

# Nonhuman Value: A Survey of the Intrinsic Valuation of Natural and Artificial Nonhuman Entities

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## Abstract

To be intrinsically valuable means to be valuable for its own sake. Moral philosophy is often ethically anthropocentric, meaning that it locates intrinsic value within humans. This paper rejects ethical anthropocentrism and asks, in what ways might nonhumans be intrinsically valuable? The paper answers this question with a wide-ranging survey of theories of nonhuman intrinsic value. The survey includes both moral subjects and moral objects, and both natural and artificial nonhumans. Literatures from environmental ethics, philosophy of technology, philosophy of art, moral psychology, and related fields are reviewed, and gaps in these literatures are identified. Although the gaps are significant and much work remains to be done, the survey nonetheless demonstrates that those who reject ethical anthropocentrism have considerable resources available to develop their moral views. Given the many very high-stakes issues involving both natural and artificial nonhumans, and the sensitivity of these issues to how nonhumans are intrinsically valued, this is a vital project to pursue.

**Keywords:** Ethics · Nonhumans · Environmental ethics · Artificial intelligence · Intrinsic value · Anthropocentrism

## 1. Introduction

A famous line in moral philosophy is the following by Bentham (1789): “The question is not, Can they reason?, nor Can they talk? but, Can they suffer?” This statement articulates the view that avoidance of suffering is of intrinsic value: something that is valuable for its own sake. Taken in the surrounding context of the text, this statement is also part of an argument that humans are not the only entities that can be intrinsically valuable. Specifically, the intuition is that human suffering is not the only suffering that matters; nonhuman animal suffering matters too.

This paper surveys conceptions of the intrinsic value of nonhumans. The suffering of nonhuman animals is an important example, but it is just one of many. What all of these conceptions have in common is the rejection of ethical anthropocentrism which, for purposes of this paper, can be taken as being the view that only humans are intrinsically valuable.<sup>1</sup> Despite centuries of non-anthropocentric moral philosophy dating to at least Bentham (1789), and despite centuries of science locating humans within the animal kingdom and subject to the same laws of nature as everything else, ethical anthropocentrism remains commonplace. We believe ethical anthropocentrism is a mistake and of grave and potentially catastrophic consequence. Therefore, the paper surveys the question: In what ways might nonhumans be intrinsically valuable?

The concept of intrinsic value is a point of some debate (Rønnow-Rasmussen & Zimmerman, 2005; McShane, 2016). We take intrinsic value to be something that is of inherent moral goodness or rightness. In moral evaluation, something intrinsically valuable

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<sup>1</sup> The term “anthropocentrism” has been used in a variety of ways (Thompson, 2017).

merits consideration for its own sake; depending on the details, it may be something to advance for its own sake, or increase for its own sake, or respect for its own sake, etc. The something of intrinsic value can be a physical object, such as a plant or a computer, or something more abstract, such as happiness or diversity. Intrinsic value is contrasted with extrinsic value: something valuable for some other reason, such as instrumental value, which is valuable because it advances some other value. In ethical anthropocentrism, nonhumans can be of instrumental value to the extent that they advance the values or interests of humans; in ethical non-anthropocentrism, nonhumans may be intrinsically valuable regardless of their effect on humans.

As Table 1 summarizes, the paper classifies conceptions of nonhuman intrinsic value into two binaries: subject/object and natural/artificial.

CATEGORY	NATURAL	ARTIFICIAL
<b>2. SUBJECT-BASED MORAL THEORIES</b>		
<i>2.1. Nonhuman Subjects</i>	2.1.1. Natural subjects	2.1.2. Artificial subjects
<i>2.2. Human Subjects</i>	2.2.1. Nature intrinsically valued by humans	2.2.2. Artifacts intrinsically valued by humans
<b>3. OBJECT-BASED MORAL THEORIES</b>		
<i>3.1. Life</i>	3.1.1. Natural life	3.1.2. Artificial life
<i>3.2. Wellbeing</i>	3.2.1. Natural wellbeing	3.2.2. Artificial wellbeing
<i>3.3. Species</i>	3.3.1. Natural species	3.3.2. Artificial species
<i>3.4. Ecosystems</i>	3.4.1. Natural ecosystems	3.4.2. Artificial ecosystems
<i>3.5. Diversity</i>	3.5.1. Natural diversity	3.5.2. Artificial diversity
<i>3.6. Aesthetic Quality</i>	3.6.1. Natural aesthetic quality	3.6.2. Artificial aesthetic quality
<i>3.7. Everything</i>	-	-

**Table 1.** Classification scheme of nonhuman intrinsic value. The numbers correspond to paper sections and subsections.

The subject/object binary refers to two major types of normative ethical theory. Subject-based theories are rooted in the views held by moral subjects, which are those beings capable of holding moral views. The theories generally establish (1) which subjects' views are to be considered, (2) how the subjects' views are to be identified, and (3) how disagreements between different subjects are to be resolved (Baum, 2009, 2020). For example, democracies consider the views of adult citizens via voting, with disagreements resolved via vote-counting schemes such as first-past-the-post or ranked choice. In contrast, object-based theories call for some moral object to be intrinsically valued regardless of how much a population of subjects values the object. For example, a Benthamite may argue that suffering is bad, full stop, and that anyone who thinks otherwise is mistaken.

