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RESEARCH: A RELATIONAL TURN IN SUSTAINABILITY

Ecological empathy: relational theory and practice

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ABSTRACT

Sustainability science researchers are increasingly interested in human–nature connection as a leverage point for societal transformation. Empathy has potential as a way to reconnect people to nature by building relationships among more-than-humans. However, current approaches to empathy with more-than-humans usually prefer sympathy and compassion. I argue that these approaches limit the potential of empathy when considering human–nature (re)connection. I use the established concept of social empathy (Segal 2011, 2018) to structure a new presentation of empathy with more-than-humans: ecological empathy. Ecological empathy, as presented in this paper, consists of two subcomponents: contextual understanding of more-than-human interdependencies and more-than-human awareness and earth system perspective-taking. From this new perspective, I suggest defining ecological empathy as a cognitive and affective ability, which allows for internal coherence across bodily separation in humans and their environment. Integrating literature from biophilia, deep ecology, embodied cognition and multi-species ethnography, I elaborate on ecological empathy with inspirational practices that can be advanced across a range of decision, policy and design environments to address human–nature (re)connection.

KEY POLICY HIGHLIGHTS

- Empathy has potential as a way to reconnect people to nature by building relationships among more-than-humans.
- Ecological empathy, as presented in this paper, consists of two subcomponents: contextual understanding of more-than-human interdependencies and more-than-human awareness and earthy system perspective-taking.
- Ecological empathy can be advanced across a range of decision, policy and design environments to address human–nature (re)connection.

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Introduction

The construction of a human–nature separation is a western historical and philosophical tradition rooted in a dualistic understanding of the world (Descartes 1901; Ingold 1996). Traditional western dichotomies have been foundational to the development of environmental ethics, which have been challenging the strict separation of humans and nature since the 60s and 70s (Carson 1962; Plumwood 1993). Scholars argue that these dichotomies structure underlying belief systems in western cultures and constitute the basis for the subjugation of non-human world without substantive reflection in everyday life of the Anthropocene (Cronon 1996; Rogers 1998). Furthermore, decolonial scholars argue that human–nature dualism sets the stage for western colonialism (Harding 1998) and modern-day capitalism (Steinberg 2002). Despite critiques of progress narratives of modern development (Mumford 1967; Latour 1993), such systems have remained incapable of reining in their negative impacts on Earth systems, even in service of the human-centered goal of our own species' survival (Meadows et al. 1992; Rockstrom et al. 2009; Steffen et al. 2015; Folke et al. 2021).[1] As such, the Anthropocene lays bare the falsity of dualistic and reductionist thinking (Crutzen and Stoermer 2000; Rockstrom et al. 2009; Steffen et al. 2015).

Increasingly, human–nature connection has become the subject of sustainability scholarship (Ives et al. 2017). Reconnecting to nature is a vital leverage point (sensu Meadows 1999) for a broader system change (Abson et al. 2017; West et al. 2020; Riechers et al. 2021). For example, indigenous scholars argue that decentering human–nature separation in favor of human–nature interdependence enhances human and ecosystem well-being (Salmón 2000). Calls for reconnecting to the biosphere (Folke et al. 2011) and reconnecting to nature (Ives et al. 2017) point toward the need for relational approaches to human–nature connection. Relational approaches emphasize the inherent connection between humans and nature and attend to interdependence in social-ecological systems (West et al. 2020).

Mattijssen et al. (2020) argue that relational values ought to underlie integrated approaches to Abson

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et al. (2017) '*reconnecting* to nature, *restructuring* institutions *and rethinking* how knowledge is created and used' framework. Early sustainability approaches to valuing nature were about the instrumental and substitutive valuation (Daly 1974; Daily 1997; Kates et al. 2001). Sustainability discourse now includes intrinsic value (Millennium Ecosystem Assessment 2005; Costanza et al. 2017) as well as relational value in the assessment of approaches to reconnecting people to nature (Díaz et al. 2015; Pascual et al. 2023). Chan et al. (2016) define relational values as values that are 'derivative of relationships and responsibilities' among the connected units but 'not present in the things themselves' (p. 1462). Relational values, then, arise through interconnectedness among entities and apply across all human relationships (Chan et al. 2016). This observation, by extension, suggests that reimagining human–nature interconnectedness would also be central to a relational approach in this domain. Consequently, when people do not have relationships with non-human species or ecosystems, relational values will not bear weight in decision, policy or design contexts (c.f., Arias-Arévalo et al. 2023).

Yet the term 'non-human' itself embeds a separateness into language, thought, and action. Posthumanism in the social sciences and humanities challenges the notion that humans are autonomous and separate and instead embeds humans in a more-than-human world (Wolfe 2003; Bennett 2004, 2010; Abram 2012; Keeling and Lehman 2018). The term more-than-human describes the entangled relationality among humans and multiple species and ecosystems. Being neither human nor non-human, more-than-human is inherently relational and embeds human–nature connection into language, thought and, potentially, action.

How, then, might humans build relational connection to more-than-human beings and bring the resulting knowledge and experience into research, practice and policy? A promising vehicle for doing so is empathy. As humans, one of the ways that we build connection is through empathy. Empathy is widely used across a diverse range of literatures. For example, in sustainability science, 'empathy for nature' is referenced as a key for sustainable interactions (Blythe et al. 2021). As Tschakert (2022) explains, empathy is also vital to overcome, 'untenable human exceptionalism' driving damaging human–nature relationship (p. 1). Brown et al. (2019) put forth an 'empathy-sustainability hypothesis to consolidate models of human-environment relations with empathy as a route to human action' (p.11). Empathy, thus, has good potential as a way to reconnect and relate to nature and we need a way of talking about the kind of empathy that creates this potential. However, as I will explain below, the current approaches to empathy miss opportunities for building human–nature embeddedness and we need a better way to realize more-than-human connections in research, policy and practice.

Empathy

The last one hundred years of empathy scholarship have led to different conceptualizations of empathy across multiple fields of research (Wispé 1987). Despite different definitions offered across various empathy literatures, a recent review by Håkansson Eklund and Summer Meranius (2021) highlights the convergence in four core themes: understanding, feeling, sharing and self-other differentiation (p. 304). This convergence reflects earlier work by Davis (1983) to show the inter-relation between affective and cognitive aspects of empathy.

