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Review

Relationships between people and nature: Nature connectedness and relational environmental values

Michael L. Lengieza[1] and Rosemary Aviste[2]

There is growing recognition that our relationship with nature needs repairing. Two operationalizations of this construct within psychology are nature connectedness and relational environmental values. This review covers recent advances on both constructs. It outlines the growing evidence that both operationalizations are strong predictors of pro-environmental outcomes. It goes on to review what is known about the antecedents of the human–nature relationship and outlines three emerging principles about nature connectedness, in particular: (1) it largely operates like a true relationship, (2) it is a form of self-transcendence, and (3) it involves the self. Additionally, the review highlights recent paradigmatic shifts in the study of the human–nature relationship, shifting from studying associations at the individual level to instead focus on group-level processes.

Addresses
[1] Durham University, United Kingdom
[2] The Pennsylvania State University, United States

Corresponding author: Lengieza, Michael L. (Michael.l.lengieza@durham.as.uk)

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In 2020, the UN Secretary-General ended his speech on the state of the planet by stating, "Now is the time to transform humankind's relationship with the natural world" [1]. Now, more than ever, the Western world is beginning to recognize that changing our relationship with the natural world is key to moving toward a more sustainable future (see Ref. [2] for a review of recent policy interest in the human–nature relationship). The human–nature relationship has been studied in many ways. Within psychology, it is mainly studied through two constructs. First, nature connectedness—the psychological closeness of one's relationship with nature [2], often represented by the extent to which nature is included in one's sense of self [3] or an affective sense of oneness with nature [4]. Second, relational environmental values—the valuing of the environment expressly because of the relationships that form between people and nature [5]. This paper reviews recent developments in our understanding of the psychology of human–nature relationships, with a focus on these two constructs.

Nature connectedness

Considerable research has documented the robust association between nature-connectedness and important outcomes for both the planet and people. Several meta-analyses have shown that nature connectedness is a reliable predictor of a broad range of pro-environmental behaviors (see Ref. [6] for a systematic review of meta-analyses). In other words, connectedness to nature is good for the planet. It is, however, also good for people. There are meta-analytically documented links from nature connectedness to multiple forms of wellbeing, including general wellbeing [7], hedonic wellbeing [8], and eudaimonic wellbeing [9]. Moreover, nature connectedness is positively associated with beneficial group outcomes, such as pro-sociality [7,10,11] and social cohesion [12]. Thus, it is quite clear that nature connectedness serves both people and planet, making the more interesting question: 'How can the closeness of our relationship with nature be improved?'

Antecedents of nature connectedness

With over two decades of research, we already know a lot about the antecedents of nature connectedness (see Ref. [13] for a thorough review). One of the more frequently cited predictors of nature connectedness is contact with nature [6,7,13]. However, it seems that it is not just *any* contact with nature that predicts nature connectedness, but specific types of *meaningful* contact with nature (e.g., actively noticing nature[14–16]) that most strongly predict nature connectedness [2]. Another often-cited antecedent of nature connectedness is mindfulness (see Ref. [17] for a meta-analysis). Yet, while general mindfulness tends to positively predict nature connectedness, there is some degree of nuance, with some facets of mindfulness (e.g., observing and nonreactivity) more predictive of nature

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connectedness than others (e.g., nonjudging and describing) [18,19]. Finally, positive affect is another antecedent of nature connectedness often cited in the literature [14]. However, like the last two phenomena, not all affect influences nature connectedness equally [13]. For example, while recent experimental work shows that focusing on hedonically positive experiences (i.e., on fun) [20] can lead to increases in nature connectedness, this effect is not as strong as the effect of focusing on eudaimonically positive experiences (i.e., on meaning & purpose; on growth) [10,20]. These examples illustrate that, even for the major predictors of nature connectedness, there is nuance to many of the established associations between antecedents and nature connectedness.

