

Ethnobiology, the Ontological Turn, and Human Sociality

Robert A. Wilson and Lucia C. Neco

Abstract. The ontological turn is a loose cluster of theoretical approaches within cultural anthropology that advocates a synthetic, overarching way forward for ethnographically-oriented cultural anthropology. We argue that in order to contribute substantively to ethnobiology the ontological turn needs to distance itself from a long-standing tradition of thinking within ethnography that assumes some kind of fundamental divide between the natural and the social sciences. This distancing seems especially unlikely in light of the meta-anthropological nature of the ontological turn as primarily a perspective on ethnographic methodology. Instead, we advocate for naturalistic theoretical alternatives for thinking about human sociality, where philosophical innovation develops in concert with ongoing empirical work across the biological, cognitive, and social sciences. We illustrate this perspective by drawing on two naturalistic accounts likely to prove more fruitful for ethnobiological practice, namely, trans-genera models of sociality and progenerative views of kinship.

Keywords: ethnobiology; ontological turn; integration; human sociality; kinship

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Introduction

Anthropology's recent and ongoing ontological turn (OT) is a loose cluster of theoretical approaches that has gained some prominence within ethnographically-oriented cultural anthropology. Our aim here is to explore the OT's potential for thinking constructively about ethnobiology, which has developed largely (but not exclusively) within anthropological traditions informed directly by the biological and cognitive sciences and even within those sciences themselves. This exploration is prompted by David Ludwig's repeated suggestion (Ludwig 2018; Ludwig and Weiskopf 2019; Ludwig and El-Hani 2020) of bringing ethnobiological research into dialogue with the OT as an ascendant form of recent anthropological theorizing that draws much of its inspiration from claims made about the living world of animals and plants—for example, about jaguars that are persons (Viveiros de Castro 1998) or about trees that think (Kohn 2013).

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We shall argue that for the OT to contribute substantively here it needs to distance itself from a long-standing tradition of thinking within anthropology that assumes some kind of fundamental divide between the natural and the social sciences. That tradition originated with the disciplining of the social sciences in the nineteenth century. On this view, the goal of the natural sciences is to *explain*, and it does so by seeking out general and universal laws that specify regularities in the natural world. The goal of the human sciences, by contrast, is to *understand*—to interpret the meaning of human action in all of its forms. And that goal is to be achieved by grasping the lived experience that underpins that action, for it is that lived experience that makes the part of the world occupied by human actions distinctive. Here the methodological contribution of cultural anthropology rests on participant observation, a methodology whose variants are key to twentieth-century ethnographic research.

The basic problem is that while ethnobiology needs to remain a rich interdisciplinary field drawing on developmental and cognitive psychology, cultural anthropology, linguistics, and philosophy, the ontological turn paradigm is, in essence, a meta-anthropological view whose remit is ethnography. While the OT can inspire novel and reorienting empirical work that integrates knowledge across these fields, it faces a limit whose transcendence requires a contrasting naturalistic approach, where philosophical innovation is developed in concert with ongoing empirical work across the biological, cognitive, and social sciences.

Identifying “the” Ontological Turn: From Materiality to Imagination

Joost Fontein (2021) has recently noted that articulation of the OT paradigm has shifted over time. That articulation is book-ended by Amiria Henare, Martin Holbraad, and Sari Wastell’s collection *Thinking Through Things: Theorizing Artefacts Ethnographically* (2007) and by Martin Holbraad and Morten Axel Pedersen’s monograph *The Ontological Turn: An*

Anthropological Exposition (2017). Versions of the OT have been the subject of probing and persuasive critiques by Vigh and Sausdal (2014), Graeber (2015), and Laidlaw (2017); of a recent multi-author symposium in *Hau* (2019); and of other collections of essays (e.g., Astor-Aguilera and Harvey 2018).

To convey the flavor of the early orientation of OT work, consider what Henare, Holbraad, and Wastell say in their influential introduction to *Thinking Through Things*. Motivating their perspective with the question “What would an artefact-oriented anthropology look like if it were not about material culture?” (2007:1), they identify “the germ of a new methodology” in the papers they are introducing, a method whose aim “is to take ‘things’ encountered in the field as they present themselves, rather than immediately assuming that they signify, represent, or stand for something else”. Adopting an approach that might be called ‘radically essentialist’ (2007:2), Henare, Holbraad, and Wastell then elaborate on this invocation to “take ‘things’ ... as they present themselves”, acknowledging that while this “has long been implicit in the ethnographic method itself”, what “the approach advanced here attempts to add to these routine activities is a collapse of the experience/analysis divide, such that the experience of things in the field is already an encounter, *simpliciter*, with meanings” (2007:4).

