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Review

The Human–Nature Relationship as a Tangible Target for Pro-Environmental Behaviour—Guidance from Interpersonal Relationships

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Abstract: Major environmental institutions around the globe are realising that the failing human–nature relationship is a root cause of environmental issues. Despite this shift in thinking, there is more work to be done to highlight the human–nature relationship as a tangible target for pro-environmental behaviour. This review argues for the importance of targeting human–nature relationships. It emphasises that nature connectedness, with its robust links to pro-environmental behaviour, is a useful operationalisation of such relationships. Following a review of recent references to the human–nature relationship in policy documents, this paper draws on theories of interpersonal relationships to illustrate how they can inform efforts to repair the human–nature relationship. Parallels between nature connectedness research and research on interpersonal relationships are highlighted. The potential for new routes to a closer human–nature relationship—including a more meaningful (e.g., intimate) engagement with nature, a cultural shift in support for human–nature relationships, fostering trust in nature and recognising reciprocity with nature—are noted. This review concludes that the human–nature relationship can be seen as an extension of interpersonal relationships, provides a tangible pathway to a sustainable future, and suggests that such explicit relationship-focused thinking can guide both policy and research.

Keywords: human–nature relationships; interpersonal relationships; nature connectedness; pro-environmental behaviour

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1. Introduction

Major environmental institutions around the world are realising that a sustainable future requires a new relationship with nature [1]; there is a growing recognition that the human–nature relationship is a tangible target for driving that behaviour change. For example, the 2022 UN commissioned the Stolkholm+50 evidence review, which has key messages about the human–nature relationship [2]. Similarly, the 2022 Kunming–Montreal Global Biodiversity Framework [3] includes a target to improve human–nature connection. Further, '*Exiting the Anthropocene? Exploring fundamental change in our relationship with nature*', a 2023 briefing from European Environment Agency [4], is the latest example of this shift in environmental science policy thinking. These approaches go beyond technical solutions that only address the symptoms of a deteriorating human–nature relationship and, instead, focus on its root cause: disconnection from nature [5,6]. Reversing this disconnection to instead foster a deep connection with nature is also fundamental to help motivate and continue the technological fixes that treat the symptoms of that disconnection, for example, reducing waste and moving to renewable energy [7].

Despite a shift in policy thinking, there is still more work to be done to promote the acceptance and operationalisation of this approach. This paper provides an initial summary of the human–nature relationship highlighting nature connectedness as an operational approach that is linked to pro-environmental behaviour. This is followed by a review of recent policy documents that include the human–nature relationship. The review then draws on broader theories of interpersonal relationships to emphasise the significance of relationships to people and their impact on behaviours. These are then discussed in relation to nature connectedness in order to identify new routes to a closer human–nature relationship and the pro-environmental behaviours needed for climate action. In sum, the objective of this review is to demonstrate that the human–nature relationship is an extension of these human relationships and a tangible pathway to climate action that can augment and enhance the current efforts in this field.

2. The Human–Nature Relationship

The human–nature relationship is captured well by the psychological construct of nature connectedness, which provides a theoretical foundation for enhancing pro-environmental behaviour. This internationally accepted construct captures both the cognitive aspects of recognising one's place within the wider natural world and the emotional bond to nature. It has been formally defined as including nature in one's sense of self [8,9], resulting in a feeling of oneness [9,10] or affinity to nature [11]. Thus, the construct of nature connectedness goes beyond mere contact and exposure to nature and instead emphasises a deep and meaningful relationship with nature [12]; see also [13]. From a sustainable behaviour and climate action perspective, systematic reviews and meta-analyses have shown a robust and causal link between nature connectedness and broadly carbon-cutting, pro-environmental behaviours [14–17]. More recently, this association has been extended to pro-nature conservation behaviours [18]. Turning to human mental wellbeing, further systematic review evidence has shown that nature connectedness is closely linked with wellbeing [19] and psychological flourishing [20]. To put it simply, nature connectedness thus unites both human and planetary wellbeing, making it a prime candidate for leveraging behaviour change.

To target nature connectedness for behaviour change and climate action, there is a need to (a) understand the predictors of nature connectedness and (b) develop and test approaches to improving it. Much research has explored the antecedents to nature connectedness and has suggested that there are several ways to increase nature connectedness (see [9,21,22] for more extensive reviews). These avenues range from short-term increases in exposure to nature [23] to anthropomorphising nature [24] to mindfulness [25]. Ultimately, however, most of the research on the antecedents of nature connectedness tends to fall into the category of increasing contact with nature (see [9]), focusing less on targeting meaningful interaction with nature or considering sustained benefits. Yet, some direct evidence (and much of the indirect evidence reviewed later in this paper) suggests that meaningful interaction with nature is the more important target [26].

Research has also considered interventions designed to deliver sustained benefits. This research has shown that simple interventions can bring about sustained increases in nature connectedness through prompting people to notice nature [27]. A review of interventions to improve nature connectedness has also indicated that sustained benefits are possible through repeated engagement with nature [22]. This repeated engagement can be informed by the pathways to the nature connectedness design framework, which suggests several broad categories of activities that can facilitate nature connectedness. This work was based on exploring which of Kellert's [28] nine human–nature relationship types predicted nature connectedness. The five predictive pathways (or relationship types) were sensory contact, emotions, beauty, meaning and compassion. In contrast, four relationship types did not explain nature connectedness (i.e., use, control, scientific and negativistic [29]). The 'pathways' framework has subsequently been applied by many practitioners and has been successfully explored on a societal scale [30], suggesting that nature connectedness is a realistic target for large-scale change. The utility of applying the pathways at scale to

increase nature connectedness, and thereby the human–nature relationship, as a tangible focus for a more sustainable future, is starting to be recognised in global policy [2], which will be explored further in the next section.

3. The Human–Nature Relationship and Environmental Policy

3.1. Positive Trends in Environmental Policy

As indicated in the opening, major environmental institutions are calling for a new relationship with nature, and there are some policies that indicate a shift toward more meaningful efforts to improve the human–nature relationship. For example, the UN Environmental Programme report Making Peace with Nature suggests that the climate and biodiversity crises can be tackled by transforming the world's relationship with nature through bold policymaking [1]. Changing the values and mindsets that define the current relationship with nature is an important part of this approach. In essence, this focus indicates that the target is a deeper psychological human–nature relationship rather than a simple connection through contact and visits. The report refers to a change in values from a relationship based on material consumption to one that values nature's role in a good life. Thus, a key message is transforming social and economic systems to put that value at the heart of our decision making.

The Kunming–Montreal Global Biodiversity Framework [3] adopted at COP15 is also built around a theory of change and vision that recognises the exploitation of nature fuelled by social values and behaviours as underlying causes of biodiversity loss. The framework uses the language of relationships and the need to live in harmony with nature. The framework also refers to '*Mother Earth*' and recognises that nature is vital for cultural inspiration and wellbeing, and explicitly recognises the human place within nature.

Although the Kunming–Montreal Global Biodiversity Framework is a plan to address the decline in biodiversity, it is also a plan to transform our relationship with nature by 2030. The framework aims to '*catalyse, enable and galvanize urgent and transformative action*' across society in a vision with specific goals and 23 action-oriented global targets. One target includes access to nature, but goes beyond that to improving human connection to nature and wellbeing, and '*mainstreaming*' urban biodiversity. As such, it implies a much deeper relationship than that delivered by access alone [26]. Yet, despite being included within a target, human connection to nature is not defined in the Kunming–Montreal Global Biodiversity Framework. Therefore, many might interpret it to simply mean facilitating access and visits.

Indicating a promising shift toward greater specificity, nature connectedness research is increasingly referred to in policy documents, and the pathways to nature connectedness as a tool for societal change were noted within the UN-commissioned evidence review *Stockholm+50: Unlocking a Better Future* [2]. Guided by an advisory panel of experts in policy and sustainable development science, *Stockholm+50: Unlocking a Better Future* [2] synthesised the scientific evidence and prepared recommendations for action. Once more, the human–nature relationship was highlighted: *'Our relationship with nature needs redefining, from one of extraction to one of care. Human–nature connectedness should be strengthened in our social norms and value systems, and in how we live our everyday lives.' (p. 9).* The summary for policymakers recognises that society's disconnection from nature is a root cause of ecological decline and is based on a detailed consideration of redefining the human–nature relationship.