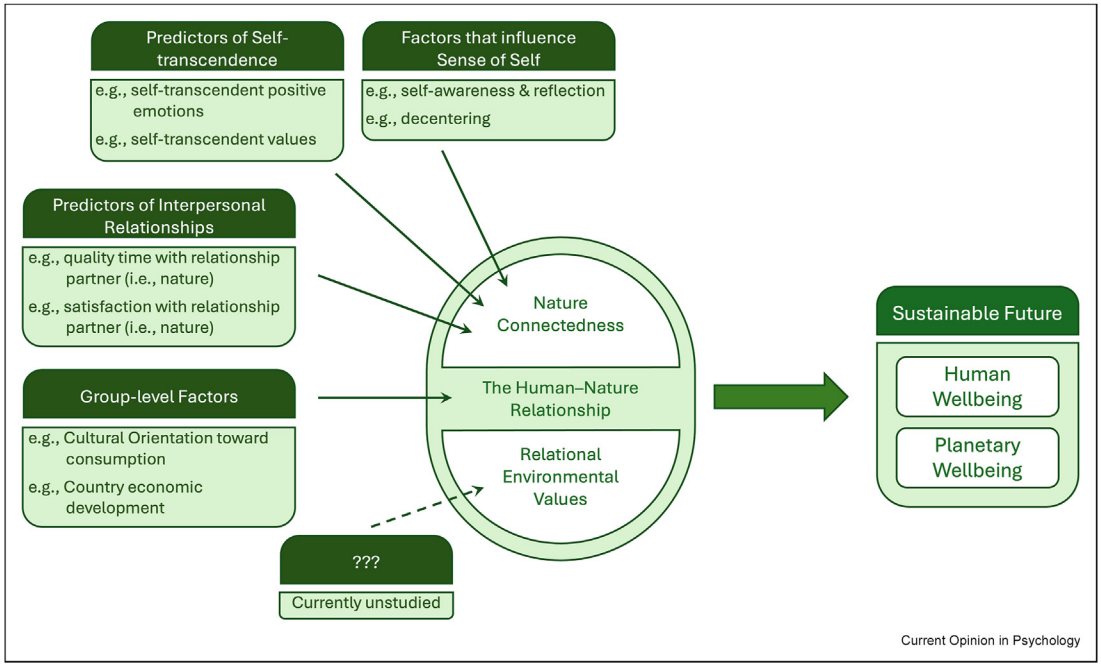
Theoretical advances: conceptual overlaps between nature connectedness and constructs from other domains

One way to make sense of the nuances of nature connectedness's antecedents is to draw upon existing theory. While there is no formal theory explaining nature connectedness's formation, other bodies of psychological literature can inform our understanding of nature connectedness and contribute toward such theoretical development. As captured in Figure 1, at present, three theoretically-important principles have been recognized about nature connectedness: Nature-connectedness operates similarly to interpersonal relationships [2], connectedness operates similarly to self-transcendence [10], and nature connectedness involves the self [13,20].

Principle: nature connectedness operates similarly to interpersonal relationships

As implied by the framing of this paper, nature connectedness is ultimately a reflection of our relationship with nature, as highlighted by a recent review of the parallels between nature connectedness and interpersonal relationships—ultimately indicating that both follow many of the same principles [2]. For one, a key metric of the quality of interpersonal relationships is the extent to which the self expands to include a relationship partner [2]—hence the reason for nature connectedness originally being defined as the extent to which nature is included in one's sense of self [3]. Additionally, models of relationship commitment have been successfully applied to nature connectedness, showing that the same factors maintaining interpersonal relationships also maintain nature connectedness (e.g., satisfaction with relationship partners and investment in the relationship) [21]. Similarly, in the same way research has shown that relationships are influenced by *quality* time [22], nature connectedness is influenced by the quality of nature engagement [7,23], as alluded to above. Thus, there is an emerging recognition of the importance of the 'relationship' in studying the

Figure 1



Paradigmatic and theoretical advancements in the study of the human–nature relationship.

'human—nature relationship'. Critically, however, little work has attempted to explore the boundaries of these parallels. This will undoubtedly be instrumental in generating formal theories.

Principle: nature connectedness operates similarly to self-transcendence

One of the core principles of research on relationships, and relationship closeness specifically, is that relationships cause self-expansion [24]. Self-expansion, which involves the self-concept growing in size [24], is conceptually similar to notions of self-transcendence, which involves a softening of the boundaries of the self, thereby allowing it to feel one with others [10,13,20]. Thus, it is unsurprising that self-transcendent phenomena tend to correlate with nature connectedness [13]. For example, as noted above, not all forms of positive affect predict nature connectedness to the same degree. As it turns out, one notable class of positive emotions that tend to predict nature connectedness quite strongly are self-transcendent emotions [25—27], including awe [14,26,28,29], gratitude [14,26,27] and inspiration [14,26,27]. Nature connectedness also correlates positively with other forms of self-transcendence, such as self-transcendent and humanistic values [7,30], connecting to humanity as a whole [10], and pro-sociality [10,11], strengthening the view that nature connectedness represents a form of self-transcendence.