Davis (1983) brought together the cognitive and affective conceptualizations of empathy and proposed multi-dimensional interpersonal empathy. Davis' Interpersonal Reactivity Index (Davis 1983, 1983) remains one of the most widely applied measurement tools in empathy research, and it consists of four subcomponents: fantasy, perspective-taking, empathic concern and personal distress. Interpersonal Reactivity Index (IRI) measures dispositional empathy or the aspect of empathy that persists at the level of a trait in one's personality. Yet, from a relational perspective, one can see how trait-level conceptualizations of empathy are themselves indebted to positivistic frames of psychology: a scientific tradition grounded in notions of separation to analyze and improve understandings of features in isolation. Even in studies about group cooperation, the concept of trait-level empathy has been largely framed through the lens of seeking to understand individual-to-individual cognitive processes and ability (De Waal 2010). A reductionist view of individual perception and interaction embedded in the empathy construct and, thus, limits the possibilities for human–nature (re)connection because of the way it implies separate – instead of relational – social dynamics (Merchant 1990; Staffa et al. 2022).

Other psychological research emphasizes the process-dependent aspect of empathy – state empathy – as well as trait empathy. State empathy emphasizes situational aspects, meaning the different elements of a situation that influence how much empathy a person deploys in a given moment (Batson et al. 1995). State empathy highlights the more relational aspects of empathy defining it as an active process of engagement rather than a static ability that exists or does not exist (Iversen 2019). State empathy is also supported in the neuroscience literature (Borja Jimenez et al. 2020) and opens up space to think about how empathy can be more deeply and

intentionally engaged in specific activities and social learning environments.

While some empathy scholars like Batson (2009) have included terms like sympathy, compassion and empathic concern in their definitions of empathy, scholars in neuroscience and social psychology have argued that this is an inaccurate muddling of historically similarly understood psychological processes that are related, but distinct (Eisenberg 2010; Gerdes 2011). With overlapping literature and underlying affective requirements between sympathy and empathy and both being related to compassion, one could imagine how sympathy and compassion converge within empathy research, statistically. Indeed, many of the popular studies about affective empathy use valid and reliable measurement instruments to capture sympathy or empathic concern or compassion as empathy (Davis 1983; Batson et al. 1995; Walker and Chapman 2003; Blythe et al. 2021; Kim and Cooke 2021). For example, Blythe et al. (2021), drawing on Kim and Cooke's (2021) approach, studied interventions that foster empathy with the ocean by asking participants three questions: one about sympathy, one about compassion and one about empathic concern (p. 1288).

Singer and Lamm (2009), however, describe a distinction conceptually and argue that empathy leads to 'isomorphic feelings to those of another person … [while] empathizing with a person feeling sad, will result in a feeling of sadness in the self, whereas sympathizing with, being empathically concerned or feeling compassion for a sad person will result in either pity or compassionate love, but not sadness' (p. 84). These scholars further argue that emotional contagion, emotional mimicry, empathy, sympathy, compassion and pro-social behavior can, and often do, occur in concert (Singer and Lamm 2009). Consequently, empathy, however defined, forms a bedrock of prosocial behavior, but it is not the same as the behavior of helping (Binmore 1994; Pigano 2007; Grönlund et al. 2017, p. 461). For example, empathy researcher Franz de Waal (2010) observed that chimpanzees undergoing high degrees of emotional distress can lack the emotional regulation necessary to drive helping behavior (de Waal 2009).

Based on this and social-neurological understandings of empathy (Decety and Ickes 2009), it is reasonable to imagine that the way a person feels and makes sense of their own emotional distress contributes to their available set of responses to a distressing situation. Social neuroscience research supports this: emotional regulation is understood as an aspect of affective empathy and underlies the ability to experience empathy and thus engage in prosocial helping behavior (Gerdes 2011). Thus, emotional contagion and emotional mimicry alone, without the emotional regulation and self-other awareness essential to the experience of empathy, could lead to emotional distress and inhibit helping behavior in social contexts (Decety and Jackson 2004; Decety and Lamm 2006). Recognizing this complexity, this paper follows current neurological and psychological definitions of empathy as a multidimensional 'inherently other-oriented' concept *distinct* from sympathy, empathic concern and compassion, which denotes 'feeling with' rather than 'feeling for' another (Singer and Lamm 2009, p. 89; Gerdes 2011, p. 233; Segal et al. 2017a).

In addition to the well-argued reasons for separating empathy from sympathy, empathic concern and compassion in the literature (c.f., Eisenberg 2010; Segal et al. 2017b), there are further reasons to make this separation from the standpoint of a 'relational paradigm' (c.f., West et al. 2020; Walsh et al. 2021). While compassion involves a genuine concern and care for another, and even the willingness to take action, it is often cultivated through moralist perspectives and religious traditions (Goodman 2014). Additionally, some scholars argue that compassion can lead to hierarchal or paternalizing responses to problems rather than deepening understanding (Segal et al. 2017b, p. 69). While sympathy involves genuine concern and care for another person, it can be motivated by an urge to 'help' another in order to relieve ones' own feelings of emotional distress or anxiety (Lamm et al. 2007). Gerdes et al. (2011) argues that helping responses stemming from personal distress and sympathy ('feeling for') depletes rather than energizes client/practitioner relationships. Empathy or feeling 'with', on the other hand, embeds a person in an others' experience allowing for deeper understanding and relating.