Contrasting their view with Bruno Latour’s actor-network theory, Henare et al. note that the distinctiveness of their approach is “in the status accorded to the new and more ‘democratic’ world that emerges from his heuristic usage of ‘things’. ... We want to propose a methodology where the ‘things’ themselves may dictate a *plurality* of ontologies” (Henare et al. 2007:7). Fontein (2021) has pointed out that, by contrast, commitments to “multiple ontologies” and “radical alterity” disappear in Holbraad and Pedersen’s (2017) metaphysically mellowed view of the OT. As Holbraad and Pedersen make clear, with the expression *the ontological* “operating

always as an adjective or adverb—never as a noun!” (2017:11), for them the OT is no longer a turn to ‘things’, let alone ontologies, but “a *methodological* intervention, as opposed to a metaphysical or indeed philosophical one ... it is a methodological project that poses ontological questions to solve epistemological problems” (2017:4-5). They continue with an elaboration of the relationship between methodology, epistemology, and ontology within the OT paradigm:

The epistemological problem of *how one sees things* is turned into the ontological question of *what there is* to be seen in the first place. ... Here, longstanding epistemological worries about ethnocentrism, solipsism, essentialism, orientalism and so forth are reconceived as ontological problems. ... The ontological turn is not so much a matter of ‘seeing differently’, in other words. It is above all a matter of seeing *different things* (Holbraad and Pedersen 2017:5-6).

Here we can see just how the OT is presented as the latest methodology for ethnographic theorizing. Although less proselytizing than the expression found in the introduction to *Thinking Through Things*, this more recent characterization retains both diagnostic and meliorative dimensions: it is both a lens on the limits of past anthropological theory and practice and provides a way forward for twenty-first-century ethnographic research within cultural anthropology. As Fontein characterizes the perspective that emerges from Holbraad and Pedersen (2017), the “point is therefore decidedly not to say anything about the world (or worlds)—whether real, really real, or really imagined—but rather to use ethnographic encounters to do ‘concept creation’, to conjure up possibilities for what could be; what I think of as the anthropology of the subjunctive” (Fontain 2021:179). Such conjuring is integral to ethnography, and we concur that this turn—the *imaginary turn* perhaps—should be distinguished from a more substantive commitment that embraces alternative ontologies. Yet the withdrawal from saying “anything

about the world” imposes a significant limit to what the OT offers ethnobiology, which aims to understand not only “ethnographic encounters” that reveal striking patterns within varying ethnobiological knowledge but those patterns and that variation themselves.

Before turning, in the next section, to convey a more concrete sense of “the” OT as articulated in Holbraad and Pedersen (2017), a final pair of notes, neither affecting the paper’s chief argument but which we mention for completeness. The first concerns diversity under the OT label. In addition to the views of Wagner, Strathern, and Viveiros de Castro that Holbraad and Pedersen discuss at length (2017: ch.2-4), other influential works in this tradition include Philip Descola’s *Beyond Culture and Nature* (2013) and Edouardo Kohn’s *How Forests Think* (2013), works that we will draw on in the following discussion; as Holbraad and Pedersen note, there are also “other ontological turns” beyond anthropology, exemplified in the work of Bruno Latour, Donna Haraway, and others in interdisciplinary Science and Technology Studies. The second is that Holbraad (2020) and Pedersen (2020) have each more recently expressed distinctive ways forward for the OT paradigm. While Holbraad continues the emphasis from Holbraad and Pedersen (2017) on the centrality of *conceptualization*, Pedersen suggests that the OT “may be understood as one of the most concerted attempts anthropology has produced to realize a distinctly anthropological version of Husserl’s method of phenomenological bracketing, namely what could be called the ontological epoché.” (Pedersen 2020:611, abstract).

The Ontological Turn in Action: Understanding Mauss on *Hau*

In their introductory chapter, Holbraad and Pedersen (2017) draw on Marcel Mauss’s widely discussed 1925 essay *The Gift* (1990) to illustrate OT methodology. Mauss’s essay is an exploration of systems of exchange in a wide range of Indigenous cultures, with Mauss observing that a gift given without negotiation seemed to carry with it some sort of power and an

obligation to reciprocate. We briefly recount Mauss's description of gift exchange by the Māori, a particular focus of Holbraad and Pedersen, before turning to the OT's distinctive contribution in making sense of it.

Based primarily on a single ethnographic report by Elsdon Best, Mauss (1990:13-16) notes that, according to Māori law (*droit*), any article (*taonga*) that will be exchanged has a strong connection to the clan, the space they occupy, and the person who possesses it. This strong connection is reflected in the fact that a *taonga* carries with it a spiritual power, the soul of the donor, a *hau*. Because the article contains a piece of the donor, the gift needs to be reciprocated: the *hau* wants to come back to its place of origin. Accordingly, a new article received by the original donor will contain the original donor's *hau* in a cycle of exchange. The thing exchanged creates a bond of souls that will hold not only a moral but also a physical and spiritual commitment among each person party to the exchange.