The distinction between subject-based and object-based moral theories is in some respects blurry. Supporters of object-based moral theories are themselves moral subjects. For example, when Bentham argued that suffering is intrinsically bad, he did so in his capacity as a moral subject. One can imagine an object-based moral theory that is correct despite no one supporting it, though in practice, a moral theory that no one supports is arguably irrelevant. Additionally, subject-based theories involve the views of moral subjects; these views can be object-based. For example, a citizen of a democracy could consider suffering to be intrinsically bad. In this way, object-based moral theories can enter into a subject-based moral theory. Finally, subject-based moral theories seek to satisfy the views of moral subjects. The moral views themselves could be taken to be a type of object. Despite these

complications, the subject/object binary provides a useful structure for organizing the paper.<sup>2</sup>

We use the terms natural/artificial (and nature/artifact) colloquially, not precisely. We take nature to consist of such things as nonhuman animals, plants, ecosystems, and planets, while artifacts consist of such things as machines, buildings, cities, artworks, and computers. These distinctions can and have been questioned. Natural science would classify all of these things—and also humans—as part of nature, because they all consist of the same natural elements and obey the same physical laws. Certain social science and humanities perspectives would classify these categories as social constructions, view them as all belonging to a network of humans and nonhumans, including hybrids of nature and society, or otherwise argue that the category distinctions should be overcome (Haraway, 1991; Latour, 1993). Furthermore, in the current era of human domination of the global environment (the “Anthropocene”), a great portion of the “natural” environment is, to a significant extent, an artifact of human activity. Therefore, our use of natural/artificial is an organizing convenience for the paper, not a theoretical claim about what ultimately classifies as natural/artificial.

One further point of clarification is on the distinction between objects and states of affairs. In this context, the term “object” means something different than in object-based moral theory. An object could be a material entity—a collection of atoms and molecules—such as a rock or a chicken or even a forest. A broader conceptualization of objects could include more abstract entities like preferences. The term “state of affairs” can be quite general, but the specific meaning of relevance here is the situation or circumstances connected to an object, such as a rock being crushed, a chicken suffering, a forest flourishing, or a preference being satisfied. Literature on intrinsic value sometimes distinguishes between intrinsically valuing an object vs. intrinsically valuing a state of affairs (Rabinowicz & Rønnow-Rasmussen 2000). This paper considers both interpretations of intrinsic value. The paper focuses on moral theories in which the object is in some way nonhuman. For example, a rock is not human; a preference can be nonhuman either by being the preference of a nonhuman or by being a preference about nonhuman(s).

To our knowledge, this paper is the first-ever survey of conceptions of both natural and artificial nonhuman intrinsic value.<sup>3</sup> Indeed, review papers seem to be rare in moral philosophy, which, in our view, is unfortunate. The paper draws primarily on literature on environmental ethics regarding nature and on the philosophies of technology and art regarding artifacts. Along the way, the paper develops some novel ethical concepts, especially in the application of environmental ethics concepts to technological domains. As a broad survey, the paper inevitably fails to do justice to many important nuances of the ideas and literatures being surveyed. The purpose of the paper is not to provide the final word on all of these topics, but instead to provide a mapping of ideas and the accompanying literature.

## **2. Subject-Based Moral Theories**

Subject-based moral theories have two layers of value. The first layer is clearly an intrinsic value. The second layer can be interpreted as either intrinsic or extrinsic.

The foundational layer of intrinsic value is the satisfaction of the moral views of the relevant subjects. In this layer, it is intrinsically valuable for the subjects’ views to be satisfied, regardless of what those views are. For example, democracy aims (more or less) to advance the moral views of citizens; preference or desire utilitarianism aims to maximize the

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<sup>2</sup> The subjectivity of phenomena such as suffering do not pose these sorts of complications because they do not involve subjective moral views: only the latter is inherent to subject-based moral theory. In other words, suffering is subjective in a different sense than the “subjective” in subject-based moral theory.

<sup>3</sup> Some prior publications, such as Curry (2011), survey conceptions of natural nonhuman intrinsic value, though in different ways than this paper.

satisfaction of some population's preferences/desires. Whoever gets the most votes wins the election, even if that person might be judged to be inferior per some object-based standard (e.g., the person is "truly evil"). Any subject-based moral theory must decide which moral subjects to include, e.g., who is allowed to vote in an election (Arrhenius, 2005). Those subjects' views provide the basis for the first layer of intrinsic value. Therefore, including nonhumans among these subjects gives them intrinsic value in a certain sense: it is not the nonhumans themselves that are intrinsically valuable, but the satisfaction of their moral views. Section 2.1 surveys ways in which nonhumans could classify as moral subjects within the scope of subject-based moral theory.

The second layer is the substance of what is intrinsically valued by the moral subjects that are included in the first layer. The second layer includes both which phenomena are intrinsically valued by the moral subjects and how much and in what ways these phenomena are intrinsically valued. The second layer is based on the idea that many—perhaps all—moral subjects intrinsically value something. That "something" that they value forms the second layer of intrinsic value. The "something" can be anything that a moral subject might intrinsically value, regardless of whether it has any sensible philosophical basis. For example, if one of the included moral subjects intrinsically values ecosystems and another intrinsically values handkerchiefs, then ecosystems and handkerchiefs both gain a certain moral status within the subject-based moral theory. Indeed, these intrinsic valuations form the basis for how subject-based moral frameworks determine what should be done. If nonhumans are intrinsically valued by the included moral subjects, then the overall framework will also value nonhumans. For example, democracies generally only include human subjects (citizens), but those humans do sometimes intrinsically value nonhumans, and those valuations sometimes inform policy. Section 2.2 surveys the moral psychology of how humans intrinsically value nonhumans and related moral issues.

For a subject-based moral framework, the second layer can be interpreted as either intrinsic or extrinsic value. It is intrinsic value if the framework is interpreted as having a two-layer form of intrinsic value, or extrinsic value if the framework is interpreted as having one layer of intrinsic value. To clarify: The moral framework intrinsically values what the moral subjects intrinsically value. Let  $X$  be the intrinsic valuation itself, meaning the phenomenon of a moral subject considering something(s) to be intrinsically valuable. Let  $Y$  be the thing(s) that the moral subject intrinsically values. As evaluated by a subject-based moral framework,  $X$  is intrinsically valuable.  $Y$  can be interpreted as being intrinsically valuable under a two-layer conception of intrinsic value. Alternatively,  $Y$  can be interpreted as being extrinsically valuable due to its connection to  $X$ . We find either interpretation to be reasonable and include Section 2.2 for its significance under the two-layer interpretation. Under the one-layer interpretation, the content of Section 2.2 would classify as extrinsic value and be outside the scope of the paper.