Similarly, the EEA [4] briefing, '*Exiting the Anthropocene? Exploring fundamental change in our relationship with nature*', is informed by nature connectedness research and also wider work on the human–nature relationship, such as deep ecology [31]. The briefing considers how to reframe the human–nature relationship based on a holistic understanding of the deep interconnection between humans, other life forms and ecosystems for societal transformation and a sustainable future, showing another example of the shift in policy thinking towards the human–nature relationship.

These international and European reviews provide a wider context for a national review, one that highlights the human–nature relationship but demonstrates how the

current paradigm struggles to incorporate such relational thinking. The 610-page Dasgupta Review [32] commissioned by the UK Government set out to assess the economic benefits of biodiversity and the costs and risks of biodiversity loss. Perhaps surprisingly, given this focus, the review recognises the more spiritual and sacred aspects of the human–nature relationship, and it runs as a theme through relevant chapters. The review includes the psychological construct of nature connectedness notes and accepts the distinction between contact with nature and connectedness with nature. Noting that improving nature connectedness goes beyond the wellbeing benefits of access to *motivate environmental behaviour.* The hope in the Dasgupta Review is grand: a future where citizens can live in peace with nature. However, despite stating that '*Connecting with Nature needs to be woven throughout our lives'* and the need to '*create an environment in which, from an early age, we are able to connect with Nature'*, the language of connectedness falls away in the five-page *Headline Messages* document [32]. Subsequent policy around connecting people with nature has reflected this, with outcomes simplified to access to the outdoors, showing that there is still a need for wider acceptance of the importance of the human–nature relationship and how to operationalise it.

3.2. Areas for Improvement in Environmental Policy

There has been an encouraging shift in policy thinking in recent years to consider the human–nature relationship. However, there is much room for improvement toward more meaningful change. In particular, there are two areas of weakness: specificity of language and sufficiency of aims. In regard to specificity, policies are often not clear in the language they are using, leaving their emphasis on the human–nature relationship either implicit or too vague (e.g., Kunming–Montreal Global Biodiversity Framework). Such vagueness and fragmentation of nature connection terminology have been noted alongside the lack of concrete guidance on improving the human–nature relationship [13]. Ives [13] specifically notes that the psychological construct of nature connectedness can provide focus and direction and can help ensure that the most effective leverage points are properly targeted.

Regarding the sufficiency of aims, while policies are beginning to use the language of human–nature *relationships*, many of the same policies focus on outcomes that are not sufficient to change our relationship with nature (e.g., simple access to nature); in other words, the policies claim to target the human–nature relationship without implementing changes that should reasonably influence a relationship. For instance, there are many examples of policies that focus on access to nature [33–36]. Promoting access, however, while undoubtedly necessary [9,22], is not sufficient to increase nature connectedness [26]. Additionally, recent evidence suggests that when considered simultaneously, a *psychological* connection to nature, rather than access and visits, better explains pro-environmental behaviour [15,18] and wellbeing benefits [15,37,38]. This research indicates that a focus on the human–nature relationship (vs. access and contact) provides greater benefits and unites both human and nature's wellbeing and that nature connectedness should not be conflated with access or contact. Thus, by placing a sole focus on promoting access or contact, many policies are at risk of falling short of meaningful changes to our relationship with nature. Accordingly, greater accuracy and careful definition in wording are needed, which—as we will argue in this paper—can be aided by more explicit recognition that the human–nature relationship is just as much a relationship as any interpersonal relationship.

The review above shows an encouraging shift in policy thinking toward nature connectedness being recognised as beneficial for health and nature conservation. However, it also acknowledges that this relationship is still largely neglected by current public policies [39] and has yet to become mainstream in practice [40]. To overcome this neglect, there is a dual need to see the human–nature relationship as a tangible and explicit target and to better recognise the conditions necessary to sufficiently alter this relationship with nature. Both these aspects can be furthered by considering the wider theory on inter-

personal (i.e., human–human) relationships as it relates to nature connectedness as an operationalisation of the human–nature relationship.

In sum, based upon the abundant evidence that nature connectedness is (a) strongly associated with pro-environmental outcomes [16], (b) sensitive to intervention [30] and (c) becoming increasingly recognised as an outcome of interest in policy, we argue that nature connectedness should be considered a priority target for environmental behaviour and climate action. Accordingly, if human–nature relationships are important for a sustainable future, then there is a need to consider how they can be promoted. Yet, while research has focused on the antecedents of nature connectedness (see [9]) and ways to improve it [22,30], there are still important theoretical lenses that have not been fully considered. One such lens is how theories of human interpersonal relationships can be applied to human–nature relationships to inform efforts to improve such relationships with the natural world (e.g., nature connectedness). The remainder of this review considers the implications of adopting such a lens, first providing an overview of research on interpersonal relationships followed by applications of relationship principles to human–nature relationships.

4. Interpersonal Relationships

4.1. The Importance of Relationships

Relationships are a fundamental part of the human experience, so much so that relationships are linked to several of our basic motives [41]. For example, relationships between two people are theorised to fulfil our basic need to expand and improve ourselves; by including close relationships in our sense of self, we increase the resources we feel are available to our self (self-expansion; [42–45]). Similarly, our relationships with other people help fulfil our basic need to belong and feel related to others [46,47]. Thus, it is no surprise that relationships are an important determinant of many facets of human existence, including psychological wellbeing (see [48]), mortality risk [48,49] and our sense of self and identity [41,43–45,50].

Wellbeing, mortality and our sense of self, however, are not the only important outcomes influenced by relationships; relationships also influence how we treat others and can make us more likely to engage in pro-social behaviours [51,52]. For example, the extent to which we include others in our sense of self—a key metric of a close relationship [42–45]—is sometimes a better predictor of helping someone in need than empathy or perspective taking [53]. Similarly, stronger interpersonal relationships tend to involve a greater willingness to sacrifice for the relationship partner [51,54–56] and a greater tendency to promote the interests of the relationship over self-interest [57]. Still further, more committed relationships are associated with a stronger tendency toward accommodation rather than retaliation in instances of relationship conflict [58]. In sum, there is little doubt that fostering stronger interpersonal relationships can result in benefits for both the individual (e.g., increased wellbeing; see [48]) and for others (e.g., pro-social behaviour; see [51,52,54–56]).

4.2. Factors That Influence Interpersonal Relationships

Given their fundamental importance to the human experience, a great deal of research has focused on the factors that influence interpersonal relationships in terms of their *closeness* (i.e., the extent to which two relationship partners are heavily influenced by one another; [59]) and *commitment* (i.e., feeling attached to a relationship and subsequently maintaining it; [60]). It is rather obvious that in order to have a close and committed relationship, one must actually spend time interacting with another person [48,59]. However, it is not just the amount of time spent interacting with a relationship partner that influences the closeness of the relationship, but the *quality* of the time spent with them [61].

There are many things that determine interaction quality and how the interaction with a relationship partner influences closeness. For example, *self-disclosure* (i.e., sharing information about oneself), versus just having a casual conversation [61], is an important part of developing intimacy and subsequent closeness [45,48,62]. Similarly, time spent engaging in *novel and exciting* activities is necessary to increase relationship closeness [44,45,61].

Likewise, *interdependence* (i.e., mutual influence) between oneself and a current or potential relationship partner is an important factor that influences the formation of a durable, committed relationship [57,59,63,64]. Finally, *commitment* to relationships is characterised by the experience of psychological attachment to the other person, long-term orientation toward the relationship, and desire for the relationship to persist [57,63]. Such commitment is influenced by the extent to which the relationship has (a) received a considerable investment of time and resources (i.e., large investment) and (b) fulfils important needs of the individual (i.e., high satisfaction) that cannot be easily fulfilled by other relationships (i.e., absence of alternatives; see [60]). In other words, it is not enough to just spend time around someone else for a relationship to form; intimacy, excitement and a sense of interdependence with the other person are all necessary ingredients for a close and committed relationship to form. This is likewise true of satisfaction with, investment in and lack of alternatives to the relationship.