In order to see the distinctive contribution that the OT makes to the longer ethnological tradition into which Mauss's *The Gift* has been incorporated, consider two examples of interpretations within cultural anthropology that Mauss's discussion has generated. Marshall Sahlins has argued, in his *Stone Age Economics* (1972/2017:142) that the "true meaning of the *hau*" is "profit" because this kind of gift-giving is localized in a context of productivity exchange. By contrast, for Mary Douglas (2004) Mauss's research is a theory about a universal aspect of human solidarity, a system of reciprocity that engages people in permanent commitments to each other.

Holbraad and Pedersen view the many ways of making sense of the exchanges described by Mauss exemplified above as offering projective, deflationary or assimilative interpretations. By contrast, instead of trying to fit Māori gift exchange into our Western definitions, or

dismiss/elevate its importance in relation to other cultures, Holbraad and Pederson propose to identify the ontological issues that arise from the practice and “run with them” (2017:2), looking to relativize the notion of personhood, correspondingly complicating our neat distinction between people and things, and reconceptualizing the concepts of gift, person, and object, even questioning whether they even make sense in this context. Here the anthropologist’s ontological activity is *concept production*. Holbraad and Pedersen say that

asking what people and things ‘might be’ in Maori gift exchange is to ask what they *must be* for these practices to make anthropological sense. It is to ask for, and generate, the conceptual and analytical apparatus that will permit us even to describe, let alone cogently comprehend, Maori gift exchange, or whatever other ethnographic materials are of concern to us. (Holbraad and Pedersen 2017:4)

In short, although located within the interpretative tradition of ethnography and concerned with sense-making, the OT is methodologically distinctive in calling on anthropologists to question the fundamental categories they use to describe the phenomena in the first place. That questioning acts as a counter to ethnocentric and other impositional interpretations, putatively letting the phenomenon speak for itself.

Ethnographically-Oriented Anthropology and the Ontological Turn

Recognition of the OT as continuing a methodological tradition within ethnographically-oriented anthropology, central to the critical stance we are adopting, is manifest in several influential overviews of the OT. For example, Eduardo Kohn’s “Anthropology of Ontologies” (2015) identifies two innovations within anthropology’s history that the OT incorporates: the

methodological innovation of “immersive engagement with the everyday messiness of human lives” (p.313) at the heart of ethnography, and the *theoretical* innovation of “the culture concept, broadly construed” (p.313), which Kohn takes to be “an anthropological refinement of a broader linguistic, epistemological, representational, or correlational turn in philosophy” (p.314). On such a view, human social life is essentially symbolic and language is taken as constitutive of historical events and human consciousness; Kohn views both “the linguistic turn” and social constructivism as core parts of this tradition. Clifford Geertz’s (1973) interpretationist view of the human sciences and the embrace of symbolic anthropology by David Schneider in his study of kinship (1972, 1984) represent two influential examples of approaches within cultural anthropology that have pursued this general pathway in studying human sociality and culture.

Likewise, Holbraad and Pedersen introduce the OT as “a technology of ethnographic description” (2017:ix), a tool for developing improved interpretative ethnographies. Here the OT’s “methodological injunction” involves “three analytical practices that have been characteristic of the anthropological project possibly since its inception, namely reflexivity, conceptualization and experimentation” (p.x). Holbraad and Pedersen then (ch.2-4) identify three ethnographic antecedents to the OT: the work of Roy Wagner on the invention of culture, of Marilyn Strathern on relations, and of Eduardo Viveiros de Castro on Amerindian perspectivism.

In these two examples, we see the OT’s proponents locate themselves within the tradition exemplified by interpretationist and symbolic anthropology associated with the linguistic turn, thus continuing the ethnographic tendency to cast the human sciences as methodologically distinct from the natural sciences. In short, as a theoretical development within an ethnographic methodology that is socially constructivist, the OT reflects a *separatist view* of the human sciences that permeates this key part of cultural anthropology more generally.

Ethnobiology itself, however, is more readily assimilable to theoretical traditions that view the human and natural sciences as continuous, adopting a correspondingly *integrationist* view of the cognitive, biological, and social sciences, what one of us has previously called *the fragile sciences* (Wilson 2004, 2005). This basic difference creates at least a *prima facie* tension between the OT and ethnobiology, one that, we shall argue, is best relieved by adopting an overarching integrationist, naturalistic framework. Our view is that one can best advance this interdisciplinary field by integrating OT-flavored ethnography with the broader range of sciences on which ethnobiology has traditionally drawn.