Principle: nature connectedness involves the self

Nature connectedness, however, is influenced by more than just self-transcendent phenomena. Ultimately, nature connectedness involves the self and is often defined as the extent to which nature is included in one's sense of self [3]. Accordingly, phenomena that impact our sense of self likewise tend to impact the closeness of our relationship with nature (i.e., the extent to which nature is experienced as part of the self). For example, multiple studies have shown that how we attend to our sense of self (i.e., self-awareness or self-attention) can influence nature connectedness—with more introspective forms of self-awareness (e.g., reflective self-attention or private self-awareness) having a positive effect and more preoccupied forms of self-awareness (e.g., rumination or public self-awareness) having a negative effect [31,32]. Similarly, research inspired by the positive association between psychedelics and nature connectedness [33] has revealed that ego-dissolution—which is a lessened or lost sense of self [34]—has a positive influence on nature connectedness [34—36]. Following a similar line of reasoning, decentering—which is linked to reduced self-referential processing [19]—is an important part of mindfulness's effect on nature connectedness [19,37]. These findings show a consistent trend of nature connectedness being influenced by our sense of self and identity.

Summary

These three principles are especially valuable because recognizing them allows the field to better predict what influences nature connectedness based on what is known to impact other types of relationships, self-transcendence, and our sense of self and identity.

Paradigmatic advances: group-level nature connectedness and cultural-processes

Recently, researchers have begun to recognize that the problem of repairing our relationship with nature is not just an individual one but a group problem as well. Accordingly, recent research reinforces the importance of considering group-level and cultural factors that influence nature connectedness [38] (Figure 1). For example, in one study of environmental studies students from 41 countries, levels of national wealth and development were negatively correlated with nature connectedness [39], suggesting that more developed nations tend to be less connected to nature. This finding is corroborated by another earlier study with a smaller sample (14 nations), which found that national income was associated with significantly lower levels of national nature connectedness [40]. This study also found that other commercial-development and consumption-oriented country-level indicators, like higher smartphone and energy use, had a significant negative association with nature connectedness [40]. These patterns suggest that broader national factors, such as urbanization, digitalization, wealth, and development, may shape individual and group behaviors—like time spent in nature—that influence overall levels of nature connectedness.

While the finding that more developed countries are less connected to nature may be partly explained by infrastructural differences (e.g., more developed countries being more urban), cultural attitudes and worldviews may also play a significant role in this disconnection. For example, one multi-country study (Greece, Poland, and Sweden) found that socio-demographic factors and environmental values accounted for more variance in nature connectedness than environmental variables (e.g., distance to nearest nature site) [38]. Additionally, a study of Americans, and the abovementioned study with 14 countries, found that consumerism, which is a cultural value, is negatively associated with connectedness [4,39].

Other research, granted based on single-culture samples analyzed at the individual level, similarly supports the influence of cultural and group factors. For example, one study has indicated that others' values can impact an individual's nature connectedness directly and that social norms related to engaging with nature can indirectly impact nature connectedness via their impact on

nature engagement [41]. In other words, these associations are generally consistent with the process through which broader cultural values would likely impact nature connectedness at the group level [2]. On the whole, this is consistent with a great deal of other work showing that *children's* sense of nature connectedness is influenced by both *parental* attitudes and values [42,43] and *parental* nature connectedness [44,45]. This, again, suggests some degree of cultural transmission of nature connectedness and alludes to the importance of considering the *social* processes that influence our relationships with nature. Thus, it is important for more research to focus on nature connectedness at the group level (e.g., across countries and cultures) to identify levers for changing societal and global nature connectedness—especially in the Western world where it is failing [39,40].

Relational environmental values

Nature connectedness, however, is not the only way the human–nature relationship has been studied. Often considered as a complement alongside instrumental (or egoistic) environmental values (i.e., valuing nature for its benefits to people) and intrinsic (or biospheric) environmental values (i.e., valuing nature for its own sake) [5], relational environmental values are another way the human–nature relationship has received attention within psychology. Specifically, relational environmental values involve valuing the *relationship* between a valuer (person) and another entity (nature) [5,46]. Critically, the extant research has shown that while relational values are highly correlated with measures of nature connectedness [46,47]—as one would expect—the two constructs are empirically distinct [46], suggesting that there is, indeed, benefit in studying the human–nature relationship from both perspectives.