In sum, while time and interaction are an important part of relationship formation, the ingredients of a sustained relationship that is close and committed go well beyond simply spending time around a potential relationship partner. This particular point—that relationships go beyond mere contact—continues to be emphasised because, in the context of human–nature relationships, mere contact with nature tends to dominate much of the discussion. As will be reviewed in the next section, applications of interpersonal relationship principles to facilitating human–nature relationships offer a range of insights supporting the need to go beyond facilitating mere contact with nature. A summary of key concepts and their parallels to human–nature relationships can be found in Table 1.

Table 1. A summary table of key ideas, parallels and insights.

Interpersonal Relationship Construct	Application in Interpersonal Relationships	Application in Human–Nature Relationships	Key Insight	Relevant NC Research	Sections
Willingness to Sacrifice	People are more likely to make personal sacrifices that benefit another person if they are in a close relationship with that person (see [55]).	People are more likely to make sacrifices for nature if they have a close relationship with nature (i.e., if they are connected to nature; [65]).	Just like relationships with people, relationships with nature are important for our willingness to make sacrifices that benefit nature.	[14,15,21,65,66], etc.	Sections 4, 5 and 5.1
Closeness	Close relationships are those relationships that are most important to us. One key metric of relationship closeness is the extent to which we include another person in our own sense of self (see [45]).	Like people, we can include nature in our sense of self. Within environmental psychology, including nature in one's sense of self is one of the more frequently cited definitions of nature connectedness (see [8]).	The human–nature relationship is a relationship. Nature connectedness is a tangible way to capture human–nature relationships.	[8,9,67–70], etc.	Sections 4.1, 4.2, 5 and 5.1
Commitment	Commitment in interpersonal relationships is the extent to which an individual is attached to the relationship (e.g., values the relationship) enough to put in the effort to deliberately maintain it (see [60]).	As with other people, we can be committed to our relationship with nature [65,71]. People who are committed to nature have a psychological attachment to nature and intend to maintain their relationship with it.	The human–nature relationship is a relationship. Nature connectedness is a tangible way to capture human–nature relationships.	[65,71], etc.	Sections 4.2 and 5.1
Psychological Attachment	Part of feeling committed to a relationship is having one's own emotional wellbeing be influenced by the other member of the relationship and the relationship itself (see [63]).	Feeling psychologically attached to nature (i.e., nature influencing one's emotional wellbeing) is one component of commitment to nature [71]. Indeed, some conceptualisations of nature connectedness emphasise an affective affinity for nature (e.g., [11]).	The human–nature relationship is a relationship. Nature connectedness is a tangible way to capture human–nature relationships.	[11,65,71]	Sections 4.2 and 5.1

Table 1. *Cont.*

Interpersonal Relationship Construct	Application in Interpersonal Relationships	Application in Human–Nature Relationships	Key Insight	Relevant NC Research	Sections
Long-Term Orientation	Part of feeling committed to a relationship is anticipating that one will continue to be part of the relationship for the foreseeable future and, therefore, considering how present actions in the relationship might impact future outcomes for the relationship (see [63]).	Part of feeling committed to one's relationship with nature is having the expectation that one will have this relationship for the foreseeable future and should consider how their current actions will affect the relationship in the future [71].	The human–nature relationship is a relationship.	[65,71]	Sections 4.2 and 5.1
Intent to Persist	Part of feeling committed to a relationship is desiring for the relationship to persist and, therefore, experiencing motivation to maintain the relationship (see [63]).	In theory, part of feeling committed to a relationship with nature is desiring for the relationship to persist and experiencing a motivation to maintain the relationship.	The human–nature relationship is a relationship.	[65,71]	Sections 4.2 and 5.1
Satisfaction	The more satisfied one is with the benefits provided by a given relationship, the more committed one should be to that relationship (see [60]).	Satisfaction with the benefits provided by nature predicts commitment to nature (see [65]).	It is important that the ways people are able to engage with nature are sufficient to meet their needs.	[65]	Sections 4.2 and 5.1
Investment	The more time and energy individuals have invested into a given relationship, the more likely they are to feel committed to that relationship (see [60]).	Investment in nature's wellbeing predicts commitment to nature (see [65]).	Personal investment in promoting nature's wellbeing is likely important for transforming our relationship with nature.	[65]	Sections 4.2 and 5.1
Available Alternatives	If an individual perceives there to be a greater number of available and attractive alternatives to the relationship, then they are less likely to remain committed to that relationship (see [60]).	In theory, perceiving attractive, available alternatives to a relationship with nature should predict lower commitment to nature (but see [65]).	Individuals will likely not have a strong relationship with nature if they believe they can obtain the same benefits another way (e.g., perhaps through relying on technology).	[65]	Sections 4.2 and 5.1

Table 1. *Cont.*

Interpersonal Relationship Construct	Application in Interpersonal Relationships	Application in Human–Nature Relationships	Key Insight	Relevant NC Research	Sections
(Inter)dependence	(Inter)dependence is one of the key determinants of relationship closeness. The more two individuals interact in a way that meaningfully affects each of their lives—that is, the more their lives depend upon each other—the more likely they are to have a close relationship (see [63]).	While people are inherently dependent on nature, they may not always realise it. At its most extreme, being truly dependent on nature would be akin to living off the land where one's wellbeing and day-to-day actions are unmistakably influenced by nature. A more widely applicable example, however, is having hobbies (e.g., birdwatching) that would not be possible if nature were to change (i.e., where nature is not just a passive background feature in someone's life).	A relationship with nature requires engagement with nature where nature is an inherent feature of the activity (i.e., the activity could not be done without nature). Individuals must explicitly recognise that their health, happiness and lifestyle directly depend upon nature.	Needed	Sections 4.2, 5.2.1, 5.2.4 and 5.2.6
Frequent	Individuals who do not interact frequently are unlikely to be (inter)dependent and are, therefore, unlikely to develop a close relationship (see [48]).	Individuals who do not interact with nature are unlikely to have a close relationship with nature (see [9]).	Easy access to green spaces is a necessary (but not sufficient) prerequisite. Additionally, individuals must also have the time and energy to frequently engage with nature.	[9,22,26], etc.	Section 5.2.4
Diverse	Individuals who only interact in a singular capacity are unlikely to be interdependent and are, therefore, unlikely to develop a close relationship (see [48]).	In theory, individuals who only interact with nature in a singular capacity are unlikely to have a close relationship with nature.	Engagement with nature must permeate many (ideally all) parts of individuals' lives for it to impact their relationship with nature.	Understudied (see [22,29])	Section 5.2.4
Impactful	Individuals whose interactions have little meaningful impact on each other's lives are unlikely to be (inter)dependent and are, therefore, unlikely to develop a close relationship [48].	In theory, individuals whose interactions with nature have little meaningful impact (i.e., only superficial engagement) on their lives are unlikely to develop a close relationship with nature (see [26,29,72]).	Engagement with nature must have a noticeable impact on individuals' lives for it to impact their relationship with nature.	Developing (see [26,29,72])	Section 5.2.4