## **2.1 Nonhuman Subjects**

The prospect of nonhuman subjects raises the question of what it means to be a subject in a subject-based moral theory. A narrow conception of moral subjectivity could require that moral subjects have specific traits such as consciousness, the ability to engage in a sufficient standard of moral reasoning, the ability to communicate their moral views to others, and status as a member in good standing of a moral community. These are common criteria for democracies, which generally deny voting rights to nonhumans, future generations, children, and foreigners, and sometimes also felons. Some nonhumans could potentially meet these criteria. Broader conceptions of moral subjectivity, with more relaxed criteria, could enable the inclusion of a wider range of nonhumans.

### **2.1.1 Natural subjects**

Philosophers have often considered that nonhuman animals may qualify as moral subjects (DeGrazia, 1996; Clement, 2013; Monsó et al., 2018). Scientific research has found that some of the animal kingdom satisfies proposed criteria for moral subjectivity (de Waal, 1996, 2006). Nonhuman animals have been found to have preferences that resemble human preferences (Amdam & Hovland, 2011) and to exhibit behaviors considered moral, such as of fairness, empathy, trust, and reciprocity (Beckoff & Pierce, 2009; Rowlands, 2012). McShane (2007) links intrinsic valuations to certain attitudes such as love, respect, and awe, which some nonhuman animals may also experience. Evolutionary research has found aesthetic sense in a range of species (Renoult, 2016), meaning that some nonhuman animals may intrinsically value objects on aesthetic grounds. A rich scientific and philosophical literature studies the details of animal morality (Rowlands, 2012; Fitzpatrick, 2017). These and other studies of nonhuman animal morality suggest that nonhuman animals could qualify for inclusion in subject-based moral theories under certain conceptions of moral subjectivity.

It is conceivable that moral subjectivity could extend beyond the animal kingdom. Some research considers that the realm of sentient and intelligent beings may include plants (Calvo et al., 2020), or even all biological life including single-celled organisms (Reber, 2019). Under certain broader conceptions of moral subjectivity, these entities could qualify. Taylor (2011) argues that all living organisms have conation, meaning an innate inclination to continue to exist, expand, and enhance oneself. Conation is typically interpreted in terms of object-based moral theory (Section 3.1.1), but it could conceivably also be interpreted in subject-based terms, with the organism's innate inclinations being its moral views. Similarly, Rolston (1988) argues that all living organisms value their own life, form, and way of being, regardless of whether they are capable of conscious moral thought, and that also species have conation. Goff (2017) proposes that moral truth is inherent in a consciousness that permeates the universe, which suggests that the universe itself could be a moral subject, or, alternatively, all components of the universe, including sub-atomic particles.

Finally, it has been argued that, if any extraterrestrial intelligence exists, then they are likely to be significantly more intelligent than humans, on grounds that the human species is quite young when measured on astronomical time scales; in that case, the extraterrestrials may have greater capacities for moral reasoning and judgment than humans (Baum, 2010; Vakoch, 2014).

All of these natural subjects pose communication challenges for humans implementing subject-based moral theories.<sup>4</sup> Factoring nonhumans' views into a subject-based moral framework requires knowing what their views are. For example, it may be straightforward to infer that a chicken does not enjoy being confined in a cramped factory farm cage; it is more difficult to learn the chicken's views on abstract moral issues. The same challenge arises with future generations of humans; some have proposed handling that via proxy representation (Wolfe, 2008). A similar approach could be pursued with natural nonhuman subjects.

### **2.1.2 Artificial subjects**

If moral subjectivity requires the capacity for moral reasoning, then artificial entities must have some degree of intelligence to qualify as moral subjects. In other words, they must be (or contain) artificial intelligence (AI). While current AI systems struggle with moral reasoning, some AI ethics research has studied the possibility of autonomous moral agents with full rights and responsibilities (Allen et al., 2005; van Wynsberghe & Robbins, 2019), especially if those agents are sufficiently human-like (Basl & Bowen, 2020; Liao, 2020). Similarly, AI legal scholarship has considered that a sufficiently advanced AI could merit legal personhood (Calverley, 2008; Jaynes, 2020), including the right to vote (Hubbard, 2011;

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<sup>4</sup> If contact with extraterrestrial intelligence is made, then they may be able to communicate their moral views.

Szentgáli-Tóth, 2021) and serve as a trustee (Solum, 1992).

Additional conceptions of artificial moral subjectivity follow from ideas presented in Section 2.1.1. Arguments for the moral subjectivity of nonhuman animals imply that AI systems could perhaps qualify as moral subjects if they are animal-like but not human-like. Alternatively, artificial living organisms could value their own life and way of being in the way that Rolston (1988) argues natural organisms do—if artificial life can be created (Hale et al., 2019; Rabinowitch, 2019; Section 3.1.2). To our knowledge, prior literature has not explored these ideas; they would be worthy directions for future research.