One source of resistance to this suggestion is the suspicion that the integration that we advocate expresses a kind of reductionism that cultural anthropologists have long been wary of. Given the track record of the reductionist wolf taking on integrationist sheep's clothing in the recent history of the relationship between the fragile sciences, such as in human sociobiology and evolutionary psychology, such resistance is *prima facie* reasonable. Indeed, a parallel concern about the relationship between traditional and academic ecological knowledge (TEK and AEK, respectively) has been recently articulated by the philosopher Dan Weiskopf (2020), who has argued against so-called integrationist approaches to this relationship. While we share the motivating concerns that Weiskopf echoes from earlier reservations (Nadasdy 1999), e.g., over whether "integration" really amounts to reduction favoring TEK over AEK, we think such issues, including the nature of scientific integration itself, are most fruitfully discussed within the broad naturalistic framework we advocate and share with Weiskopf.

The position we articulate continues the interdisciplinary aspirations motivating much of the most interesting and valuable work in ethnobiology. What is needed *is* reconceptualization, as the OT emphasizes, but reconceptualization informed by all three of the cognitive, biological,

and social sciences, rather than chiefly meta-anthropological pronouncements about ethnography. For this reason, we think that there is a better way forward for ethnobiology than the OT itself offers.

Ethnobiology and The Ontological Turn

Hunn's (2007) succinct overview of the history of ethnobiological research distinguishes four general phases of ethnobiology's history: an early etic / utilitarian phase that viewed Indigenous knowledge extractively; the heyday of ethnoscience, marked by Conklin's doctoral work on Hanunóo plant knowledge in the mid-1950s; the rise of ethnoecology that shifted to emphasise the active role that biological knowledge plays in everyday lives; and Indigenous ethnobiology that both focuses on Indigenous expertise and knowledge itself and critiques the exploitative nature of past ethnobiology. Hunn makes clear that ethnobiology has encompassed a variety of research programs, some descriptive and extractive in their approach to Indigenous knowledge of the nonhuman biological world, others more normative and political in their views of correspondingly renamed "Traditional Ecological/Environmental Knowledge" and its standing vis-à-vis scientific knowledge.

There are three obvious ways in which OT methodology, as a conceptually-oriented form of ethnographic intervention, might contribute to ethnobiology, each corresponding to a feature of ethnobiology: its ethnographic dimension, the variety of research that it encompasses, and its past focus on knowledge of the nonhuman, natural world:

1. Provide conceptualizations within ethnobiology that bypass or pre-empt standard ethnographic dilemmas, puzzles, or impasses, such as the dangers of falling into either ethnocentrism or relativism and encourage reflexivity and experimentation.
2. Facilitate the integration of different aspects of existing ethnobiological research.
3. Show how to sophisticate ethnological frameworks to incorporate human cognition and sociality within their ambit.

We will argue that, with respect to the ethnobiology of the nonhuman natural world, the conceptualizations and integration in (1) and (2) are likely to be most useful to contemporary ethnobiology when deployed within a broader naturalistic framework that eschews the separatist tradition that the OT has emerged from. With the extension of ethnobiological frameworks to human cognition and sociality in (3), we think there is more scope for the OT to make a distinctive, novel contribution. Here again, however, we are wary of the limitations of the methodology if it is used merely meta-anthropologically, rather than in ways that show the need for the cognitive, biological, and social sciences to work together in this domain.

To begin here, consider an important division persisting in differing contemporary characterizations of ethnobiology as a field. E.N. Anderson characterizes ethnobiology as “the study of the biological knowledge of particular ethnic groups—cultural knowledge about plants and animals and their relationships” (Anderson 2011:1). Anderson’s emphasis on biological knowledge within specific cultures echos Scott Atran’s earlier conception of ethnobiology as “the anthropological investigation of folk biology in diverse cultural contexts”, where folkbiology is “the cognitive study of how people classify and reason about the organic world” (Atran 1999:317). Here folkbiology constitutes a domain of knowledge with its systematic study within the cognitive sciences, “naive biology”, paralleling that of other such domains, such as

naive psychology and naive sociology. This research paradigm has developed primarily through experimental methodologies employed by developmental and cognitive psychologists, each with a corresponding anthropological form: ethnomathematics, ethnophysics, ethnopsychology, and ethnosociology.

Contrast this with the shorthand definition of ethnobiology employed by the Society of Ethnobiology as “the scientific study of dynamic relationships among peoples, biota, and environments”, recently drawn on by Steve Wolverton (2013:21). In this conception of ethnobiology, while ethnobiological research might draw on knowledge and practices specific to particular cultures, ethnobiology itself is a broad, multi-disciplinary field that includes not only anthropology but conservation biology and conservation practices, ecological knowledge, and scientific and Indigenous taxonomies of the living and nonliving worlds. Wolverton’s hopes for the development of “Ethnobiology 5”, moving beyond the four phases of ethnobiology’s past that Hunn outlines are also reflected in Ludwig’s identification of ethnobiology “as a transdisciplinary field that integrates heterogeneous methods from biological taxonomy and cognitive science to political ecology and Indigenous studies” (Ludwig 2018:269). Ludwig’s advocacy of an integrative perspective within ethnobiology aims to encourage the retention of the study of cognitive factors in ethnobiology, given not only the absence of psychology and the cognitive sciences from Wolverton’s discussion but also the trend for anthropology and psychology to head down distinct pathways in their explorations of those dynamic relationships.