Table 1. *Cont.*

Interpersonal Relationship Construct	Application in Interpersonal Relationships	Application in Human–Nature Relationships	Key Insight	Relevant NC Research	Sections
Sustained	If interactions between two individuals are not sustained, then interdependence will not be sustained [48].	In theory, if interactions with nature are not sustained, then a relationship with nature cannot be sustained.	(Inter)dependence with nature must be part of all life stages, year-round. Additionally, it is not enough to just take an occasional holiday to a national park, for example.	Needed (but see [22])	Section 5.2.4
Quality Interaction	Simply spending time with another person is not enough for a relationship to form. Rather, it is the quality of the time with them that makes a close relationship more or less likely to form (e.g., meaningful conversation; [61])	In theory, the quality of the interaction with nature should heavily impact the closeness of one's relationship with nature. A higher quality interaction should lead to a closer relationship with nature.	What individuals do while engaging with nature is as important, perhaps more important, than if they engage with nature.	[23,29,73], etc.	Sections 4.2 and 5.2.1
Intimacy	Intimacy is, more or less, the depth of personal knowledge one shares with another [62] and is a key ingredient in developing closeness in a relationship (see [45]). This is usually facilitated through mutual self-disclosure [61].	In theory, developing intimacy with nature is likely critical for developing a relationship with nature. While mutual self-disclosure with nature may not mesh with Western ways of relating to nature, there are still plenty of ways that one can develop an intimate knowledge of nature and the natural environment. For example, through extensive learning about nature (e.g., through hobbies such as foraging or fly-fishing) or perhaps through a lifelong history of engaging with a particular area.	To transform our relationship with nature, we may need a larger cultural shift in our thinking (i.e., a return to or re-embrace of animacy).	Needed (but see [74])	Section 4.2, Section 5.2.1, Section 6.3 and Section Animacy
Novelty and Excitement	Novelty and excitement are particularly important for self-expansion; thus, they are also especially important for including relationship partners in our sense of self (see [45]).	In theory, novel and exciting ways of engaging with nature are likely especially important for developing a close relationship with nature.	Nature engagement programming must strive to be creative and innovative.	Needed	Section 4.2

Table 1. *Cont.*

Interpersonal Relationship Construct	Application in Interpersonal Relationships	Application in Human–Nature Relationships	Key Insight	Relevant NC Research	Sections
Reciprocity	Relationships are a two-way street, so to speak, and many processes in relationships require both partners to participate in a similar manner (see [75]).	In theory, having subjectively reciprocal interactions with nature should contribute to the closeness of one's relationship with nature.	To transform our relationship with nature, we may need a larger cultural shift in our thinking (i.e., a return to or re-embrace of animacy).	Needed	Section 6.3 and Section Animacy
Trust	Trust is an important part of relationships. In particular, trust seems to be foundational to developing dependence (see [75]).	Trust is likely also an important part of human–nature relationships (see [76,77]).	One likely cannot have a close relationship with nature if they do not trust it.	Understudied (see [76–78])	Sections 5.2.6, 6.2 and 6.3
Sociocultural Influence	The social context surrounding relationships influences their formation (see [48]).	Likewise, sociocultural factors influence our relationship with nature (see [79]).	To transform our relationship with nature, we may need a larger cultural shift in our thinking (i.e., toward socially valuing relationships with nature).	Understudied (see [79,80])	Section 5.2.2, Section 5.2.3, Section 5.2.6 and Section Animacy
Behavioural Scripts	We learn from others how one should behave in certain types of relationships [81]. For example, we may learn how one is supposed to treat your life partner from how our parents treated each other.	In theory, we learn, at least in part, how one should go about cultivating a relationship with nature from the other important people in our lives.	Individuals, especially children, likely need a healthy role model to demonstrate how one should cultivate a relationship with nature.	Needed	Section 5.2.2
Social (Dis)approval	We learn from others which types of relationships are valued and expected by society, and we are also influenced by how others feel about our relationships (see [82]). For example, we may deliberately avoid some relationships because we know people will not approve, and we may seek out other relationships because we know others approve of them.	In theory, individuals' perceptions of others' (dis)approval of having a relationship with nature will likely influence whether or not they feel interested in having a relationship with nature.	If people do not feel that relationships with nature are valued by society, then they will be unlikely to pursue them.	Needed	Section 5.2.2

Table 1. *Cont.*

Interpersonal Relationship Construct	Application in Interpersonal Relationships	Application in Human–Nature Relationships	Key Insight	Relevant NC Research	Sections
Types of Relationships	There are many different kinds of relationships that involve different kinds of behavioural outcomes. For example, some relationships are more selfish, and others are more compassionate (e.g., [83]).	In theory, not all relationships with nature are the same. There are likely desirable relationships with nature (e.g., more harmonious) and ones that are less desirable (e.g., more exploitative).	It is important that we are mindful of promoting the type of human–nature relationship that is most beneficial to nature.	Understudied (see [30])	Section 5.2.3
Relationship Maintenance	Relationships take work and require deliberate attempts to maintain them; otherwise, they will dissolve [41].	In theory, relationships with nature likely also require deliberate maintenance.	Relationships with nature are an ongoing process that needs to be maintained.	Needed	Section 5.2.4
Cognitive Mechanisms	One way individuals maintain relationships is by using cognitive mechanisms (i.e., changing how they perceive things that are related to the relationship). For example, individuals may subjectively devalue potential alternative partners (making the current relationship seem more attractive) (see [57]).	In theory, the maintenance of human–nature relationships might rely on cognitive mechanisms, such as subjectively devaluing alternative ways of spending one's time (e.g., placing more value on walking to work than relying on motor vehicles).	Human–nature relationships may be more of an active process than the literature (e.g., nature connectedness literature) currently treats them as.	Needed	Section 5.2.4
Behavioural Mechanisms	One way individuals maintain relationships is by using behavioural mechanisms (i.e., changing how they respond to things that are related to the relationship). For example, responding to partner conflict with accommodative (vs. punitive) behaviour because they would like the relationship to continue (see [57]).	In theory, the maintenance of human–nature relationships might rely on behavioural mechanisms. For example, responding to conflict with wildlife in an accommodative manner (e.g., finding a way to live in harmony with wildlife) rather than a punitive manner (e.g., exterminating the wildlife).	Human–nature relationships may be more of an active process than the literature (e.g., nature connectedness literature) currently treats them as.	Needed	Section 5.2.4

5. Applying Interpersonal Relationship Principles to Human–Nature Relationships

One of the most prominent conceptualisations of relationship closeness is the extent to which one includes another relationship partner in the self [42–45]. Psychological research on nature connectedness, as it turns out, originated as an extension of this principle to the context of the natural environment [8]. Thus, nature connectedness can, quite literally, be thought of as a reflection of human–nature relationships [8].

Indeed, nature connectedness and interpersonal relationships share many parallel associations with important outcomes. For example, nature connectedness can fulfil our need for relatedness [9,10,20] and is inherently self-expansive (see [8]). Moreover, nature connectedness's robust associations with (a) wellbeing [15,19,20] and (b) pro-environmental [14,15,21]—including willingness to sacrifice for nature—and pro-social behaviour [84], as well as (c) its inextricable link to our sense of self [8,9], further demonstrates that nature connectedness has similar outcomes as interpersonal relationships and is consistent with our contention that the human–nature relationship can be treated as just another form of relationship. Accordingly, if nature connectedness has many of the same outcomes as interpersonal relationships, then it would stand to reason that nature connectedness may likewise have similar determinants as interpersonal relationships. In other words, deliberately treating nature connectedness, and thereby human–nature relationships, as just another form of interpersonal relationship is justified and likely has value as an updated way of thinking about our growing disconnection with nature [85].

It is important to note that we are not the first to propose this frame (see [8,71,85]). However, this frame has yet to be taken to its logical conclusion, adopted widely by the field, or recognised in policy. Thus, with the recent policy interest and rapid growth in nature connectedness research evidence since 2015, we feel it is a point worth revisiting with renewed focus. In the next sections, we outline some of the ways in which these principles can be applied to nature connectedness and human–nature relationships. In doing so, we also highlight the ways in which these applications are supported by extant research on nature connectedness, potential areas for future research, and implications for policy and practice.