While relational environmental values have seen a healthy surge of interest (e.g., all the work by the IPBES [48,49]) from outside of psychology and related fields, it is only relatively recently that it has been studied in quantitative empirical investigations [46,47,50,51]. Yet, the limited empirical work that has emerged has shown it is an important predictor of pro-environmental outcomes. For example, in one paper developing and validating the first measure of all three environmental value-bases, relational environmental values were consistently (i.e., across three studies) the stronger predictor of both behavioral intentions and actual behavior when compared simultaneously to intrinsic and instrumental environmental values [46]. Similarly, general eudaimonic values are a subtype of relational values where relationships with nature are valued because of the fundamental role that relationships, in general, play in human flourishing and fulfilment (see Ref. [52] for a lengthier discussion). Such eudaimonic environmental values have been shown to have notable indirect effects through their impact on general biospheric values, which subsequently predict pro-environmental behavior [51]. In another paper, the perceived value of cultural ecosystem services (which largely map onto relational values [5]) was positively correlated with both pro-environmental behavior and place attachment [47]. Thus, even though there is more work to be done, preliminary work within the field suggests that there is value in studying human–nature relationships from a relational values perspective.

Conclusion

There is ample evidence that our relationship with nature—whether it be operationalized as nature connectedness [6] or relational values [46]—impacts how we treat the earth (Figure 1). In light of global environmental crises, it is, therefore, more important than ever to understand how to improve these relationships [1]. At present, there is a substantial body of research focusing on how to increase nature connectedness [13]. However, there is always room for improvement, and recent theoretical developments and paradigmatic shifts have begun to emerge. In contrast, empirical, quantitative work focusing on relational environmental values has only recently surfaced and has yet to address how we can promote these critically important values (Figure 1). It will, therefore, be especially important for research to focus on how we can promote relational environmental values alongside the continued work focusing on promoting nature connectedness.

Author contribution

Lengieza: Conceptualization, Writing- Original draft preparation. Aviste: Writing - Review & Editing.

Declaration of competing interest

The authors declare no conflict of interest.

Data availability

No data was used for the research described in the article.

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* of special interest
** of outstanding interest

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Further information on references of particular interest

2. ** This paper provides a review of recent policy interest in the human–nature relationship. It goes on to draw upon the literature on interpersonal relationships and evidence from decades of research on nature connectedness to make the case that the human–nature relationship *is* a relationship. The paper highlights some of the major implications of putting the relationship back into human–nature relationship. In particular, engagement with nature must be meaningful (i.e., more than passive contact), just as time with relationships partners must be meaningful. Similarly, reciprocity and intimacy are both important for interpersonal relationships and are likely important for nature connectedness and the human–nature relationships as well. This paper is especially important because it represents a key step toward developing a stronger theoretical foundation for understanding human–nature relationships.

6. ** This paper provides a systematic review of the meta-analytic links between connections with nature and both wellbeing and pro-conservation outcomes. The review indicates a robust link between contact with nature (i.e., 'physical connections' with nature) and wellbeing as well as nature connectedness (i.e., 'psychological connections' with nature) and wellbeing. More importantly, it also showed robustly strong relationships between nature connectedness and pro-environmental outcomes. This paper is especially important because, being a systematic review of meta-analytic evidence, it provides high quality evidence of a robust link between nature connectedness and pro-environmental outcomes.

7. * This incredibly useful meta-analysis of 53 experiments and 147 correlational studies on nature connection provides several key insights into both the predictors and outcomes of nature connectedness. In particular, this paper indicates that contact with nature is one of the useful means of improving nature connectedness but that this can be enhanced through mindfulness, consistent with the importance of the quality of nature engagement. It also indicates that nature connectedness is robustly associated with human wellbeing and nature conservation. This paper is especially important because it brings together and synthesizes the large body of literature on nature connectedness that has been collecting over the last two decades.