For a relational turn in sustainability, the distinction between sympathy and empathy may be of especial significance. While sympathy, compassion or emotional distress may sometimes be effective as motivational states, if they are the *only* affective states sought or instigated, they can lead to burnout and disengagement (Ojala et al. 2021; Ojala 2023). Furthermore, sympathy driven responses can limit 'diverse decision making and action choices' with the 'immediate urge to comfort or relieve stress' (Gerdes 2011 citing Gallese 2007). Therefore, a more plural, relational understanding of empathy makes room for more relationality and plural solution spaces to emerge or explore. For example, plural responses like the Rights of Nature are available when multiple alternative realities are engaged and considered within a system (Gilbert et al. 2023). By comparison, consider early conservation efforts that aimed to save wildlife by displacing native inhabitants (Adams and McShane 1996; Dowie 2011). It could be argued that the logic driving such early conservation parks

was aimed at *saving* rather than *engaging* ecosystems and, thus, a plurality of responses to conservation. In sustainability contexts, this is especially important, because a plurality of solutions and understandings are required (Gibson 2006). Furthermore, in a world built on the heels of western reductionist paradigms, opportunities for considering, feeling, wrestling and sitting with the harm that we create is an important step toward building policies that more accurately reach toward human and ecological well-being (c.f. Bernstein et al. 2023).

Building from research that suggests that sympathy and empathic concern can lead to burnout rather than more empathy-driven energizing client–clinician relationships (Gerdes 2011, p. 237), one can imagine how sympathy could short circuit wider ecosystem level interventions in favor of issues that provoke the most emotional response and ultimately lead to burnout or human–nature relationship displacement. Building upon the concept of empathy, on the other hand, has the potential to open up understanding and conversation about the plurality of responses available to a given issue while energizing human–nature relationships. Empathy, understood as a capacity to experience an other being, while maintaining personal differentiation, lends itself well to the need for creating space for pluralities so essential to sustainability work (Robertson 2021). Empathy, framed this way, becomes not about expressing the 'right' kind of sympathy but instead about holding open the space for plurality within which authentically relational responses can emerge.

Social empathy

How, then, might one go about scaffolding a more plural, cognitive, state-based approach to empathy in support of a relational turn? Here, the work on social empathy is instructive in the way it integrates a state-based approach without relying on sympathy, compassion or empathic concern for construct development (Gerdes 2011). Instead, social empathy draws on neuroscience to develop a construct with the multidimensional aspects – cognitive and affective – of empathy (Segal 2011; Gerdes et al. 2011). Multidimensional empathy is thus a prerequisite to social empathy, however social empathy also depends on experience, social learning and direct encounters with people who have different social contexts (Segal 2018).

Segal's work in social empathy is, ultimately, rooted in social justice. Her interest lies in how to help people understand social inequality from a more human and less socially 'othering' perspective. She hypothesizes that through social empathy, people will be more equipped to, for example, help alleviate poverty. Segal defines social empathy as, 'the ability to understand people by perceiving or experiencing their life situations and as a result gain insight into structural inequalities and disparities' (Segal 2011, pp. 266–267). The social empathy construct consists of two subconstructs: *contextual understanding of systemic barriers* and *macro perspective-taking and self-other awareness*. Social empathy's contextual understanding of systemic barriers measures an individual's understanding of the systemic aspects of a person's social experience (Segal 2018). Macro self-other awareness and perspective-taking, the second subconstruct of social empathy, measures how well a person is able to think beyond their own social and historical experience toward a larger macro-social perspective of their and others' lived experience (Segal 2018).

Moving from empathy to social empathy makes two noteworthy leaps beyond focusing on sympathy and empathic concern, regarding empathy research. First, operationalization (i.e. the steps taken to deploy the concept in a data collection tool) of social empathy moves from individual-to-individual empathy to individual-to-group empathy. Second, social empathy is situated in a context of social learning. If we take these insights from a more open, cognitive, state-based approach to empathy into human–nature relating, the last question is how to bring in the more-than-human world.

Human-to-animal empathy

Efforts to cultivate environmental concern and care through empathy with animals are numerous and well documented in the conservation literature (Schultz 2000; Tam 2013; Amiot et al. 2017; Luebke 2018). Science communication efforts have centered climate induced perils to polar bears, for example, to engage human empathy toward animals and impact pro-environmental action (Swim and Bloodhart 2015). However, anthropomorphism in human-to-animal empathy research is also well documented in the literature (Amiot and Bastian 2017; Young et al. 2018, p. 335). And, while anthropomorphism can motivate conservation action (Tam 2013), sticking with an anthropomorphic perspective to conservation can also lead to a hierarchy of attention toward certain 'more human-like' species that can then undermine broader system-wide conservation efforts (Root-Bernstein et al. 2013). Therefore, scholars of human-to-animal empathy argue for integrating cognitive aspects of empathy alongside the affective emotional ones (Young et al. 2018). Such empathy is achieved through drawing people's attention to integration across cognitive and affective aspects of empathy in education environments (Young et al. 2018). Despite this acknowledgement, human-to-animal empathy studies still focus on measures of

sympathy or empathic concern as expressions of empathy. In seeking to cultivate empathic concern, rather than empathy, attention to individual animals takes precedent over attempts at cultivating human relations across multiple species.

In short, human-to-animal empathy misses important growth opportunities in expanding empathy from individual-to-individual to individual-to-wider 'nature'. Human-to-animal empathy also does not deliver opportunities for social learning that link ones' perceived well-being to the well-being of a more-than-human world. Beyond aligning efforts toward invoking sympathy for a particular species or cause, a state-based and multi-dimensional approach to empathy can help to align effort toward increasing the understanding, recognition and integration of human–nature plurality in a more-than-human world. In order to reach this aim, however, empathy with more-than-humans must be able to expand toward the multiple species and multiple landscapes that need sustained action. Furthermore, it is helpful to find ways to engage empathy and more-than-human connection in environments outside of the classroom, zoo or even large-scale conservation projects.

Social Empathy to Ecological Empathy

To cultivate an alternative approach to empathy that centers human and more-than-human relationality and invites plural approaches to learning and action — *an ecological empathy* — we can turn back to social empathy to help overcome the limitations of individual-to-individual relating in more traditional framings of empathy.

Constructed on the bedrock of social empathy, ecological empathy can be situated within the context of learning and process, and therefore as something that can be practiced and built, systemically, and over time. Grounding ecological empathy in this way also affords an opening up to outcomes beyond sympathy, compassion or empathic concern. Creating an ecological empathy framework from this perspective provides scaffolding for human–nature (re)connection across a range of practice environments. In Table 1, I elaborate on an ecological empathy framework in the manner of social empathy.