5.1. Extant Applications

There already exists a (very) small amount of research that has used theories from interpersonal relationships to study human–nature relationships. Indeed, some research has applied some principles of relationships to measuring the human–nature relationship and understanding its effect on our treatment of nature [71]. In this research, it was shown that two features of commitment in interpersonal relationships—psychological attachment and long-term orientation—can be used to capture people's relationships with nature; that is, measures of these two dimensions as they relate to commitment to nature correlated strongly ($r = 0.53$) with common measures of nature connectedness [71]. Importantly, in this study, commitment to nature—as indicated by psychological attachment to and long-term orientation toward nature—was associated with more positive treatment of the environment [71]. Thus, this research supports the proposition that nature connectedness can, in fact, be treated as a relationship and that it has similar outcomes as interpersonal relationships (e.g., more positive treatment of the relationship partner). What is missing, however, is an application of relationship formation principles to the human–nature relationship. In other words, the question of whether human–nature relationships form in the same way interpersonal relationships do was not answered by this research.

A second article partially addressed this question [65]. Specifically, in this study, the researchers applied the principles of Rusbult's model of commitment in relationships [60] to commitment to nature in order to understand the factors that influence individuals' relationships with nature. Once again, commitment to the natural environment showed strong correlations with commonly used measures of nature connectedness ($r = 0.57$). More importantly, however, the researchers found that satisfaction with (i.e., satisfaction

with the benefits provided by the environment) and investments in the environment (i.e., investment of time and resources into promoting the wellbeing of the environment) predicted commitment to nature [65]. In turn, commitment to nature positively precited both environmental behaviour and willingness to sacrifice for the environment. Thus, this research was largely consistent with the research on interpersonal relationships [60]. Once again, we find distinct parallels between interpersonal relationships and human–nature relationships. Yet, as will be discussed in the next section, interpersonal relationship theory provides opportunities to catalyse advancements in research on nature connectedness and ultimately to restore the human–nature relationship as a route to pro-environmental behaviour and climate action.

5.2. Possible Future Applications

While the above research shows clear parallels between interpersonal and human–nature relationships vis-à-vis nature connectedness, there has yet to be widespread adoption of this perspective or a careful and deliberate application of the principles of interpersonal relationships to nature connectedness. Moreover, the extant research reviewed in the previous section was primarily focused on how human–nature relationships influence the treatment of nature, both placing much less emphasis on understanding how the relationship forms and applying only a limited subset of relationship formation principles. A recent review of approaches to improving the human–nature relationship, as conceptualised by nature connectedness, found that research has focused on a rather limited range of nature contact and engagement activities [22]. So, although it is known that carefully designed interventions can deliver sustained increases in nature connectedness and despite the wide adoption of the pathways to the nature connectedness design framework, new approaches are needed. Given the growing policy interest in improving the human–nature relationship, it would be useful—for guiding both future research questions and practical efforts to improve the human–nature relationship—to deliberately apply the principles of interpersonal relationship formation (and maintenance) to the formation (and maintenance) of human–nature relationships. Just a few of these possibilities are reviewed briefly in the following sections.

5.2.1. Quality Contact and Intimacy

As has been emphasised numerous times in this paper, it is not just basic superficial contact with another person that increases relationship closeness with them but contact that promotes a sense of (emotional) intimacy [45,61,62,64,86]. Additionally, it is not just recognising that you enjoy spending time with someone but also recognising that your interdependence with them is an important ingredient for interpersonal relationships [57,63,64]. Both of these elements—intimacy and interdependence—should likewise be important for our relationship with nature. A great deal of research has confirmed the importance of spending time in nature for our relationship with nature (see [9,22], or [21] for more elaboration). However, based on the principles of close interpersonal relationships, there is likely nuance to this association. That is, compared to mere contact with nature and having a nice time outside, intimate contact with nature (e.g., perhaps through actions as simple as walking barefoot; see [74,87]) and contact that promotes meaningful interdependence with nature should most strongly lead to greater nature connectedness, at least in theory. While the role of intimacy in the context of nature connectedness is as yet unstudied (representing a new potential area of research), the importance of *quality* time in nature is consistent with past research on the pathways to nature connectedness. Programmes that have successfully applied the pathways framework provide examples of how theory can be operationalised, with the pathways of sensory contact and emotion leading to nature connectedness, which aligns with aspects of quality contact and intimacy (see [30] for examples) [29]. Additionally, some research has suggested that the quality of contact with nature (e.g., intensity or immersion) influences nature connectedness (see [9] for a review) [23,73].

This is important for both theory and practice and applies to a number of domains. For example, it is particularly relevant for environmental education, which often places promoting nature connectedness as one of its aims [88–90], but often fails to deliver that outcome [21]. From the view of nature connectedness as a relationship, the literature would suggest that the activities of environmental education must go beyond objective learning about nature [29]; instead, the learning should involve novel and exciting activities [44,45,61] that promote both a sense of intimacy [45,61,62,64,86] and perceptions of interdependence [57,63,64] with nature.

This also suggests that policies aimed at promoting nature connectedness [36] need to do more than just promote access to nature. They must also promote the key ingredients of relationship formation by promoting novel and exciting engagement with nature, intimacy with nature, and perceptions of interdependence with nature. Yet, unfortunately, much of the conversation around efforts to improve the human–nature relationship and nature connection stops at mere access to and contact with nature (which is often discussed as increasing green space), despite evidence that suggests simply spending time in nature is not enough [26].

5.2.2. Social and Cultural Expectations about Relationships

Research has also revealed that relationships are heavily influenced by cultural norms concerning how one should behave in relationships [48] and norms about which relationships elicit approval or disapproval from others (see [41]). For example, sociocultural expectations about what is normal to do or expect in a relationship (i.e., the scripts or schemas employed in relationships) can influence behaviour in relationships [41,48,50,81]. Similarly, there are shared cultural expectations about which relationships are or are not desirable and worth pursuing [41], and the approval or disapproval of a relationship from other individuals in one's social network can influence the persistence of the relationship [82,91–93]. For example, in some cultures, greater emphasis is placed on relationships with elderly parents, and these expectations shape which type of relationships individuals involve themselves in [94]. These are rather unsurprising findings as many intuitively know that approval or disapproval from others influences relationships, and tales of forbidden love are not hard to find (e.g., Romeo and Juliette). Still, while it is rather obvious that interpersonal relationships do not exist in a vacuum and are very much influenced by social and cultural factors when it comes to nature connectedness and human–nature relationships, this fact is often missed by Western science and policy.

It is, therefore, important to explicitly recognise that some relationships can be seriously hindered by social and cultural factors and that individuals learn from others how to behave in relationships. If we apply these ideas to human–nature relationships, then it would suggest that we should also be considering how sociocultural expectations surrounding relationships with nature influence things such as nature connectedness (see [9,79]). This possibility is supported by some, granted limited, indirect evidence; parental values surrounding engagement with nature (i.e., their support for building a relationship with nature) influences children's relationships with nature [80], and country-level values (e.g., orientation toward consumption and commerce, land and technology use) influence country-level nature connectedness [79].

It is also important to note the historical contexts that continue to shape human relationships with nature, particularly in Western contexts. Throughout Western history, being in a close relationship with nature was demeaned as primitive, unenlightened, and uncivilised [95–97]. These characterisations have been (and still are) used to enact harm on people of colour and Indigenous communities around the world [95,98–100]. For example, the doctrine of manifest destiny provided justification for the mass displacement and genocide of Indigenous peoples in North America under the guise of taming the wilderness (of which Indigenous people were a part) and bringing civilisation to the West [95,98]. Further, Africans have been likened to apes as a way to place them evolutionarily behind Europeans [101], a comparison still used in contemporary American politics to dehumanise

and discredit black Americans [102]. In other Western contexts, being 'one with nature' is negatively viewed in popular culture, with those having close relationships being invalidated as 'tree huggers' and 'hippies' [103,104].