This retention of a role for psychology even within the conception of ethnobiology as the study of *relationships* (rather than of *knowledge*) is important. How people relate to other parts of the natural world through their individual and collective behaviours is at least partially

mediated by the kinds of representations they have of both themselves and the natural world. As Medin and Atran said in introducing the essays in their *Folkbiology*,

[p]eople's actions on the natural world are surely conditioned in part by their ways of knowing and modeling it. What are these modes of knowledge and mental models? How are they affected by goals, theories, and intimacy of contact with the biological world? What is universal and what is not, and what are the implications of such observations for our understanding of the development of biological cognition? (Medin and Atran 1999: 1-2)

Insofar as the relationships that people have with other people, biota, and the environment are themselves partly mediated by such representations, ethnobiology needs to encompass the study of biological knowledge on either conception of ethnobiology.

The importance within ethnobiology of knowledge and its roles in guiding how people relate to the natural world poses a problem for at least some of the conceptualizing work that features within the OT framework. For example, the philosopher Mark Risjord has recently argued that the OT reconceptualization that is “most philosophically striking, and perhaps the most profound” (2020: 587) is its rejection of the category of belief. Risjord identifies this rejection as part of a broader anti-representationalist strand within the OT, which he anchors both in Holbraad and Pedersen's discussion of Viveiros de Castro's method of controlled equivocation (Holbraad and Pedersen 2017: 184-190) and in a line of thinking linking Rodney Needham's Wittgensteinian *Belief, Language, and Experience* (1972) to Tim Ingold's *Perception of the Environment* (2000). Yet it is difficult to see how this particular reconceptualisation could shed light on ethnobiology, given that field's core interest in the representations—concepts, categories, beliefs, theories—governing human relationships to the natural world.

Perhaps the most charitable way to understand this challenge to belief (and to representationalism more generally) is as inviting a re-thinking of what it means to have a belief (or a representation), in much the way that we might view this as the take-home message of the OT with respect to the concept of a gift. But what the re-thinking itself involves will require going beyond the OT as a form of ethnographic caution to engage with the developing accounts of representation—minimalist, distributed, embodied, extended—in the cognitive sciences themselves, an example of the kind of naturalistic approach we advocate that requires methodologies beyond ethnography itself.

Let us turn now to (1) and (2) more generally. Might (1) the OT paradigm provide conceptualizations that bypass or pre-empt standard ethnographic dilemmas, puzzles, or impasses, such as the dangers of falling into either ethnocentrism or relativism? We note first that these are chiefly dilemmas *for ethnographers* working within an interpretationist framing, rather than ones arising within ethnobiology itself. Insofar as ethnobiology raises specific forms of classic anthropological issues, such as whether there are cultural universals regarding living things or aspects of human knowledge of the living world that are innate, these are most likely to be meaningfully addressed by further interdisciplinary research, such as the substantive body of research on folkbiology that draws on developmental, cognitive, and cultural psychology (e.g., Atran 1990, 1998; Medin and Atran 1999; Medin et al. 2015; ojalahto et al. 2017; ojalahto mays et al. 2020).

Alternatively, could (2) the OT facilitate the integration of different aspects of ethnobiological research? While this is a goal of OT-reconceptualizing and re-imagining, it is difficult to see how the OT could facilitate the integration of various aspects of ethnobiology *through ethnography alone*. Such integration instead requires moving beyond ethnographic

refinements to engage with a suite of the other disciplinary approaches that constitute ethnobiology (see Coley et al. 1999). As with (1), epistemic integration is premised on the large and still evolving literature at the interface of naive and folkbiology that continues the interdisciplinary field inaugurated by cognitive anthropology and that draws on the experimental paradigms central to developmental and cognitive psychology. Again, integrating across the cognitive, biological, and social sciences and the various methodologies they employ finds a natural place within the tradition of sophisticated naturalism, rather than within ethnographic traditions of which the OT constitutes the most recent development.

Turning to Human Sociality and Ethnobiology

OT methodology holds more promise when we turn to (3), the task of sophisticating ethnobiological frameworks to incorporate human cognition and sociality into their ambit. We focus on two promising, relevant reconceptualizations developed within OT: the rejection of a firm separation between notions of culture and nature, and the ethnographic expansion beyond the human to include relationships between humans and other living things, exemplified by notions of nonhuman agency and multispecies kinship. Here we shall argue, however, that in order to realize their promise, these reconceptualizations again need to move beyond ethnographic methodology, drawing on the more multidisciplinary form of integration that one finds within sophisticated naturalistic thinking.