Contextual understanding of more-than-human interdependencies

Building from social empathy's contextual understanding of systemic barriers, the first element of ecological empathy would be a contextual understanding of more-than-human interdependencies. Understanding systemic barriers in a social context requires widening the understanding of larger social system and structure of inter-relations among political, social and historical aspects which impact a person's experience. To apply this to human–nature connections, we would want to help a person understand the larger ecological system and structure of inter-relations among the ecological and more-than-human aspects that impact more-than-human lived experience. In this way, contextual understanding of systemic barriers from social empathy (Segal 2018) can be reconfigured to build contextual understanding of more-than-human interdependencies for ecological empathy.

More-than-human awareness and earth system perspective talking

Further building on Segal's constructs, macro self-other awareness and perspective-taking is the second subconstruct of social empathy (Segal 2011) and requires a person to think beyond their own social and historical context toward a larger macro-social perspective of their and others' lived experience. Transposing this to an ecological context, a person would have to think beyond their own social, and in this case, human context, to include ecological perspectives. To this end, I propose the construct of more-than-human perspective-taking. Additionally, they would have to think beyond their own historical, or, applied to ecological perspectives, temporal contexts. For this, I propose more-than-human temporal perspective-taking. As such, macro self-other awareness and perspective-taking can be reconfigured to build macro-earth system perspective-taking, consisting of more-than-human perspective-taking, more-than-human temporal perspective-taking and more-than-human sensing and listening.

Taken together, contextual understanding of more-than-human interdependencies and earth system perspective-taking constitute a more expansive approach to ecological empathy. By systematically identifying aspects of human–nature relations that are overlooked through anthropocentrism, the ecological empathy concept, summarized in Table 2, should help scaffold people's learning to move beyond dualistic anthropocentric thinking. Practices for relating across humans and non-humans, constructed within the conceptualization of ecological

Table 1. Building ecological empathy from social empathy.

Social Empathy	Ecological Empathy
Contextual Understanding of Systemic Barriers	*Contextual Understanding of* ***More-than-human Interdependencies***
Macro Self-Other Awareness & Perspective-Taking	***More-than-human Awareness & Earth System Perspective-Taking***

Table 2. Human–nature (re)connection framework to build ecological empathy competence.

Ecological Empathy (EE)	Sub-components	Description	Inspiring literature	Cultivating EE
Contextual Understanding of More-than-human Interdependencies		Understanding of larger ecological system and structure of more-than human interactions and human inter-relations	Intertwined Biosphere (*Folke* et al. *2021*; *Riechers* et al. 2021); Social Empathy *(Segal 2018)*	
	Personal Embeddedness	Personal connection to the more-than-human world	Biophilia *(E.O. Wilson 1986)*	Take an inventory of relationships to more-than-humans that provide comfort or affinity
	Body Embeddedness	Felt sensory experience of self in more-than-human environment	Embodied Cognition *(Shapiro 2010)* Deep Ecology *(Naess 2009)*	Practices which connect awareness to senses, body and physical place in present moment of experience
	Ecological Embeddedness	Awareness of more-than-human actors in any context	Actor Network Theory (Latour 2007) Bio/Life Design (Borthwick et al. 2022; Latour 2007; *Rafael* et al., 2022; *Veselova & Gaziulusoy*, 2022)	Create systems map and rich picture of all more-than-human actors in a context of interest
More-than-human Awareness and Earth System Perspective-taking		Awareness & of multiple overlapping more-than-human perspectives	Intertwined Biosphere (*Folke* et al. *2021*; *Riechers* et al. 2021); Social Empathy *(Segal 2018)*	
	More-than-human Perspective-taking	Multiple more-than-human perspectives	Multi-Species Ethnography *(Bennett 2010; Gatto & McCardle, 2019; Luebke 2018; Tsing 2021)* Eco-narratives & Storytelling *(Talgorn and Ullerup 2023)*	Use imagination and best available information to take the perspective of more-than-humans identified in systems map. Activities could include improve, role-playing, storytelling, speculative fiction and creative writing
	More-than-human Temporal Perspective-taking	Multiple more-than-human temporalities	Multi-temporalities*(Adams* 1996; Fitz-Henry 2017; *Terry* et al. *2024*)	Integrate multiple temporal perspectives from more-than-humans identified in systems map
	More-than-human Sensing & Listening	Sensing and listening with multiple more-than-human perspectives	e.g. Biodiversity reports (Brondizio et al. 2019) Deep Ecology (Naess 2009)	Activities could include role-playing, reflection, writing and using the imagination Engage modes of sensing and listening through direct experience, scientific data collection & analysis, and other ways of knowing

empathy, should consist of methods for growing the relational space toward human–nature (re)connection. Growing the relational space widens the territory within which relational values can emerge.

Cultivating ecological empathy

I draw on biophilia, embodied cognition, deep ecology, multispecies ethnography, eco-narrative and multi-temporalities to elaborate on the aforementioned components of ecological empathy. Additionally, I suggest how we might go about building such ecological empathy competence in various settings. There are other ways ecological empathy competence can be built if the activities are designed to build competency across *all* six subcomponents: personal embeddedness, body embeddedness, ecological embeddedness, more-than-human perspective-taking, more-than-human sensing and listening and more-than-human temporal perspective-taking. Note that all the suggested components would need to be present in order to build ecological empathy competence. The sub-components are presented in a particular sequence; however, they could be ordered in any way to suit an intervention or decision context. Additionally, the practices are suggestions but could be adapted and layered into other methodologies such as scenario planning, design thinking, community visioning, participatory urban planning, community development, deliberative democracy or any other learning or decision environment design where anthropocentrism limits thinking.