Thus, it seems more than likely that there are some sociocultural contexts where human–nature relationships are less encouraged and valued (i.e., in terms of norms about which relationships are worth pursuing) or less well-modelled (i.e., in terms of behavioural scripts) than others. In such sociocultural contexts, then, we might expect lower levels of nature connectedness as a direct result of the sociocultural expectations around human–nature relationships. Accordingly, if we were interested in increasing nature connectedness in these contexts, then it would be necessary to address the underlying sociocultural factors that are failing to support—if not actively hindering—people's relationships with nature. More generally, these findings linking sociocultural factors and relationship formation strongly suggest that the issue of our growing disconnection from nature requires a deep-rooted cultural shift in the way we view and support relationships with nature [85]. They also suggest that critical interrogations of our rhetorical practices when communicating about nature are well warranted (see [105] for a review of such interrogations of our use of ecosystem services rhetoric, for example) because they, too, might be reinforcing the societal norms that hinder our relationships with nature. In sum, the implication here is that, once again, the issue of dwindling nature connectedness may not just be a case of increasing access to nature but may actually require a collective change in the way we *actively* support these human–nature relationships. At present, the dominant cultural context creates pervasive illusions of separation and supremacy over nature that became a mainstream way of thinking during the scientific and industrial revolutions, where the control and use of nature became a dominant narrative. A situation captured by Tim Ingold, '*a single, underlying fault upon which the entire edifice of Western thought and science has been built—namely that which separates the 'two worlds' of humanity and nature*' [106]. Overcoming such a deep fracture lies at the heart of restoring the human–nature relationship.

5.2.3. Types of Relationships

Additionally, it may be valuable to recognise that there are distinct kinds of interpersonal relationships (e.g., communal vs. exchange; [107]; see [48] for others, such as toxic relationships), which have different implications for behaviour [50,108]. Accordingly, there may be different kinds of human–nature relationships with different implications for behaviour. It would, therefore, be useful to consider the possible differences between different types of human–nature relationships because they may have important implications for downstream behaviours. At present, however, the implicit assumption found within most research that relates to human–nature relationships reflects a monolithic view of human–nature relationships (see [29] for an example of a more nuanced perspective). The research on interpersonal relationships, however, has implied that there might be different types of human–nature relationships, and they might not all be associated with equally desirable outcomes.

For example, future research could consider the possible difference between self-centric human–nature relationships (egosystems) and other-centric human–nature relationships (ecosystems; [83]). Specifically, an egosystemic *interpersonal* relationship is defined as one in which individuals experience a self-centred motivation to promote and care about the relationship that has little to do with the other relationship partner beyond the partner's instrumental potential to benefit oneself [83]. In such relationships, the individual prioritises their own needs over the needs of the partner and tends not to take a long-term view of their behaviour's impact on the relationship [83]. Alternatively, an ecosystemic *interpersonal* relationship is one in which individuals experience a wholly system-centric motivation to promote the wellbeing of the relationship because they feel a genuine concern for the other relationship partner's wellbeing [83]. In such relationships, individuals construe their needs as part of an interconnected system of needs that they share with their partner and tend to take a longer-term view of the relationship and its maintenance [83]. Thus,

in the context of human–nature relationships, it may be important that the relationship with nature that forms is one that aligns more with an ecosystemic relationship with nature rather than an egosystemic one because the former would likely result in a more positive treatment of the environment relative to the latter.

As it turns out, different types of relationships are associated with different determinants. For example, in the early stages of relationship formation, egosystems are more associated with self-image-based motivations [83]. In contrast, ecosystemic relationships are theorised to be more supported by motivations toward compassion and shared experience with other individuals [83]. Thus, it may be important to ensure that policies support the 'right' type of relationship with nature. Additionally, relevant to the preceding section, it may also be worth considering whether the sociocultural discourse surrounding the promotion of nature connectedness adequately promotes the most desirable *type* of relationship with nature (i.e., considering whether we are promoting a selfish or otherwise problematic relationship with nature; see [85]). For example, research has already suggested that a dominating relationship with nature is unhealthy for the environment's wellbeing [109] (see also [79]).

5.2.4. Relationship Maintenance

Finally, thinking about interpersonal theory might spark new ways of thinking about the issue of the declining human–nature relationship. For example, it is not uncommon for interpersonal relationship research to focus on relationship maintenance [41,57]. Some research, for instance, has suggested that individuals employ both cognitive (e.g., devaluing alternative relationship partners) and behavioural (e.g., accommodation of partner behaviour) maintenance mechanisms to ensure that their relationship persists [57]. The research on nature connectedness, however, has not had much to say about the way individuals deliberately *maintain* their relationship with nature or which maintenance practices are most effective. Yet, the small amount of research that has applied relationship principles to the human–nature relationship has suggested that these may be important considerations. Specifically, focusing on long-term orientations is likely an important part of the human–nature relationship, just as it is to interpersonal relationships [71].

An interesting additional consideration is that an important element in creating the type of interdependence that supports a long-term, committed relationship is, once again, the *type* of interaction between two relationship partners. Specifically, the type of contact must be frequent, diverse, impactful, and sustained over a long period of time [48,59]. This implies that while increasing the access to *and* use of green spaces is undoubtedly necessary to support human–nature relationships (i.e., addressing frequency), it is also important that people interact with nature in a diverse range of ways.

In other words, for policies to be effective, they would likely need to ensure that interacting with nature permeates all facets of individuals' lives in a variety of ways (i.e., diverse interaction). Additionally, the interaction cannot be superficial; it must be meaningful and have a strong influence on people's lives (i.e., impactful interaction). Finally, it must be continued over long periods of time (i.e., sustained interaction). Thus, to illustrate, it is not just planting more trees in and around workplaces; it is getting people to actively participate in planting them (see [110]) and getting them to plant gardens at home (see [9]) and keep a journal of the one beautiful part of nature they see each day (see [26,72]), and to do that month after month until their relationship with nature begins to be repaired. In other words, policy should encourage individuals to explore a variety of different pathways to nature connectedness [29,30].

5.2.5. Relationship Barriers

Relatedly, it may also be important to consider the factors that prevent or undermine interpersonal relationships to help identify potential barriers to positive human–nature relationships so that they may be addressed. For example, contempt—which is closely related to disgust (see [111])—is an infamously detrimental emotion in relationships (see [112]).

Research on nature connectedness similarly suggests that such negative emotions (see [9]), along with other negative factors, may serve as barriers to nature connectedness [29,79]. Yet, a thorough investigation into the negative effects of 'bugs and mud' on nature connectedness has been largely absent (see [9]). As another example of a potential barrier, research has noted that high levels of stress from sources external to interpersonal relationships can make it hard to maintain high-quality relationships (see [41]). In parallel, then, one might expect high levels of stress in one's personal life (e.g., stress induced by poor working conditions or cost of living) might make it hard to have a high-quality relationship with nature [113]. Thus, efforts to increase nature connectedness might be stymied by other stressors plaguing modern life. Although, emphasising the role of nature in emotional regulation and managing stress provides an opportunity in these circumstances that also reinforces the notion of interdependence between people and the rest of nature.

Additionally, as noted above, there are several factors that can undermine *commitment* to relationships, such as more attractive alternatives [60]. Importantly, some evidence suggests that this also applies to nature connectedness; there was a significant, negative zero-order correlation ($r = -0.19$) between attractive alternatives (to nature) and commitment to nature [65]. In other words, the extent to which people can find replacements for their relationship with nature may be an important obstacle to promoting strong human–nature relationships. Thus, the future of human–nature relationships may be facing an uphill battle in the modern age, where there are many alternative ways to achieve many of the benefits one could derive from a relationship with nature. For example, a relationship with nature often has benefits such as restoration [114,115] or fulfilling our need for relatedness [9,10,20]). Yet, modern life has countless (seemingly easy) ways to achieve these benefits through alternative means (e.g., going to the spa or watching TV to relax and using social media or video chatting with friends to stay connected to others). Thus, people may be more likely to perceive alternatives to a relationship with nature than not, which would further undermine our already-obscured interdependence with nature (i.e., we live in a time 'where meat comes from the grocery store' [116] (p. 1)). This possibility is further supported by negative associations between features of modern life, such as smartphone use, and nature connectedness [117].