If any artifacts qualify as moral subjects, this poses distinctive challenges for subject-based moral theory. What values should humans design artifacts to have? Current work on AI ethics is heavily focused on designing AI systems that are “aligned” with human values (Russell, 2019), though arguably AI systems should instead be designed to have less anthropocentric values (Owe & Baum, 2021). Should human designers get any credit or bear any responsibility for the moral successes or failures of their creations? Human responsibility for AI technologies has been studied in the context of legal liability (e.g., Zohn, 2015), but not, to our knowledge, in the context of subject-based moral theory. Additionally, artifacts (AI or otherwise) could be mass manufactured, and digital artifacts can be copied and pasted into new computer hardware. Therefore, artifacts could radically outnumber human (or other biological) populations and dominate the procedures of subject-based moral frameworks, for example by out-voting them in elections. Some research acknowledges this challenge (Hubbard, 2011; Baum, 2020), but there is a need for proposals for how to address it.

## **2.2 Human subjects**

Subject-based moral theories commonly assume human subjects. Social choice theory studies societies that are generally assumed to be human (Arrow, 1963); democratic theories generally assume human citizens (Arrhenius, 2005); preference utilitarianism, especially in welfare economics, generally only considers human preferences (Johansson-Stenman, 2018); multistakeholder governance regimes generally invite only human stakeholders to participate (Raymond & DeNardis, 2015), even when nonhumans may be affected, such as in the United Nations Sustainable Development Goals (Stibbe et al., 2020) and in the governance of AI (Cath et al., 2018). Excluding nonhumans is controversial (Section 2.1). Nonetheless, when nonhumans are excluded as moral subjects, they can still enter into subject-based moral frameworks via humans who intrinsically value nonhumans. Object-based moral theories consider how humans *should* intrinsically value nonhumans (Section 3). The remainder of the current section surveys the moral psychology of how humans *do* intrinsically value nonhumans.

### **2.2.1. Nature intrinsically valued by humans**

Environmental psychology and environmental economics are perhaps the two fields that have done the most to study human valuation of nature (Steg et al., 2013; Tietenberg & Lewis, 2018).<sup>5</sup> Much of the work is on the instrumental valuation of nature by humans, such as in the environmental economics concept of ecosystem services. Additionally, some work does not distinguish between intrinsic and extrinsic valuations, such as in studies that ask whether people care about nature and how much they would be willing to pay to protect it. This research provides limited guidance to subject-based moral theories.

Some studies have investigated human intrinsic valuation of nature. They generally find that humans do indeed place significant intrinsic value on a variety of natural nonhumans, including nonhuman animals (Johansson-Stenman, 2018), wildlife (Bruskotter et al., 2015), biodiversity (Berry et al., 2018; Bugter et al., 2018), and ecosystems (Arias-Arévalo et al.,

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<sup>5</sup> Environmental psychology also studies artificial environments such as buildings and cities.

2017). For example, Johansson-Stenman (2018) finds that only 4% of Swedish adults consider nonhuman animal welfare to have zero intrinsic value; 43.5% intrinsically value nonhuman animal welfare some but less than human welfare; 49.3% intrinsically value human and nonhuman animal welfare equally, and 3.2% intrinsically value nonhuman animal welfare more than human welfare. Additionally, two survey studies by Bruskotter et al. (2015) found that 82% and 81% of adult Ohio and U.S. residents, respectively, believe that wildlife possess intrinsic value.

Certain trends in human intrinsic valuation of nature are apparent (Amiot & Bastian, 2014). For example, concern for nonhuman animal welfare has been found to be strongest among people who are more affluent and face less social discrimination (Opatow, 1993; Paul, 2000; Brown, 2005), hold liberal political beliefs (Bowd & Bowd, 1989; Galvin & Herzog, 1992), have secular views on religion (DeLeeuw et al., 2007), have egalitarian views on human race, gender, and sexual orientation (Caviola et al., 2019), and eat vegetarian or vegan diets (Allen et al., 2000). Relative to adult humans, children have been found to consider nonhuman animals (Wilks et al., 2020) and trees (Gebhard et al., 2003) to have greater intrinsic value, and studies point to anthropocentrism being learned (Herrmann et al., 2010). Adults may tend to intrinsically value nature more if, as children, they have more exposure to nature and nonhuman animals (Longbottom & Slaughter, 2016), or if they are raised in communities that tend to intrinsically value nature, such as certain Indigenous communities (Taverna et al., 2016).

An additional point of evidence comes from public policy. Policy documents typically represent points of consensus across broad populations, especially when made by democratic governments. Some high-level policy documents intrinsically value nature. The Convention on Biodiversity—ratified by all UN member states except the US—begins its preamble with “Conscious of the intrinsic value of biological diversity”.<sup>6</sup> The constitution of Ecuador recognizes the rights of nature (Ecuador, 2008), and Bolivia recently passed a law on “the Rights of Mother Earth” (Bolivia Government, 2012). EU legislation on the use of animals in scientific research explicitly recognizes the intrinsic value of nonhuman animals (EU, 2010), and the recent Dasgupta Review on the Economics of Biodiversity recognizes the intrinsic value of all of nature, including ecosystems and biodiversity (Dasgupta, 2021). These policies suggest broad human support for the intrinsic valuation of natural nonhumans.

Finally, there is, or at least there can be, a richer and more nuanced body of evidence from culture, language, and relationships. A limitation of the bodies of evidence discussed above is that they often provide highly general accounts of human intrinsic valuation of nature. In doing so, they fail to capture the many context-specific nuances of actual valuations. For example, a human may value a pig less if she thinks of the pig as “pork”, more if she thinks of the pig as “pig”, more still if she thinks of it as “a pig”, and more still if she thinks of it as “Wilbur”, and more still if she has a personal relationship with the particular pig (Coeckelbergh & Gunkel, 2014). Similarly, humans have been observed to downplay the moral status of meat animals (Loughnan et al., 2010). Future work could further explore these topics and assess their implications for subject-based moral theory.