Cultivating contextual understanding of more-than-human interdependencies

Personal embeddedness

Biophilia describes an innate human tendency to 'affiliate with other life forms' and situates human–nature connection as beneficial to humans and separation from nature as costly (Wilson 1986). Whether or not humans are innately and emotionally attracted to other more-than-human life forms de facto is beyond the scope of this research. However, biophilia invites thinking about the human capacity

and need for connection to more-than-human beings (Nisbet et al. 2009, 2011; Howell et al. 2011). Considering connection to nature as a human need sheds light on personal embeddedness in the environment as a pathway to a contextual understanding of more-than-human interdependencies. Practices which cut off possibilities for human–nature connection, such as any practices which don't intentionally acknowledge reflection or connection to the more-than-human world, create personal disconnection and limit opportunities for engaging human empathy. The possibility for connection to more-than-humans and place which biophilia brings to light is generative for thinking about human–nature interdependencies.

Practices for cultivating personal embeddedness

At a personal level, a person can be invited to take inventory of the multiple personal benefits a person receives from environments and more-than-humans which they personally connect and find affinity toward. Personally, situating one's own embeddedness in the more-than-human world is foundational to a relational understanding of ecological empathy and human–nature connection.

To encourage reflection on personal embeddedness in the environment, a person could begin by drawing a rich picture (Monk and Howard 1998) of themselves and the various aspects of their daily environment including more-than-humans that bring them joy or comfort. The act of drawing encourages reflection through the act of building out a representative system within which to perceive oneself as embedded (Moscovici 1973, 1984; Ainsworth and Scheiter 2021). By creating something directly in the environment a person can externalize and then internalize, a new perception of their embeddedness and multitude of connections in the environment might become more available. Furthermore, images relate information with multiple connections at once which might be a more ecological way of depicting information than non-visual forms of knowledge production. Drawing requires the creation of rich visual information as a form of knowledge production that would more closely mimic the ecological environment. Exploring the relationship between art and empathy Curtis (2009) argues that the act of drawing nature can contribute to an increased emotional affinity with the natural world and inspire conservation efforts. Curtis' work outlines a 'chain of inspiration', whereby nature inspires art and art inspires conservation activity (p181). The aforementioned reasons make drawing the multiple objects, places and more-than-humans in our lives which give us connection and comfort a good starting place to prime thinking about human–nature connection in any practice or policy context.

Body embeddedness

Despite years of reductionist and disembodied approaches to cognitive science, there has been an uptick in the exploration of theories of embodied cognition (Gangopadhyay 2014). Scholars proposing embodied cognition explore the role of the body in the environment as a fundamental aspect of the complex processes of cognition (Shapiro 2010). Relative to ecological empathy, embodied cognition invites the consideration and awareness of body embeddedness in the environment as crucial to the development of contextual awareness of more-than-human interdependencies. Body embeddedness describes an awareness of the body's sensory experience in a more-than-human environment. One way to begin to build body embeddedness across all interventions is to actively disengage in thinking to experience other ways of knowing. Deep ecology suggests that more-than-humans are great teachers in this regard and can be looked to for inspiration in terms of how one might spend time if they were, say, a tree; embodying what it feels like to be quiet and still or tree-like in the presence of a tree or landscape (Naess 2009) is one way to practice body embeddedness.

This might look like taking time to engage the senses and the body quietly, in the presence of other more-than-humans or through movement. There is a long history of environmental injustice being experienced at the level of the body (Nixon 2011), yet most decision, policy and design environments do not draw on our sensory experience of being in the world. Furthermore, disconnection from the body, cuts one off from his or her ability to experience empathy, as the affective aspect of empathy co-occurs with activities in mirror neurons in the body which respond to stimulation in the external environment (Kaplan and Iacoboni 2006). Awareness of embodied cognition can support relationality in human–nature (re) connection when movement, art and stillness are deliberatively engaged as a pathways to empathy in more-than-human connections (Jenkins 2017; Cho et al. 2022).

Practices for cultivating body embeddedness

Questions that invite such expanded relationality include: How do various environments make you feel? How do you experience sustainability or unsustainability in your body? What are pathways for creating connection within this space rather than disconnection or 'shut down' responses? Additional practices for cultivating body

embeddedness could include singing, dancing, mediation or any other activities that help people become more present in their bodily sensations and experience.

An awareness of and relationship to the body is an essential aspect of generating a contextual awareness of human – sustainability interventions and building toward ecological empathy among more-than-humans and the environment in practice. As such, any practices which generate this body embeddedness or embodied cognition can help to build contextual awareness of more-than-human interdependency. These practices can be engaged throughout any intervention and support practices of being that might increase the success of the next steps described below relating to ecological embeddedness.

Ecological embeddedness

Latour's (2007) actor network theory and flat epistemology of assemblages and distributed agency across all actors and actants across humans and non-humans offer a beneficial starting place for building ecological embeddedness. Latour's theory of distributed agency is a relational ontology in so far as assemblages come into being through their networks or connections. Building on Deep Ecology's assertion that humans are inseparable from their ecological environments, design practitioners, for example, are increasingly finding ways to embed ecological knowledge into design processes (c.f., the bio-design certification program).

Designers also use design thinking methods to build empathy with the end-users of products. Expanding the definition of end-users to more-than-humans offers additional step in methodologies for building ecological embeddedness more generally. Maher et al. (2018) builds beyond human end-users in design thinking by integrating the Sustainable Development Goals into the design process. Borthwick et al. (2022) propose a move away from human-centered design toward life-centered design. Poleac (2023) suggest a reformulation of humancentric design toward 'planetary centric design'. What each of these efforts have in common is a de-centering human agency from the design process to include more-than-human agency and relations. Such a de-centering more deeply embeds more-than-human relationships in design practice.

Practices for cultivating ecological embeddedness

Rather than inventing something entirely new, these steps seek to build on the aforementioned bio and life design processes in the hopes of making its uptake more feasible across a broader array of practice contexts.