Together, these findings suggest that there are, indeed, barriers to human–nature relationships and that they can potentially be identified by considering the literature on interpersonal relationships. It is important to note, however, that some of the barriers to positive human–nature relationships will be irreducible parts of modern life. Still, *knowing* that these barriers exist, regardless of their mutability, will only ever help to inform efforts to increase nature connectedness. At the very least, this section hopefully serves to exemplify the importance of actively considering the possible barriers to forming a strong relationship with nature from a relationship perspective.

5.2.6. Trust

Another important relationship factor is trust [41,48,54,75,118–120]. Trust, in relationships, is the general perception that the relationship partner can be expected to behave benevolently and responsively to oneself [75]. Importantly, this trust is comprised of perceptions of the relationship partner as *predictable*, and *reliably* benevolent, and that this benevolence is *intrinsically motivated*—as opposed to instrumentally motivated [54,75,119]. While trust is intuitively important to relationships, research suggests that it is a necessary precursor of willingness to become dependent on a relationship [54,75]. In other words, without trust, one will be reluctant to become dependent on a relationship [54,75] and, without this (inter)dependence, a relationship will not form [57,59,63,64]. To put it bluntly, trust is incredibly important for interpersonal relationships.

It should be no surprise, then, that trust is a potentially important—but woefully understudied—part of human–nature relationships, especially in childhood [76,77]. Comfort being outside is also an important part of fostering human–nature relationships [78]. This is important because it implies that developing trust in nature is crucial *and* it also hints

that this trust needs to develop early (consistent with past research; [121,122]). Moreover, linked with the influence of sociocultural factors, this suggests that we should consider whether sociocultural factors promote trust or distrust in nature. For example, throughout Western environmental history, nature has been depicted as an unpredictable and dangerous entity that needs to be subdued and conquered by humans [95]. While there are parts of nature that can be unpredictable and dangerous, the risks of nature are greatly reduced through proper education and gaining experience in outdoor settings [123]. Further, recent work on improving nature connectedness has focused on the importance of simple interactions and noticing nature [26]. This is especially important in the context of increasing urbanisation, which is a macro-factor in the human–nature relationship [79].

6. Discussion

This review demonstrated how considering the principles of close interpersonal relationships can be extended to the human–nature relationship. In doing so, we make the case that relationships, be they with other people or with nature, are a fundamental part of the human experience and influence not only our wellbeing but also our behaviour toward others and our willingness to sacrifice for them; close relationships are good for us, and good for others. For this reason and based upon copious direct and indirect empirical evidence, we argued that the human–nature relationship should be a key target towards the end of promoting climate action and a sustainable future. The clear parallels between interpersonal relationships and nature connectedness help highlight the latter as a tangible operationalisation of the human–nature relationship that can serve as a point of focus for policymakers.

6.1. Recommendations for Improving Policy

Consistent with this assertion, the review also outlined a growing policy focus on the human–nature relationship and nature connectedness. However, we also noted that this has yet to translate into widespread adoption and practice, and we further note that policies would benefit from a greater acknowledgment of the 'relationship' in the human–nature relationship that nature connectedness reflects. By more explicitly acknowledging that the goal is to change human–nature *relationships*, policy and practice should inevitably be more likely to enact changes that will actually alter our relationship with the natural world.

Specifically, the analysis of interpersonal relationships identified several key aspects to be considered when attempting to address the human–nature relationship (see Table 2 for a full list of policy implications). First, the importance of quality contact and intimacy was emphasised with clear parallels in nature connectedness theory but often overlooked in policy. Second, the influence of social and cultural expectations on relationships was noted as an additional factor that needs to be considered in both research and policy; changing our relationship with nature will undoubtedly require a significant shift in the cultural and societal encouragement of such relationships, especially because we should be sure to promote the most desirable *type* of relationship with nature. Third, the importance of maintenance was also highlighted as an important area to consider. The need for novel and exciting activities and for realising the interdependence between people and the rest of the natural world is seen as important but currently overlooked considerations in efforts to repair the human–nature relationship. Importantly, these are aspects that could be readily combined with existing frameworks, such as the pathways to nature connectedness (see [29]). Finally, trust and barriers to the human–nature relationship were considered. The discussion of these factors highlighted that there may be foundational conditions that need to be met in order to support the formation of positive relationships with nature. Trust, in particular, might be a necessary prerequisite to the development of a healthy relationship with nature. This, however, raises some possible limitations of applying interpersonal relationship principles to human–nature relationships.

Table 2. Specific policy recommendations stemming from key topics (parallels Table 1).

Interpersonal Relationship Construct	Policy Recommendation
Willingness to Sacrifice	Policy should continue to place the human–nature relationship as a key target.
Closeness	Policy would benefit from deliberately consulting the nature connectedness literature and using nature connectedness as a concrete way of targeting the human–nature relationship.
Commitment	Policy would benefit from deliberately consulting the nature connectedness literature and using nature connectedness as a concrete way of targeting the human–nature relationship.
Psychological Attachment	Policy should consider ways of fostering psychological attachment to nature. For example, starting or supporting initiatives that encourage individuals to explicitly recognise how nature impacts their emotional wellbeing.
Long-Term Orientation	Policy should consider whether/how it is promoting a long-term orientation toward our relationship with nature, both in terms of explicit language but also in terms of implied priorities.
Intent to Persist	Policy should consider whether/how it is promoting a desire to strengthen and maintain one's relationship with nature, specifically. This would likely be aided by making it explicit that the end goal is for people to have a relationship with nature.
Satisfaction	Policy should make sure that the available means of engaging with nature allow individuals to effectively satisfy their needs. Increasing public access to nature (e.g., public access to rivers) is an important first step, but it is also important that there are opportunities to engage with nature in a number of different ways so that individuals can meet their needs.
Investment	Policies should consider ways of encouraging personal investment in promoting nature's wellbeing.
Available Alternatives	Policies may need to consider ways of making a relationship with nature more attractive than alternatives to such a relationship. There may also be a need to document and emphasise the relational value of nature.
(Inter)dependence	Policies need to encourage active engagement with nature through activities that are entirely dependent on nature. To illustrate, encouraging hiking in nature or bird watching specifically (nature is necessary) rather than encouraging exercising outside (nature is technically not necessary). More than just access to green spaces.
Frequent	In addition, policy should also focus on ways of actually increasing the frequency of *active* engagement with nature, recognising that people can only engage with nature frequently if they have the opportunity, inclination, time and energy to do so. Policies should continue to provide greater access to green spaces.
Diverse	Policies likely need to put forth multiple distinct initiatives to promote engagement with nature in a diverse set of ways.
Impactful	Policies need to go further and target specific types of activities (as informed by research). More than just access to green spaces.
Sustained	It may be especially important for policies to focus on how to keep people connected during extended periods of inhospitable weather (e.g., the winter months).
Quality Interaction	More than just access to green spaces. Policies need to focus on promoting high-quality interaction with nature.
Intimacy	Policy may want to consider promoting innovative programs that promote deep engagement with nature (e.g., innovative outdoor education programs). More than just access to green spaces.
Novelty and Excitement	Policy may want to consider promoting innovative programs that promote exciting and novel engagement with nature (e.g., innovative outdoor education programs). More than just access to green spaces.
Reciprocity	Policies may benefit from a critical interrogation of the institutions that reinforce our potentially problematic ways of thinking about nature.
Trust	Policies should be aimed at promoting trust in nature (and general comfort with being outside). This is likely best done at an early age, so this may be especially relevant for educational policies.
Sociocultural Influence	Policy should specifically consider how it can target the sociocultural factors that influence human–nature relationships.
Behavioural Scripts	Policy may find it valuable to consider whether there is room for nature connectedness as a specific learning outcome in primary education to ensure that children have the appropriate understanding of how to have a close relationship with nature.