### **2.2.2 Artifacts intrinsically valued by humans**

A small and very recent literature has explored human intrinsic valuation of AI and robots. The literature finds mixed support for robot rights across study populations, with the most support for the right of robots to not be treated cruelly (Spence et al., 2018; Lima et al., 2020). Humans tend to intrinsically value robots more if they (the humans) demonstrate high empathic concern (Darling et al., 2015), or if the robots are perceived to have significant capacity for emotion (Nijssen et al., 2019). Children appear to intrinsically value robots more

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<sup>6</sup> <https://www.cbd.int/doc/legal/cbd-en.pdf>

than they do inanimate objects but less than they do living beings (Sommer et al., 2019). People sometimes also form relationships with robots similar to the relationships they form with nonhuman animals (Coeckelbergh, 2021), which may suggest a nuanced and context-specific intrinsic valuation. Overall, human intrinsic valuation of technology remains a poorly studied topic, making it difficult to draw conclusions for subject-based moral theory.

Another type of artifact that humans may consider intrinsically valuable is art. Research finds that humans attribute a variety of types of values to art, including cognitive, aesthetic, physical, spiritual, political, emotional, and socio-cultural, as well as both personal and public value (Walker & Scott-Melnyk, 2002; Connecticut Commission, 2004; National Endowment for the Arts, 2020; Australia Council for the Arts, 2020). However, studies to date lack detail, so it cannot readily be determined if these are intrinsic or extrinsic valuations. A point of caution is that research on art tends to use the term “intrinsic value” when referring to certain benefits that art provides to the observer, such as pleasure, expanded empathy, cognitive growth, creation of social bonds, and expression of communal meaning (Walmsley & Oliver, 2011; Gillies, 2016). In moral philosophy, however, this makes art instrumentally valuable. We are not aware of any empirical studies on the human intrinsic valuation of art which use moral philosophy’s concept of intrinsic value.

### **3. Object-Based Moral Theories**

Object-based moral theories derive moral frameworks from some conception of which objects are intrinsically valuable.<sup>7</sup> Object-based moral frameworks vary depending on which object(s) are taken to be intrinsically valuable and how the relative value of different intrinsically valuable objects is handled. Intrinsically valuable objects can be either individual in character, such as individual living beings (Section 3.1) and subjective experiences (Section 3.2), or they can be of holistic character, such as species (Section 3.3) and ecosystems (Section 3.4),<sup>8</sup> or they can be of more abstract character, such as diversity (Section 3.5), aesthetic quality (Section 3.6), and existence itself (Section 3.7). Whether intrinsic value should be individualistic or holistic is a major debate in environmental ethics (Curry, 2011). Common individualistic conceptions of intrinsic value emphasize rights, sentience, and conation. Common holistic conceptions of intrinsic value emphasize relations, interdependencies, scientific naturalism, and evolutionary history.

Object-based moral frameworks also vary according to how moral agents are expected to behave. For example, agents may be expected to act to maximize intrinsic value (as in aggregative consequentialism), or to increase but not necessarily maximize intrinsic value (as in satisficing or supererogation), or to always act in accordance with certain intrinsic values (as in deontology). This section surveys the objects that are sometimes argued to be intrinsically valuable. Object-based moral theories generally take one or more of these objects to be intrinsically valuable.

An object-based moral framework may be taken to be non-anthropocentric if it intrinsically values an object equally regardless of whether the object is human. However, even then, the framework may be considered anthropocentric if objects are intrinsically valued for human-related reasons. For example, a framework may value all wellbeing equally regardless of species, but it may also define wellbeing in a way that is rooted in human wellbeing (Coeckelbergh & Gunkel, 2014).

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<sup>7</sup> In contrast with some literature (e.g., Rabinowicz & Rønnow-Rasmussen, 2000) our use of “object” includes physical objects such as biological organisms as well as abstract phenomena such as diversity. This terminological distinction is, in our view, not significant for the normative discussion presented in this section.

<sup>8</sup> The distinction between individuals and wholes is itself a subject of debate in environmental philosophy. For example, an individual animal is also an everchanging collection of individual cells.



### 3.1 Life

The view that natural life is intrinsically valuable, or *biocentrism*, is a central idea in environmental ethics, and has also been discussed in the context of certain forms of artificial life, especially in the bioethics of synthetic biology.

#### 3.1.1 Natural life

A common argument grounded in the concept of conation is that each living organism is a goal-oriented center of life that pursues its own good—its life-goals—in its own particular way, and that this “good” can be violated or harmed. This “good”, therefore, gives all living organisms intrinsic value (Taylor, 2011; Goodpaster, 1978; Schweitzer, 1976).<sup>9</sup> Theories of conation are typically understood in object-based terms, but they conceivably could also be understood in subject-based terms (Section 2.1.1). As the argument goes, this conation gives humans the duty, in their capacity as moral subjects, to respect all living beings, and to let wild creatures carry out their existence in their wild state without human interference. In contrast, Tonn (2002) argues that the intrinsic value of Earth-life compels humans not to avoid interfering with it, but to act to ensure its ongoing survival, including by propagating it into outer space in the distant future. Taylor (2011) additionally argues that all living entities are of *equal* intrinsic value as members of the biotic community of a natural ecosystem.

Conation-based theories of intrinsic value have been criticized for being overly individualistic (Rolston, 1988; Callicott, 1989), and for being insensitive to important differences between simple and advanced lifeforms (Schmidtz, 1998). Likewise, biocentric egalitarianism—the view that all life is of equal intrinsic value—has been criticized for being insensitive to other factors, such as whether an organism is the millionth or the last member of a species (Curry, 2011, p. 76), and for placing impossible or intolerable restraints, as to live necessarily entails the exploitation of other living beings (Callicott, 1989, p. 264). Critics argue that we cannot expect anyone and everyone “to live as if literally every life-form, including oneself, has equal value to all others” (Curry, 2011, p. 105).