The denial of a firm separation between nature and culture can be seen within OT research emphasizing the materiality and historicity of human relationships, as well as inter-species continuities. For example, Kohn recognizes that semiosis is always embodied and entangled with material processes, developing that insight as part of his attempt to shift to an

anthropology of life that “situates all-too-human worlds within a larger series of processes and relationships that exceed the human” (2007:6). Here there is no separation between an objective, external world and the human subject actively attributing meaning to it. Meaning is instead pervasive in the biological world: where there is life, there is perception and representation. Subsequently, ethnographic understanding extends to the nonhuman world, where dogs dream and forests think. Likewise, Descola denies the separation of culture and nature in recognizing “a legacy of human phylogenesis” in his exploration of human relations, such as predation and gift, noting that these are “a reminder of the function of natural predispositions in the structuring of the ‘being together’ that is organized by culture” (2013:312). Such recognition is essential to including human sociality within ethnobiological descriptions, viewing humans within the natural world, rather than standing apart from it as meaning makers.

While these conceptual first steps of Kohn and Descola enrich ethnography, they remain merely first steps *for ethnobiology* precisely in failing to explore the sciences beyond anthropology, especially the biological and cognitive sciences, in understanding meaning-making. Accordingly, Kohn’s exploration of the materiality of meaning and representation is stymied, even accepting the detachment of meaning from materiality in his view of how we inhabit the different *Umwelts* of other kinds of beings, where “attributes and dispositions become dislodged from the bodies that produce them and ontological boundaries become blurred” (Kohn 2007:7). Similarly, Descola mentions “the function of natural predispositions” in human relations but does not explain how such predispositions affect the development of those relations.

This failure in exploring other sciences is a limitation of the nature of the OT itself as a methodological innovation within cultural anthropology. Although the OT creates distance from

symbolic anthropology's restrictive notion of human culture and extreme relativism in rejecting the nature/culture divide, it lacks the tools to explore the natural aspects of human relations. This is because the insistence on reconceptualization without comparison does not allow empirical data from the relevant sciences to play a role that goes beyond ethnographic description. As a result, for example, Kohn's descriptions fail to capture the ways the different bodies of humans, dogs and plants, for example, attribute meaning to the world: "all sentient beings, be they spirit, animal, or human, see themselves as persons. That is, their subjective worldview is identical to the way the Runa [people] see themselves" (Kohn 2007:7). If representations are pervasive in nature and individuals' bodies mediate their interactions with the world, the bodies of the entities interacting will directly influence the different (not identical) forms these representations take—highlighting the need to study them via an interdisciplinary field such as ethnobiology. Operating purely meta-anthropologically in the construction of ethnographic descriptions precludes the OT's inclusion of those empirical elements that contribute to the understanding of human relations.

Another contribution to introducing human sociality into ethnobiological frameworks is the inclusion of agential relationships among humans and nonhuman living beings in some OT accounts. For Kohn (2015), this inclusion is possible because the focus on language is abandoned and the self-referential circuit that would restrict ethnographic descriptions to humans is broken. Ethnography expands to reach all beings that represent the world through signs, whether linguistic (and symbolic) or not. In this expansion, agency is not restricted to human beings: jaguars see themselves as persons (Viveiros de Castro 1998); dogs become human (Kohn 2007), and forests think (Kohn 2013).

Extending cognition and sociality to the nonhuman living world is welcome. Humans do form agentic relationships with other living agents, relationships that expose natural aspects of our interactions with biota and environment, as much recent *biological science* has indicated (see below).

However, while the OT paradigm might well inspire such systematic scientific study (e.g., ojalehto et al. 2017; ojalehto mays et al. 2020), without shedding its meta-anthropological skin, the paradigm itself is limited in what it can offer such studies. Consequently, many questions about the possibility and depth of those interactions arise. If multi-species interactions are a reality and they are embodied, entangled in material processes, what kind of mechanisms allow their possibility? Do communities identify those processes? Are there limitations to the kind of living things that are recognized as agents? Are intraspecific relationships any different from interspecific relationships? What kinds of values are associated with different relationships? These are only a few examples of questions that can be explored by ethnobiology and the OT methodology can do little to help answer. Here naturalistic approaches informed by recent developments within the philosophy of science are likely to prove more fruitful for ethnobiological practice because of their focus on comparative studies, empirical knowledge, and careful discussion of the prospects and limitations of integrating knowledge systems. In the next section, we outline two of those approaches, one to sociality, the other to kinship.

Naturalistic Ways Forward for Ethnobiology: The Cases of Sociality and Kinship

One such naturalistic theoretical alternative is a new, general framework to study social systems (Neco in prep). This framework derives from the acknowledgment that humans are far from alone in the realm of social reality: we share this space not just with dogs and jaguars but with a truly diverse range of living entities that build intra and interspecies relationships. This

expansion of the social domain can be seen in the biological sciences, where the word “social” has been used recently to characterize collective behaviors of microorganisms (Crespi 2001), plants (Gorzalak et al. 2015), and interactions among parts and groups of organisms (Reynolds 2017). This expansion generates the need to develop a clear and useful understanding of sociality and an articulation of the actors and processes involved in social behavior. Accordingly, this framework acknowledges the organic continuum that humans are part of and grounds a useful approach to social reality and social complexity that integrates claims, evidence, and theories from the biological, cognitive, and social sciences.