To support the development of contextual understanding of more-than-human interdependencies, I suggest beginning with a systems thinking map commonly used to articulate the complex problem space of a particular sustainability issue (Wiek et al. 2011; Redman and Wiek 2021). Creating a visual and picture rich social object through systems thinking encourages a person or group to consider all of different actors and resources connected in a given decision context. However, since it is not habitual to think beyond the anthropocentric in spaces dominated by anthropocentrism, I suggest we go an additional step to actively and explicitly focus attention on the more-than-humans which are also actors in the system of interest. To this end, borrowing from more-than-human design practice, sustainability researchers could add an additional layer in the process is to ask participants to think specifically, and then draw, all the more-than-humans who are connected to either the actors or the resources they have mapped in their system. By explicitly thinking about specific more-than-human actors and communities and mapping them into the systems map, the conceptual scope of a problem space is expanded to include human–nature relationships that otherwise often go unconsidered. In this way, a person or group becomes present to actively thinking about the more-than-human communities and connections that are embedded in any given decision context.

More-than-human awareness and earth system perspective-taking

More-than-human perspective-taking

Multi-species ethnographies are one way that anthropologists seek to move beyond limiting western cosmologies of practice and inquiry (Kirksey and Helmreich 2010). Multi-species ethnographies are anthropological texts that assume multi-species agency rather than solely human agency in their understandings of socio-cultural environments (c.f., Tsing 2021). In other words, the anthropologist seeks to perceive and analyze the subject of interest from a more-than-human perspective. Such multi-species ethnographies help to move anthropocentric knowledge traditions toward considering more-than-human perspectives and the interrelationships therein (Bennett 2010; Kirksey and Helmreich 2010; Locke and Münster 2015). Additionally, approaching inquiry from a multi-species position helps to generate new perspectives and social understanding of more-than-human embeddedness. Using multi-species ethnographies as a jumping off point for practice is helpful to fostering human–nature (re) connection, because it offers a way we might practice more-than-human perspective-taking through re-situating inquiry and understanding from the perspectives of more-than-human others.

Drawing on multi-species ethnographies, design thinking anthropologists have also made efforts to integrate more-than-human stakeholders by building ecological personas (Frawley et al. 2014; Sznel 2020). Building on this work, Talgorn and Ullerup (2023) explore how to build empathy with planetary stakeholders using participatory story-telling with more-than-human stakeholders. In pedagogical settings, storytelling through art has been linked to empathic understanding of more-than-humans in classroom environments (Rock and Gilchrist 2021). Additionally, role-play is an effective way to cultivate learning toward new perspectives in sustainability research (Chen and Martin 2015). Role-playing not only brings more-than-human perspectives to life, but as an embodied practice it also serves to generate multiple ways of knowing and connecting to the experience of the more-than-human experience which helps to prime learning toward being able to feel empathy with the exogenous more-than-human other.

To practice more-than-human perspective-taking, I suggest integrating more-than-human perspectives through a structured process of thinking or acting from as many of the more-than-human perspectives outlined in the original systems map as possible. Once the systems map includes more-than-human actors and communities, it is important to take time to think, write or role-play from each of these different perspectives. While the list might have been exhaustive in the mapping out phase, even bringing in a few more-than-human perspectives into a process will help to move beyond anthropocentric thinking as usual to integrate more human–nature connection and relationship in practice.

In contexts where ecological role-play might not be feasible, using imagination and best available information to take the perspective of more-than-humans identified in the systems map would be ideal. Activities that deploy the imagination could include improve, role-playing, storytelling, creative writing or speculative fiction to bring more more-than-human perspectives to life. Practitioners could also create ecological character cards or artifacts. An example of an ecological character card could be an image of the more-than-human being and some quick facts about where it lives, what it likes to eat and in what contexts it encounters humans, where to find out more information about it, as well as what type of timescale it views as relevant to its existence.

More-than-human temporal perspective-taking

Resituating thinking from more-than-human perspectives, however, also requires a temporal shift away from the orientation of an anthropocentric present toward an inclusion of multiple temporalities of different more-than-human agents. Recently, theory that encompasses multiple temporalities has come into focus among sustainability scholars (Terry et al. 2024). Integrating multiple temporalities relevant to more-than-human perspectives supports the ambitions behind future-focused work in sustainability and helps to move beyond its limitations by extending temporal scales to include more-than-human communities. Environmental humanities scholars have also explored the notion of multiple temporalities with regard to the way people imagine the ecological world and environmental hazards (Adam 2005; Fitz-Henry 2017). The more-than-human temporal perspective-taking subcomponent provides practices within which to orient multi-temporalities across a wide array of practice environments.

Practices for cultivating more-than-human temporal perspectives

There are two ways that more-than-human temporal perspectives could be linked to the more-than-human perspectives articulated in the previous activities. One way could be to consider ecological character role-play across multiple temporal perspectives. Another way could be to consider the present circumstance, decision context or innovation from multiple timescales from the perspective of as many of the more-than-human communities identified. If individuals and groups are successful in imagining the world from more-than-human perspectives, it will be obvious that different time horizons than humans are used to thinking about are also important to consider (from the very immediate, death of an entire population of single cellular organisms in one second! To the long-time horizon of water-soluble contaminants). This could be interpreted in a broad variety of ways depending on the project, but a simple scaffolding could be to use the following prompts:

> If I imagine the world in 5 months (5 years, 50 years, 500 years, 5000 years), what would be my view?

While the questions articulated above are very simple, asking them can increase the range of temporalities considered in a particular project context. Despite sustainability, scholars' long interest in future-focused methods, more often than not, the temporal scope of consideration for a project is determined by what is conceived of as relevant to the project. Some projects might operate at a twenty-year future time horizon and if you are doing a futures intervention, you might go so far as a hundred years or 'the far future' (Iwaniec et al. 2020; Keeler and Bernstein

2021; Pereira et al. 2021). Still, building ecological empathy requires thinking across multiple time horizons which might be relevant for different more-than-human communities to inform considerations in the present. Integrating the plural ecological timescales at play in any decision pathway, therefore, is a first step toward considering more-than-human temporal perspectives in any decision, policy or design environment.