#### 3.1.2 Artificial life

Whereas the ethics of natural life primarily concerns protecting it or just leaving it alone, the fact that artificial life is created by humans raises some distinctive normative questions. The creation of artificial life has been criticized as “unnatural”, tampering with nature, playing God, and human hubris (De Vriend, 2006; Calvert & Tait, 2008). Furthermore, if the intrinsic value of life depends on it being in a wild state without human interference, then artificial life could have no intrinsic value (Link, 2013). However, if the intrinsic value of life derives from its conation, then its artificiality may be irrelevant (*ibid.*, p. 440).

If artificial life can be intrinsically valuable, this raises the question of which life is artificial. The distinction between natural and artificial life is blurry. Living organisms can be members of the traditional biological domains (Archaea, Bacteria, and Eukarya) yet still be artificial in the sense that they are in part the products of human activity, including breeding, genetic manipulation, or environmental change such as deforestation. More distinctive would be life in the form of digital computer systems. Researchers have successfully developed computational “lifeforms” that behave in ways comparable to natural life (Aguilar et al., 2014). Conceivably, computational lifeforms could have conation comparable to natural life and could therefore be intrinsically valuable. Whether specific computational lifeforms do have conation could be explored in future research.

### 3.2 Wellbeing

Wellbeing is that which is good for an entity. The concept of wellbeing can be interpreted

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<sup>9</sup> Including extraterrestrial life (Cockell, 2005).

broadly to include such things as the conation of life (Section 3.1). This section interprets wellbeing narrowly to refer only to the common usage of the term “wellbeing” in moral philosophy literature. One way the term is used is to refer to the satisfaction of preferences or desires; this is a part of subject-based moral theory and is discussed in Section 2. The other two ways are hedonistic and objective list. Hedonistic wellbeing refers to positive and negative experiences, such as pleasure/pain and enjoyment/suffering (Tännsjö, 1998).<sup>10</sup> Objective-list wellbeing refers to having the components (a list of objects) of a good life such as knowledge, play, aesthetic experience, friendship, happiness, pleasure, achievement, and development of abilities (Fletcher, 2015).<sup>11</sup>

### 3.2.1 Natural wellbeing

Advocates for the hedonistic conception of wellbeing have frequently called for the intrinsic valuation of the wellbeing of nonhuman animals (Bentham, 1789; Singer, 1977; Ng, 1995). This perspective motivates active movements for animal welfare, animal rights, and animal liberty. It raises the scientific question of which natural entities—animal or otherwise—are capable of positive/negative hedonic experiences, and how strong the experiences are. Some scientific consensus points to vertebrates and cephalopods having hedonic experiences (Low, 2012). Some research finds that plants such as trees possess cognitive capacities such as learning, memory, communication, cooperation, and socialization, perhaps driven by biochemical signaling (Parise et al., 2020; Calvo et al., 2020), though this does not necessarily mean that plants have hedonic experiences. Other research proposes that all biological life, including single-celled organisms, possess similar capacities and may have subjective experience (Reber, 2019). If plants and cognitively simpler animals can experience hedonic wellbeing, they may have less intense hedonic experiences than humans and other more cognitively advanced animals. Likewise, on the other end of the spectrum, it has been proposed that if sentient extraterrestrial intelligence exists, it could have more intense hedonic experiences than humans because they would likely have had more time to evolve greater cognitive capacity (Baum, 2010).

Objective-list wellbeing has also been applied to nonhuman animals and intelligent extraterrestrials (Moore, 2017). Some items commonly included on the list clearly apply to at least some nonhuman animals, such as friendship, pleasure, and play. And, as with hedonic wellbeing, extraterrestrial intelligence may have greater capacity for objective-list wellbeing than humans. Some conceptions of objective-list wellbeing may also apply to non-sentient beings. One such concept is *functioning*, which can be understood as the development of one’s abilities (Broom, 1991); this could apply equally to all living beings, given that biological organisms are defined by certain abilities to function in the world. Another related concept is *perfectionism*, meaning that objects advance wellbeing if they serve to perfect an individual’s nature (Hurka, 1993); this could likewise apply to the nature of all living entities (Rollin, 1993).

### 3.2.2 Artificial wellbeing

If machines can experience wellbeing, then they would be intrinsically valuable in a wellbeing-centered moral framework. The possibility of machine sentience—and therefore hedonistic wellbeing—is of fundamental interest in the study of general AI (Hofstadter & Dennett, 1981; Chalmers, 1997, 2006; Oizumi et al., 2014). While the science remains

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<sup>10</sup> The term “hedonistic” invites some confusion because the word “hedonism” is generally associated with happiness/pleasure, whereas here the term is also used to include suffering/pain. The term “subjective” is sometimes used instead, but it is not used here to avoid confusion with subject-based moral theory.

<sup>11</sup> Perfectionist wellbeing is sometimes, but not always, distinguished from objective-list wellbeing (compare Crisp, 2017; Moore, 2017). We include the two together.

unresolved, some moral implications have been considered. Ziesche and Yampolskiy (2019) postulate that sentient AI systems would have interest in avoiding suffering and having the freedom to choose whether they are deleted. Kelley and Atreides (2020) propose a laboratory process for the assessment and ethical treatment of AI systems that may experience emotions. Additional important questions include the circumstances in which sentient machines should be created, whether machines should be designed to optimize their hedonistic wellbeing, and, if they are created, how they should be treated. If sentient machines can be mass-produced, their welfare could drown out that of natural beings, raising questions of the relative importance of natural and machine wellbeing similar to questions about the weighting of artificial moral subjects (Section 2.1.2). A sufficiently advanced AI may have a significantly greater capacity for wellbeing than a human, raising issues similar to those posed by advanced extraterrestrial intelligence (Section 3.2.1). These considerations may be particularly pronounced within consequentialist theories; other theories may differ.