The framework describes social systems in general using three basic building blocks: interactions, relationships, and social units. A social system is formed when cognitively autonomous individuals (social units) interact repeatedly and form relationships. Each one of these building blocks brings important tools from the philosophy of science that can contribute to the introduction of human sociality into ethnobiological frameworks.

First, social systems are *interactive systems*. As a consequence, they are inherently dynamic and intertwined systems. An appropriate tool to study such systems is processual ontology. For advocates of a processual ontology (Nicholson and Dupre 2018), the living world consists of processes that persist through time. Interactive systems are always changing: they are processes and their boundaries are hard to determine. When they become somewhat more stable, with the formation of relationships and an emerging structure—in other words, when they become social systems—they start to be subjects of explanation. Correspondingly, processual ontology can be an important tool to investigate and compare different assumptions between (ethno)biological knowledge systems in regards to the presence, extension, and boundaries of social systems. This is because this approach accommodates for ontological pluralism, similar to

other recent proposals in ethnobiology, such as the model of partial overlaps proposed by Ludwig and El-Hani (2020), and has tools to explain the different social systems that humans are part of in the world.

Relationships are the second building block of social systems. These are patterns of interactions that vary in quality and intensity from which emerge interesting and familiar descriptions of social relations such as those in hierarchical structures, preferential associations (as in friendships), and kinship relations. The focus on relationships is rooted in social science descriptions of human sociality, such as Ingold's (1986/2016) characterization of the constitutive sense of a social relationship. For Ingold, the person is an active social actor, a conscious subjective agent. Yet this view surely excludes most non-human entities from sociality because of their lack of subjectivity. More recently, however, in his preface to the 2016 edition of his 1986 book, Ingold affirms that there is actually no division between the objective and the subjective dimensions of existence, despite continuing to endorse a view of sociality restricted to humans.

In the framework being presented here, Ingold's new perspective is taken seriously, along with the denial of the firm separation between culture and nature from the OT paradigm. Relationships are an essential part not only of human sociality but also of social systems in general. They are not only reconceptualized, they can be studied as ontological categories that can be compared among different social systems (and knowledge systems). Also, nonhuman entities can also be social agents and form agential relationships among themselves and with humans, generating trans-genera models of sociality.

The last building block is comprised of the individuals that can interact and form agential relationships, the *social units* of social systems. Since sensing and responding to the world are

the most fundamental features necessary for social interaction, cognition is a key concept for understanding the complex relationships and collective behaviors observable in diverse social systems. Biogenic approaches to cognition (Lyon 2006) ground this view, allowing for cognitive capacities in many living things. Here human cognition ceases to be the starting point for understanding cognitive abilities; perception and representation are not restricted to humans and material and embodied aspects of social interactions are recognized. However, again, this recognition is taken one step beyond OT methodology in being informed by relevant empirical data, such as that provided in a recent two-part special journal issue on the emerging field of ‘Basal Cognition’ that discusses radical expansions of the realm of cognition, including to unicellular organisms and plants (Lyon et al. 2021).

In fact, discussions of plant cognition and sociality are great examples of how ethnobiology can benefit from naturalistic approaches. Ethnobiology historically has had a focus on the diverse interactions among communities and plants through ethnobotany, including the description of taxonomic data, medicinal uses, and the role of plants in important rituals (Balick and Cox 2021). Additionally, many communities like the Ngöbe of Panama recognize plant agency and their capacity to interact and build relationships through communication (e.g., ojalehto et al. 2017). We have empirical evidence that plants not only perceive and interact with their environment but also build social relationships. An integrationist approach to this evidence places human sociality in a broader network of social reality and advances theories of agency.

Accordingly, the interactions those communities build with plants contribute to metaphysical claims about the world. As already discussed by Ludwig and El-Hani (2020), the idea of forests as thinking agents described by Kohn (2013) is not so unintelligible for Western cultures; there is a potential in the description of those agents and their interactions with humans

for an ontological overlap. In sum, this new framework to study social systems goes further than reconceptualizing sociality, interaction, and relationship. Instead, it affords a new perspective on data about social behavior, yielding insight into the evolutionary, developmental, and ecological importance of those behaviors.