Table 2. *Cont.*

Interpersonal Relationship Construct	Policy Recommendation
Social (Dis)approval	Policy would benefit from considering how it can explicitly communicate that strong human–nature relationships are something that the government values and that the general public should value as well.
Types of Relationships	Policy should be careful not to inadvertently promote a problematic relationship with nature. This is particularly relevant for our use of ecosystem services.
Relationship Maintenance	Policy should recognise that the goal is not just to get people to have a one-off experience in a national park, for example. Instead, the goal should be to help foster a life-long relationship with nature, which means that people need ample ways to maintain it.
Cognitive Mechanisms	Policy must recognise that the human–nature relationship is competing with many other factors. It, therefore, needs to ensure that strengthening one's relationship with nature is valued by the general public more highly than alternatives.
Behavioural Mechanisms	Policy might want to consider how it can encourage healthy human–nature relationship maintenance behaviour (e.g., taxing the use of pesticides or providing rebates for using environmentally accommodative solutions).

6.2. The Trusting Relationship Challenge

While trust in nature is likely important for positive human–nature relationships [76,77], it is possible that it does not adhere to the same principles as trust in interpersonal relationships. Again, trust in interpersonal relationships is influenced by perceptions that the other partner is predictable as well as reliably and intrinsically benevolent (see [119]). These elements are more easily perceived in relationships between two people and less so in relationships between humans and aspects of nature. That is, the behaviour of other humans is likely easier to predict than the behaviour of animals, for most at least. Individuals may also be less readily inclined to perceive nature as reliably benevolent and less inclined to perceive any benevolence of nature to be intrinsically motivated. In fact, it may be common enough for many individuals in modern urban life to perceive nature as reliably hostile. For the inexperienced, nature can pose a great number of dangers and can seem unpredictable or inhospitable (e.g., sudden changes in weather, some plants but not others being poisonous, predators acting unpredictably). However, like in human–human relationships, learning about nature may still be one way to reduce unpredictability and increase trust.

6.3. The Reciprocal Relationship Challenge

Another notable disconnect between interpersonal relationships and human–nature relationships is that the former involves two agentic parties capable of participating in a *psychologically* reciprocal relationship. The latter, however, is somewhat lopsided in comparison. Specifically, in interpersonal relationships, there is a reciprocal relationship between the two members of the dyad, and research has shown that the *perceived* responsiveness of the partner *to* the individual, for example, is an important part of relationship formation [41,48,54]. Similarly, both giving *and* receiving self-disclosing information is an important part of the relationship formation process [48,62,75]. Still, further, trust also requires a level of reciprocity to form [75]. Thus, reciprocity is clearly an important part of interpersonal relationships (see [75]); that is, interpersonal relationships are a two-way street, so to speak.

In the case of individuals and nature, however, this bidirectionality is less present and likely less readily *perceived*, at least in the Western world. The important element here is actually perceiving reciprocity. While it is undoubtable that nature influences humans as much as humans influence nature, this reciprocity is both different from the reciprocity found in interpersonal relationships (especially vis-à-vis intimacy) and is increasingly obscured in modern life (e.g., 'meat comes from the grocery store', [116] (p. 1)). That is, while individuals are perfectly capable of having a relationship with nature, it may not be

readily apparent to individuals—at least not in the intuitive way found in interpersonal relationships—whether nature has a relationship with them. Thus, it is easy to intuit that you are connecting with your partner and that they are connecting with you; it seems much harder to intuit that you are connecting with nature *and* nature is, in turn, connecting with you.

Animacy

Part of this difficulty stems from the Western worldview of seeing nature and beings in nature as inanimate things rather than animate beings who are autonomous, communicative, and relational [124–129]. Although children naturally demonstrate animistic thinking [130], within Western rationalistic schooling, it is typically framed as an 'error' rather than something to be nurtured and listened to [131]. However, very little psychological research addresses animacy beliefs. One study has shown that believing that animals, plants, land, and water are animate beings is positively associated with experiencing reciprocal relationships with nature [132]. Additionally, animacy beliefs may be an especially important component of reciprocal relationships since they begin to deconstruct the power dynamic in human–nature relationships. An animistic philosophy rejects the idea of human exceptionalism or, rather, the idea that humans are superior to other beings and alone are capable of mental capacities such as intentionality, emotion, and cognition [125,133].

This 'reciprocity' disconnect between interpersonal versus human–nature relationships may ultimately be an irreconcilable theoretical limitation of the perspective of human–nature relationships furthered in this paper. However, it may instead turn out to be a valuable theoretical implication—a possibility that serves to highlight that one of the major strengths of the perspective furthered here is its generativity. We might find that the rare activities that do allow for this reciprocity may be especially potent ways of promoting nature connectedness. For example, activities such as gardening (see [9]), especially for produce, might create a more reciprocal sense of intimacy with nature than more one-sided activities such as hiking—or it might not, but that is an empirical question. Similarly, combinations of activities that create a sense of intimacy with nature (e.g., foraging) and activities that create a sense of giving back to nature (e.g., conservation volunteering) might be able to create a sense of reciprocity that seems to influence interpersonal relationships. Indeed, compassion and care for nature are some of the pathways to nature connectedness [29].

Beyond these more immediate ways of increasing perceived reciprocity in human–nature relationships, the broken relationship with nature means that there is likely a need for a larger cultural shift in how we know and relate to nature. That is, part of the potential difficulty perceiving reciprocity with nature likely stems from the Western worldview of seeing nature and beings in nature as inanimate things to be controlled and provide utility rather than animate beings who are autonomous, communicative, and relational. A larger cultural shift away from Western ideas of nature could be particularly relevant for policies that influence environmental education. For example, increasing the coverage of a wide array of worldviews (e.g., Indigenous, animist, Eastern, etc.) as they relate to nature and increasing nature education outside of STEM fields (e.g., environmental humanities, arts, and social sciences).

6.4. Funding Priorities

A final policy-related recommendation is to encourage nature connectedness to be made an explicit funding priority by bodies that support basic research. There is ample evidence of parallels between interpersonal and human–nature relationships (see the first few rows of Table 1), strongly supporting the perspective that human–nature relationships are relationships. However, there are many parallels and insights implied by the interpersonal relationship literature that have yet to be directly investigated in the context of human–nature relationships (e.g., the importance of intimacy and how to increase it in the context of nature connectedness). Before such parallels can be applied in practice as interventions, they must be investigated empirically first. Thus, to the extent that the

human–nature relationship—and nature connectedness as a concrete operationalisation of such relationships—are a key policy target, funding opportunities to test the many hypotheses generated by this perspective must be made a priority.

7. Conclusions

A cultural shift lies implicitly at the heart of global calls to fix the broken relationship with nature. The close and more harmonious relationship with, and within, nature found in many Indigenous peoples has been lost across the globe. A primary driver of this loss was the scientific and industrial revolutions that saw humans break free from the bonds of nature to a relationship based on the use and control of natural resources. The existence of past dramatic cultural shifts is a reason for hope; however, they are difficult to engineer. They may, perhaps, be realised through a recognition that the current paradigm has become outdated and unsustainable, along with clear visions of a more sustainable future. A future where human–nature relationships are actively valued and supported represents such a vision.

This vision, however, must be accompanied by opportunities, actions, and meaningful engagement. This reinforces the importance of policy, which should be informed by research on both human–nature relationships and interpersonal relationships. It is not only crucial that environmental policy comes to recognise that relationships are tangible and a driver of action but that this shift extends beyond environmental policy to permeate all areas of policy and decision making. Ultimately, there is an imperative to provide trusting, quality, and emotionally intimate contact with nature every day. Adopting this aim can guide and inform urban planning and housing policies that also provide communities with the opportunity for the shared care for nature. These opportunities, however, require a change in orientation. Social norms can and should be fostered, for example, through cultural policy and treasury incentive schemes to foster novel and exciting engagement with nature. Education and health policy can highlight the interdependence of humans and the rest of nature and work to reverse the teaching-out of the animistic thinking that may be fundamental to healthy relationships with nature. The law can also work toward supporting a change in our relationship with nature. Just as women have gained greater equality through legislation, laws and legal precedents can give rights to nature. Further, legal frameworks can afford natural features legal personhood much the same as has been granted to corporations, which would be an important step toward legitimising nature as a valued member of the planetary community. Together, such relationship-focused thinking would foster a cultural shift towards a reciprocal relationship with nature needed for a sustainable future.

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