Similar issues arise for objective-list wellbeing, including how machines should be designed and treated and how to weight the value of artificial and natural beings. Objective-list wellbeing could face more profound challenges if non-sentient beings can have wellbeing. A wide range of artifacts can be understood to have things that advance their functioning or perfect their nature. Indeed, even the simplest tools are developed for their functionality. If objective-list wellbeing is restricted to living entities, then it raises questions about its application to artificial life (Section 3.1.2). On the other end of the spectrum, advanced AI could vastly outperform humans in various objective list items, such as knowledge or achievement.

### **3.3 Species**

Whereas life and wellbeing center on individuals, the remaining conceptions of intrinsic value discussed in this section center on wholes. Species is an important type of whole, it being a major focus of environmental protection, such as in the US Endangered Species Act, and in conservation biology (Soulé, 1985). There are instrumental reasons to protect endangered species: many species are beneficial to humans or to other ends. Nonetheless, arguments have been made that species are intrinsically valuable.

#### **3.3.1. Natural species**

Several arguments have been made for the intrinsic value of natural species, most explicitly on grounds of natural (ecological) history: Rolston (1988) observes that “individuals are genetically impelled to sacrifice themselves in the interests of reproducing their kind” (p. 148), and argues that species therefore possess intrinsically valuable conation, interests, and wellbeing analogous (but not equivalent) to that of individual organisms. Further, a species is a unique lifeform with a unique evolutionary history and potential future (Rolston, 1988). On the same grounds, Ehrlich and Ehrlich (1981) argue that all species have a right to exist. Rolston (1988) further sees intrinsic value as deriving from the natural process of speciation and the irreplaceability of lost species. Callicott (1989) considers the recognition of species’ intrinsic value a natural step in the expansive tendency of human morality, toward an ethic empathic to, and inclusive of, the broader ecological community (p. 151-153).

An important issue for the intrinsic value of natural species is the appropriate role of humans and other moral agents. Emphasis is often on protecting existing species, and natural speciation, and preventing their extinction, particularly as the result of human activity. However, modern biotechnology suggests the possibility of de-extinction: the resurrection of extinct species. De-extinction has been advocated on grounds of justice, as the reestablishment of lost value, as creating new value, and as a conservation tool of last resort (Sandler, 2013; Cohen, 2014). De-extinction could be criticized as being “unnatural” or

hubristic, similar to criticism of artificial life (Section 3.1.2). De-extinction may undermine the natural process of speciation emphasized by Rolston (1988). Even if species are intrinsically valuable, it may not necessarily mean that any action should be taken to increase how long they endure.

### 3.3.2 Artificial species

If artificial life is possible (Section 3.1.2), then presumably artificial species are also possible. Humans have genetically manipulated nonhumans since the dawn of agriculture. Humans can drive speciation via breeding, genetic engineering, de-extinction, introduction of species to new environments, and potentially by making computer-based artificial life. Indeed, human-driven speciation is already substantial (Bull & Maron, 2016). Modern biology has implicated human activity in the creation of at least six crop species (Thomas, 2015), a mosquito species (Byrne & Nichols, 1999), and a damselfly species (Feindt et al., 2014).

Creation of artificial species raise some similar issues as artificial life (Section 3.1.2) and de-extinction of natural species (Section 3.3.1). Artificial species may lack the distinctive evolutionary histories of natural species; it may even be possible to mass produce new species. Proponents look forward to a “beautiful destiny” in the form of “a new Cambrian”, with humans as “initiators of this new genesis” (Naam, 2005, p. 232). Critics argue that creating new species is unnatural, hubristic, “playing God”, and unjustly devalues natural species (Rifkin, 1985; Comstock, 2000; Plumwood, 2002). Others posit that the motives and intentions behind the species’ creation are of primary moral significance (Sandler, 2013).

## 3.4 Ecosystems

Ecosystems are interconnected communities of biotic and abiotic entities. Ecosystems make it possible for life to exist and to flourish. Ecosystems are a primary focus of environmental protection, including *conservation*, in which natural environments are generally protected *for* human use, because of their instrumental value, for example by preventing the depletion of important natural resources, and *preservation*, in which natural environments are protected *from* human use, because of their intrinsic value, for example by designating certain land areas as off limits to human activity.<sup>12</sup> Ecosystem protection focuses on natural ecosystems, though the ideas can be applied to certain conceptions of artificial ecosystems. The position that ecosystems are intrinsically valuable is typically referred to as *ecocentrism*.

### 3.4.1 Natural Ecosystems

Ecocentrism is rooted in holism and the science of ecology. As individual living beings cannot survive without ecosystems, it is argued that ecosystems are the proper scale of intrinsic valuation (Leopold, 1949; Rolston, 1988; Næss, 1989; Sylvan & Bennett, 1994). The ecosystem can be local (e.g., Sherwood Forest), regional (e.g., the Amazon rainforest), or even global (as in the Gaia hypothesis; Lovelock, 1979; Latour, 2017). Ecocentrism further emphasizes that the interconnectivity and symbiosis between ecosystems’ components are central to ecosystems’ intrinsic value, so that the whole is worth more than just the sum of its parts (Rolston, 1988; Næss, 1989; Mathews, 1991).

This ecocentric holism has been criticized for inadequately accounting for the good of individuals (Taylor, 2011, p. 118), and even derided as “environmental fascism” on this ground (Regan, 1983, p. 362). Defenders argue that ecocentrism is not necessarily authoritarian (Curry, 2011, p. 96), and that it does not imply an either/or choice between individuals and wholes (Vetlesen, 2015, p. 102). Similarly, ecocentric holism is sometimes criticized for being anti-human, noting that human activity is often harmful to ecosystems (Curry, 2011, pp. 57-8). Ecocentrists respond that this fails to comprehend the central

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<sup>12</sup> For nuance on the conservation/preservation distinction, see Norton (1986).

messages that humans are part of ecosystems and that ecocentrism necessarily advances humans' interests: the very project is to reconcile human culture and worldview with the reality of the ecological world, so that all can flourish (Morton, 2007; Curry, 2011; Rolston, 2012; Latour, 2017).

