, even in today's context of growing environmental threats, nature connectedness remains important to good mental health.

The findings that climate anxiety predicts general anxiety, and climate anxiety and climate moral distress predict depression, add further evidence that climate anxiety has the potential to impair mental health. A novel finding was the generally high endorsement of climate moral distress items. Research into the moral dimensions of climate change is nascent, and we argue that our findings require greater attention be given to moral responses to climate change. This is particularly important considering large correlations with climate anxiety and moderate correlations with anxiety and depression.

These results do not suggest that nature connectedness is harmful or problematic, or that it should be discouraged. Evidence regarding the beneficial effects of feeling and being, connected to nature is convincing [40–42]. People reporting more nature connectedness may be more likely to spend time in (and pay attention to) nature; and time in nature can reduce stress and improve mood [43]. Greater nature connectedness is also consistently associated with sustainable behavior [5].

As multiple researchers stress, climate anxiety is not pathological, but can be considered an appropriate, rational and constructive response to our current environmental conditions [44,45]. We further argue that when nature connectedness enhances climate anxiety, it need not be framed as a 'problem', particularly as it can lead to greater pro-environmental behaviours [19]. However, we must remain aware of potential routes by which nature connectedness enhances sensitivity to, and concern about, threats to the natural environment in less helpful ways, enabling potential psychological vulnerabilities to be identified and managed. Different aspects of the connection to nature may be associated with increased stress under certain conditions, particularly in a world of

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growing environmental threats [12]. However, the apparent ability for nature relatedness to protect against depression among those feeling climate anxiety and moral distress suggests a complex relationship, though this finding should be replicated in different groups.

A key question remains: within a context of chronic planetary degradation, how can nature connection be conceptualized in a way that supports the resilience of people and planet? One possibility is to support nature connection activities that are varied, and to highlight that nature-based experiences can be both positive and negative or unsettling. This might help people to acknowledge nature as comprising more than just walks in the woods and encounters with charismatic animals, and as something that also includes challenging experiences that may require adaptive behavior on the part of the person who wants to experience it [46]. Practice in coping with nature in potentially uncomfortable conditions, and offering compassion in response to that discomfort, may help people to learn how to benefit from nature, and care for nature, even when nature seems less safe or stable [21]

We encourage clinicians to consider whether patients may be experiencing moral distress as part of their awareness of climate change, and to develop tools that can enhance emotional management and moral repair in clients whose connection with nature is strong. As stated elsewhere [15], "distress as the natural world degrades is a dimension of connection." If moral distress arises when a sense of right is violated, what is the effect on a society increasingly aware of the ways its consumption habits and a 'culture of uncare' [47] lead to environmental and social crises all over the world, whilst simultaneously being confronted with its own failure to change course? If people who feel a strong sense of connection to the natural world are both more likely to attend to environmental threats, and to assign greater value to environmental entities, might this make them inherently more vulnerable to distress, or may they have corresponding sources of resilience from which they could also benefit? More information is needed about the possible positive or negative connection between climate moral distress and sustainable behavior.

Even those who feel related to nature will be served by intervention that grows a sense of efficacy, social trust, and, perhaps most importantly, hope (Chawla, 2020). Because moral distress can undermine trust in others, and even the self, it may be important to support the benefits of nature connection by boosting recognition that many other people also care about nature. Participating in groups that have organized to support pro-environmental behaviors and policies could be one way to promote such a recognition. This could in turn enhance confidence that one's own care for nature remains meaningful, important, socially valued, and that in combination with the efforts of others, it has the potential to lead to effective change.

5. Conclusions

The current era presents us with incontrovertible evidence that nature is threatened by human activity (IPCC), and at best will continue to change in ways that affect the relationship between people and the natural world [46]. We cannot pretend that in this context, our relationship to nature is of unalloyed benefit to human well-being [16]. Humanity is part of, and interdependent with nature, and as such our health depends on planetary health; how can we expect nature to support our wellbeing if we do not care for it in turn? In a world that includes both positive and negative experiences of nature, researchers and mental health professionals should investigate the sources of individual, community and planetary resilience that enable people and the living world to thrive together.

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