14. * This paper used a novel application of network analyses to investigate the emotions and activities that are especially influential in nature connection experiences. Like much other research, positive emotions were notably and positively influential for nature connectedness and negative emotions seemed to hinder it. However, this research suggested that drive emotions (e.g., inspiration) are more influential than contentment emotions (e.g., calmness). Additionally, it highlighted boredom as a particularly detrimental nature-connection emotion. In terms of activities, deliberate engagement with nature (e.g., using senses and appreciating nature's beauty) and meaningful engagement (e.g., having deep emotional experiences in nature) were the two most important pathways to nature connectedness. In contrast, other forms of engagement, such as intellectual engagement (e.g., learning about nature scientifically) weren't as important. This research is important because it, like other studies noted here, shows that there is much more to experiences with nature than simply basic contact; that is, the activities we engage in and the emotions we feel while in nature are crucial to how connected to nature a given experience makes us feel.

15. * This paper sought to differentiate the effects of passive contact with nature and noticing nature on individuals' sense of nature connectedness. In this study, both contact with nature and deliberately noticing nature predicted unique variance in nature connectedness. Specifically, noticing nature accounted for almost 16% of the variance in nature connectedness whereas passive contact with nature only accounted for 10% of the variance, suggesting, at the very least, that noticing nature is an especially important antecedent of nature connectedness. This study is important because it highlights how it is more than just simple contact with nature that increases nature connectedness; the contact must be meaningful as well.

20. ** This paper tested the causal effect of eudaimonic experiences (experiences involving meaning and purpose in life, personal growth, or authenticity) across three experimental studies. In each study, participants reflected on either (a) one of the three facets of eudaimonia, (b) hedonia (i.e., fun), or (c) mundane planning. Based on evidence from other forms of self-transcendence and theories related to self-expansion in interpersonal relationships, eudaimonia was hypothesized to lead to greater nature connectedness than either hedonia or the control. On the whole, the three studies revealed that eudaimonia—i.e., meaning and growth—led to greater nature connectedness than either of the other reflections suggesting that eudaimonia can cause the self to expand to include nature. This paper is particularly important because it exemplifies how drawing on literature related to self-transcendence and self-expansiveness can be used to make sound causal predictions.

25. * This paper sought to understand the differential relationship between nature connectedness and self-transcendent emotions (e.g., awe or compassion) versus self-enhancing emotions (e.g., pride or joy). The key finding from this work, at least in the context of the present paper, was that self-transcendent emotions positively predicted nature connectedness whereas self-enhancing emotions either did not (Studies 1 & 3) or negatively predicted it (Study 2). The paper also reported that self-transcendent values, but not self-enhancement values, were positively associated with nature connectedness. Thus, this study provides strong evidence that self-transcendence and nature connectedness as closely linked. This paper is important because it serves as pointed evidence supporting the theoretical principle that nature connectedness reflects a form of self-transcendence.

39. ** This paper used data from university environmental studies students from 41 students to conduct the first large scale investigation of how country-level factors can impact nature connectedness. Across a variety of metrics, this study revealed a negative association between levels of national wealth and development and nature connectedness. This strongly suggests that cultural and country-level factors impact our relationships with nature. This study is especially important because it provides a strong example for future research looking at other indicators of country-level factors (i.e., beyond wealth and development).

40. ** This paper was one of the first studies, if not the first itself, to seriously consider the society-level factors that can influence nature connectedness at the country level. In the paper, societal extinction of nature experience (i.e., reduced nature engagement), negativistic relationship factors (i.e., aversive relationships with nature, such as natural disaster risk), societal orientation toward consumption and commerce (e.g., smartphone use), and societal orientation toward dominion over nature (e.g., resource extraction) were considered as potential predictors of nature connectedness. Analysis of data from 14 countries revealed that nature connectedness was negatively impacted by all four indicator types, providing clear evidence that societal factors impact our relationship with nature. This paper is especially important because it not only investigates nature connectedness at the country level, but it did so using a theoretically well-reasoned framework for identifying potential factors that would influence societal relationships with nature connectedness.

47. ** This paper developed and validated the first scale designed to capture the three primary reasons people value nature: valuing nature for people (instrumental), valuing nature for its own sake (intrinsic), and valuing nature as community (relational). Across three studies, relational environmental values were consistently the strongest predictor of pro-environmental intentions and behavior. In contrast, instrumental values were consistently negative predictors of pro-environmental intentions and actual behavior and intrinsic values were a rather inconsistent (and often weak) predictor of pro-environmental outcomes. Thus, this research suggests that, just like nature connection research, our relationship with nature is a key predictor of pro-environmental behavior. This paper is especially important as it is one of the first attempts to capture relational environmental values quantitatively and the first evidence that relational environmental values are better predictors of pro-environmental outcomes than other environmental values.