More-than-human sensing and listening

For more-than-human perspective-taking to be an effective route to empathy, it is essential to engage in tools for more-than-human sensing and listening that substantiate self-other awareness & differentiation in ecological empathy practices. Perspective-taking alone, without listening and self-other awareness, would not necessarily contribute to greater empathy. Sensing and listening refers to practices that seek to better understand the ways more-than-humans communicate or exhibit responsiveness. This includes practices that stem from deep ecology such as sitting in presence with more-than-human beings (Naess 1973, 2009). However, it also includes all efforts directed at the scientific collection or aggregation of data about more-than-human worlds. Examples include but are not limited to earth science, ecology, biology and geography. Other efforts include initiatives to work across earth science data sets as exemplified by the Group on Earth Observations (GEOOS).[2] GEOOS is a portal operated by the European Space Agency that integrates heterogenous earth observation data across multiple local, regional and global scales. GEOOS, in essence, enables sensing and listening to support policy and decision-making in the service of everything from fishing and marine ecosystem management to agricultural development and biodiversity restoration efforts across the globe. Other exemplary efforts to collect and aggregate data include work by IPBES, such as the global assessment biodiversity report (e.g. Brondizio et al. 2019). Still other examples include calls to more deeply integrate remote sensing data (Pasetto et al. 2018; Chadwick et al. 2020; Cavender-Bares et al. 2022) to better conservation efforts, which could also be extended to industrial endeavors at large.

Practices for cultivating more-than-human sensing and listening

Sensing and listening may happen in one intervention, but in order to build this sub-competence relative to ecological empathy, it is important that it happens over time and in conversation with the other sub-competence development processes. Psychologist Iversen (2019) describes how to practice building empathy in clinical settings through a steady stream of moving from self to other back to self, back to other. Her construction of empathy as a practice asks that the empathizer temporarily 'bracket back' oneself in an intentional way in order to effectively 'reach across difference' toward another person, over and over again. In a similar manner, through bracketing back human-centrism to more-than-human listening, humans can effectively build ecological empathy with the more-than-human world.

Sensing and listening is vital in more-than-human contexts where the affective aspects of empathy alone contribute to some of the limitations of human–animal empathy described in earlier sections (e.g. caring for one animal at a time or prioritizing charismatic megafauna). By 'bracketing back' the human centered perspective and sensing and listening to more-than-human perspectives through a keen attention to inquiry through observation, ways of being, and the best available earth science data, humans can practice better listening.

There are precedents for more-than-human sensing and listening all over the world. For example, consider road design that integrates more-than-human needs. In Brazil, based on the knowledge devastating levels of roadkill (Abra et al. 2021), the road through Carlos Botelho State Park was designed specifically to mitigate animal deaths. The road through the park is closed during the hours of highest animal crossings (between 6 pm and 8 am) and also has extra curves to force traffic to travel more slowly, enabling safer wildlife crossings (Goldfarb 2023). Other opportunities to learn from ecosystem function include fishery management and initiatives like the Monterey Bay Aquarium's Seafood Watch.[3] The Seafood Watch app allows consumers to connect directly with fishery data in real time, so they can make choices about the types of seafood they consume and thus, contribute to creating demand for environmentally sustainable seafood through a sensing and listening practice.

The above examples illustrate how sensing and listening might contribute to human–nature (re)connection in policy and design. Integrating sensing and listening of more-than-human worlds into decision-making frameworks can be achieved through traditional practices, including conservation monitoring and evaluation or designing the built environment to include the ecological landscape. In fields where sensing and listening to more-than-human beings is less common, for example in bio-medicine, innovation policy, or industrial engineering, the creative steps outlined in this article aim to help practitioners identify and integrate data sources.

Process level ecological empathy competence building

The point is not that every approach to build ecological empathy be done through a deliberative

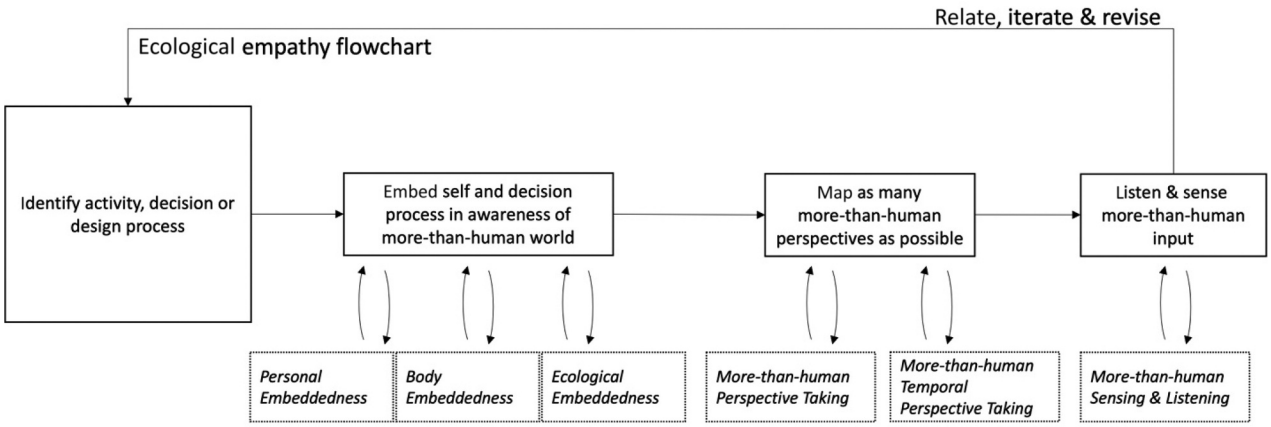

Figure 1. Ecological empathy competence building flowchart: the solid outlines circumscribe processes for building ecological empathy, while the dotted outlines circumscribe the ecological empathy sub competences that get built in each process step.

democracy activity, for example. The point is that whatever a project is trying to do that connects to human–nature interactions (from energy management to biodiversity to conservation to philanthropy to urban planning, etc.) can be redesigned so that the process includes activities that contribute to building ecological empathy. Such an approach would do this by asking itself: does my process proposal or activity have something in it to contribute to each of the following sub competences: personal embeddedness, body embeddedness, ecological embeddedness, more-than-human perspective-taking, more-than-human temporal perspective-taking, and more-than-human sensing and listening? Figure 1 helps to visualize this point through an ecological empathy competence building flowchart.