A second example draws on the concepts of kin and kinship. In the biological sciences, kin are defined biologically (e.g., genetically), and amongst the relationships whose representations ethnobiologists explore are the corresponding biological relationships amongst plants and animals. In exploring cross-cultural variation and cultural universals in the human representation of the nonhuman natural world, ethnobiologists consider this biological notion of kin. By contrast, the contemporary study of kinship within cultural anthropology has taken human kinship to involve culturally enriched notions of kin, with biological relationships either backgrounded, usurped, ignored, or rejected (Schneider 1984, Bamford 2019). To the extent to which kinship is, as Marshall Sahlins (2013) says, culture rather than biology, ethnobiology simply operates with a different notion of kin than does cultural anthropology.

The kind of naturalistic way forward here that one of us has begun to explore revolves around reinvigorating reproductive or progenerative views of kinship that function to unify discussions across the biological, cognitive, and social sciences (Wilson 2016, 2022a, 2022b). The key idea here is that it is sensitivity to an array of basic progenerative facts that grounds kinship, a sensitivity that is not uniquely human but that has been elaborated distinctively in different human cultures. Developing such a view draws on recent theorizing in the cognitive sciences. Paramount here is the rise of the extended cognition paradigm within the cognitive sciences (Wilson 2004; Menary 2010), emerging both as a critique of dominant individualistic

views of cognition and the mind and as a positive program of research adopting a “4E” view of cognition: as embodied, enactive, embedded, and extended.

This paradigm directs researchers to attend to the ways in which relatively low-level representations of simple progenerative facts—such as that females are pregnant prior to giving birth, or that the life-spans of intergenerationally-related individuals overlap in time—are coupled together with these facts to form extended cognitive systems. On the account articulated elsewhere (Wilson 2022a), the intergenerational binding that typifies kinship draws on internal resources (“like us detectors”) that operate on culturally extended resources constructed through embedded interactions between individuals and between them and kinship systems. Such extended cognitive systems are the mechanisms through which kinship relations are mediated.

Just as this progenerative view of kinship relies on developments within the cognitive sciences, so too does it draw on innovations in the philosophy of science that create the space for an integrative but non-reductive view of this important form of social relationship. More specifically, kinship so conceived is a *homeostatic property cluster* natural kind. The HPC view of natural kinds was pioneered by Richard Boyd in developing a realist view of morality (Boyd 1988) and applied to species and higher taxa (Boyd 1999), as well as other biological kinds (Wilson 2005; Wilson et al. 2007). In this view, natural kinds are defined by clusters of properties, no one or even subset of which is strictly necessary for membership in the kind, with the cluster itself stabilized and regulated by underlying mechanisms and ongoing systematic relations. HPC kinds have no traditional essence and are particularly apt for characterizing intrinsically heterogeneous kinds, such as biological and social kinds. To view kinship as a HPC kind featuring clusters of biological and social properties and relations that regulate the kind is to

adopt a view of kinship that accommodates the intrinsic cultural variation to kinship that might be thought incompatible with previous forms of progenerativism.

A progenerative view of kinship articulated through the extended cognition paradigm and HPC views of natural kinds is especially promising for the sophistication of ethnobiological frameworks to incorporate human cognition and sociality. Progeneration plays an important role across the entire living world in establishing and maintaining lasting, intergenerational relationships, and capacities to detect and respond to progenerated kin are widespread. Culture and technology both expand the conception of progeneration—from established practices of adoption and child circulation through to the latest reproductive technologies involving artificial wombs—and provide ways to limit the reach of kinship (e.g., through processes of “de-kinning”). Here culture stands as an elaboration of biology, rather than juxtaposed against it.

Likewise, for ethnobiologists contemplating multispecies kinship, the progenerative view offers several ways forward. For example, consider that the set of low-level progenerative facts on which like-us detectors operate can also include progenerative facts about the relationship between species. For example, there can be provisional, nurturing, and protective relationships between people and nonhuman animals, whether these be direct or whether they simply facilitate such relationships between other living species. Such progenerative facts thus simply specify further properties and relations that form part of kinship as a HPC kind. Alternatively, one could view multispecies kinship as a non-literal extension of progenerative kinship, one for which progenerative kinship serves as a model, rather than a superordinate kind that subsumes human, nonhuman, and multispecies kinship. On this view, multispecies kinship would share with much-discussed phenomena, such as adoption and reproductively-mediated kinship, the feature of being distinctively cultural yet progenerative.

Conclusion

The alternatives for a way forward for ethnobiology that we have briefly sketched in the previous section invite input from, and integration with, the ongoing interdisciplinary research being undertaken within ethnobiology. In this key respect, they differ from what we see the OT offering ethnobiologists. Rather than simply providing a way to reconceptualize the “ways things are”, the refinements to how such conceptual tools are best used are sensitive to new and emerging findings in the cognitive, biological, and social sciences. Whereas the separatism that informs meta-anthropologically quiescent OT methodology limits the methodology’s implications for ethnobiology, the integrationism that animates these naturalistic alternatives invites us to a feast of further interdisciplinary food for thought.

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