Discussion

A radical reframing of empathy, such as proposed above, is essential for expanding collective human capacity for human–nature (re)connection. From this new perspective, I suggest defining ecological empathy as a cognitive and affective ability, which allows for the internal coherence across bodily separation in humans and their environment. Configuring ecological empathy as relational practice across barriers of difference opens up an entirely different set of responses to pursuing human–nature connection. It also builds on earlier efforts at connecting empathy and nature, like Schultz (2000), but broadens attention from environmental behavior generated through emotional distress toward developing multiple and overlapping relational connections. The framework offered in this manuscript for cultivating ecological empathy aims to offer a model for practitioners to distribute agency and care across multiple, overlapping and ecologically embedded networks of more-than-human relationships (Mackenzie and Stoljar 2000; Latour 2005; Bennett 2010; Staffa et al. 2022).

While Mahbub's (2022) 'ecological empathy' was the first time that 'ecological empathy' as such was put into print, there have been numerous other attempts to integrate empathy and nature to move beyond anthropocentrism. Mahbub (2022) advocated shifting away from anthropocentrism toward non-anthropocentrism, drawing on Buddhist and Confucian perspectives and a Kantian ethics of care, to situate the interconnection among humans and the natural world through the lens of holism (Mahbub 2022). Gruen (2015) argued for an expanded ethics of care that can be extended to the non-human world through her concept of 'entangled empathy'. She describes 'entangled empathy' as a caring perception for tending to another's experience of well-being in those we recognize relationship with. Another related and proposed concept of empathy in this space is Talgorn and Ullerup's (2023) 'empathy for the planet' that builds 'relationship with Planetary entities' through the 'imagination of their emotions inspired by our own emotions' and, in doing so, seeks to guide compassionate action and planetary ecosystem care. Even earlier works like McGarry's (2014) arts-based doctoral thesis focused on the role of imagination and, by extension empathy, in healing inner and outer separation from nature.

The ecological empathy framework presented here builds from the underlying logic across these works that an intrinsic sense of connection to more-than-human worlds leads to pro-ecological behavior and greater care for the environment. However, the ecological empathy framework offered also moves beyond an ethics of care argument to articulate how we might still seek to build such more-than-human connection when it is not intrinsic. In making this move from 'already there' to 'needs to be built', the ecological empathy framework set forth here actively

creates opportunities for building relationships and deeper understanding of more-than-human beings in places, where relational values have not taken hold (or have been lost).

While researchers have shown a close alignment between relational values and empathy and gone so far as to suggest empathy as a relational value (Hagen and Gould 2022), placing empathy as a value rather than a practice limits empathy's constructive potential. One of the main contributions of a multi-dimensional, state-based approach to ecological empathy grounded in social empathy is that it advances relational values by intentionally designing ways to step beyond anthropocentric biases and (re)connect to the more-than-human world. Ecological empathy, then, like relational values (Chan et al. 2016), is derivative of the relationships and responsibilities to the more-than-human world, but not present in the things themselves (human, non-human or oneness). Rather, ecological empathy invites a more-than-human perspective and in inviting this perspective opens up space for new relational values to *emerge*.

There is an extensive research on ways to integrate relational values in human–nature connection through the inclusion of more diverse democratic representation of indigenous knowledge and participation in the democratic processes which dictate sustainability outcomes (Aragwal 2002; Berkes 2016; Burgos-Ayala et al. 2020; Mattijssen et al. 2020). In addition to connecting local and indigenous knowledge systems (Tengö 2014), it is essential to create more pathways for ecological information to enter the conversation in non-indigenous policy and praxis contexts. The way that ecological empathy is deployed in this article – by offering six sub-components along with inspirational practices – makes it usable in decision, management and policy, and design environments alike. By advancing ecological empathy for human–nature (re)connection, relational values can be embedded in wider arenas of practice.

Ecological empathy supports the intentional integration of information and perspectives from multi-species communities which are often left out of policy discourse, unless the more-than-humans are represented by specific human-interest groups (Leopold 2014). When direct human–nature connection through immersive experience isn't feasible within a project, practitioners must still seek to generate relational values which emerge through human–nature connection. In such settings, systems maps, alongside storytelling, role-playing or ecological character cards can offer paths toward connection and relationship. The ecological empathy framework provides a systematic and structural way to design such opportunities.

Future research

Future research to operationalize the ecological empathy competence and its sub-components through exploratory factor analysis and confirmatory factor analysis would enable a move from a framework to a valid and reliable construct. Validating the ecological empathy construct and its subconstructs would help people to better understand whether their efforts are building a pluralistic awareness with multiple possible responses – rather than only sympathy or emotional concern. By advancing a better understanding of if we are building what we think we are building in research, policy and design environments, we can create more opportunities for synergistic and caring choices. Additionally, ecological empathy construct development would support the deepening of human–nature (re)connection efforts by enabling theory-driven monitoring, evaluation and feedback over time and across projects.

Conclusion

Pursuing ecological empathy in the manner I propose has the potential to embed ecological imagination, sensing, listening and thinking into the multiple contexts where sustainability work takes place. It is not without irony that I have pointed out how the predominant construct of empathy is itself built with the very dualistic world view that separates humans from nature and thus enables exploitation and instrumentalization. Therefore, at the radical root of this conception is the need for a different way of relating to nature that harnesses our human capacity for empathy, enlarging it, so we can relate to the world and its inhabitants in different ways. The relational practice of cultivating ecological empathy competence in decision, policy and design environments embeds human–nature (re)connection into environments where it might otherwise be left out. Through the cultivation of ecological empathy, more-than-human relationality can help to overcome anthropocentrism.

Building beyond anthropocentrism is a first step toward building systems that honor and reinforce interdependence rather than disconnection. Deepening our understanding of human interests as inherently interdependent and ecological can support social-ecological recovery, resilience and thriving. Further refinement and operationalization ecological empathy can help partitioners to structure interventions that don't miss steps to consider our actions and decisions from orientations other than our own.

Notes

1. For a complete philosophical review of western thought that situates human–nature separation within the emergence of science, see for example Merchant (1990).
2. http://geoportal.org.
3. https://www.seafoodwatch.org/.

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