Though abiotic natural systems are not ecosystems per se, some have argued that they can also be intrinsically valuable. Rolston (1986, p. 156) argues this on grounds that abiotic systems can be dynamic (e.g., mountains, rivers, volcanoes, geysers) and therefore constantly in progress, with their own particular story and creativity. Milligan (2015) argues against "life bias", arguing that abiotic systems, particularly extraterrestrial ones, can be remarkable in their own right in morally significant ways. Likewise, Owe (2019, p. 52) argues that while other parts of the universe may be irrelevant to *us*, being irrelevant to one specific species in one specific spatiotemporal location does not necessarily imply that other parts of the universe have no value.

### **3.4.2 Artificial Ecosystems**

If there can be artificial life (Section 3.1.2), then such life presumably requires some sort of ecosystem. Artificial members of traditional biological domains require the same sorts of inputs and conditions as their natural counterparts. Even the GloFish, a genetically engineered fish that commonly resides as a pet in household fish tanks, still requires an interconnected system of food, water, and so on. For computer-based artificial life, the accompanying "ecosystem" could potentially include software elements that the living beings interact with and hardware and energy inputs needed to run the software—though, to our knowledge, this has not been explored in prior literature.

Should artificial ecosystems be intrinsically valued? Ecocentric philosophy typically emphasizes ecosystems unaltered by humans, including laments about "the end of nature" (McKibben, 1989). Such a perspective may not intrinsically value artificial ecosystems. Other perspectives differ, including those that intrinsically value natural and artificial members of ecosystems (Torrance, 2011) and recent Indigenous techno-animism philosophy (Abdilla, 2018; Lewis, 2020). If ecosystems are intrinsically valued for their inherent qualities—for example for their webs of relationships, support for life, and dynamic creativity—and not strictly in terms of human interference, then natural and artificial ecosystems may be intrinsically valued in similar ways.

## **3.5 Diversity**

Diversity is an attribute of groups involving a variety in the members of the group. Diversity is generally said to increase when a group has more different types of members (e.g., a snail and a bat instead of two snails), when the types are more different from each other (e.g., a snail and a bat instead of two types of snail), and perhaps also when there is more balance across the types (e.g., two snails and two bats instead of three snails and one bat) (Stirling, 2007). Conceptions of diversity can also account for interconnections, such as symbiotic relations between members of an ecosystem (Næss, 1989).

### **3.5.1 Natural Diversity**

Natural diversity includes biological and ecological diversity. Much of the popular and policy attention going to natural diversity focuses specifically on biodiversity, meaning diversity of life. Likewise, some arguments for the intrinsic value of biodiversity have been made (Soulé, 1985; Ghilarov, 2000), though philosophical analyses have found these arguments to be weak (Maier, 2012; McShane, 2016). Additionally, environmental ethicists have often focused on natural diversity more generally, especially within a broader ecocentric moral philosophy. Næss (1989) and Mathews (1991) intrinsically value natural diversity as part of the

realization of nature's potential, which is a product of a global impulse toward self-realization. Miller (1982, p. 107) intrinsically values natural diversity as part of a theory of "value as richness", in which "other things being equal, more, fuller, greater, or richer potential or realization of potential is what we should identify as better".<sup>13</sup> Tonn (2002) argues that humankind has an obligation of biodiversity stewardship with the goal of "preserving indefinitely the journey of Earth-life", including by eventually propagating it into outer space in the distant future, on grounds that the continued evolutionary story of Earth-life has the greatest intrinsic value. Additionally, whereas biocentric egalitarianism (Section 3.1.1) values all living organisms equally, the intrinsic valuation of natural diversity can give priority to, for example, rare organisms (Mathews, 1991).

One can imagine arguments against the intrinsic value of natural diversity. For comparison, within the human realm, Sarkar (2010) argues that wealth diversity would be bad: it would be better for there to be two rich people than one rich person and one poor person. Analogously, it might be better for nonhuman wellbeing, ecosystem functioning, etc. to be uniformly good than diverse. For example, two happy ants may be better than one happy ant and one miserable ant (if ants can be happy). Or perhaps the argument from nature's self-realization implies that the diversity of ant wellbeing would be better, assuming it is a product of natural processes.

### 3.5.2 Artificial Diversity

The intrinsic value of artifact diversity has received virtually no prior attention. The best example we are aware of is Boldt (2013), considering a moral obligation to create synthetic lifeforms to increase intrinsically valuable biodiversity, but not finding direct theoretical support for such an obligation. Another example is Tonn (2002), arguing for genetic engineering and otherwise altering species to ensure that biodiverse Earth-life survives into the astronomically distant future. This view would avoid altering natural life but accepts it in certain circumstances. It is only in a limited sense an argument for creating diverse artifacts. We are not aware of any arguments that there would be intrinsic value to creating a diversity of AIs, or works of art, or other sorts of artifacts. There clearly is instrumental value in having a diversity of artifacts—for example, a range of different tools is needed to complete complex tasks—but the intrinsic value of artifact diversity has been neglected.

Some existing arguments for the intrinsic value of other types of diversity could also apply to artificial diversity. The Miller (1982) concept of value as richness could conceivably include a rich diversity of artifacts. The Næss (1989) and Mathews (1991) concept of diversity in nature's self-realization could conceivably extend to the diversity of certain artificial processes, such as the diversity of candidate solutions to optimization problems generated by genetic algorithms. Furthermore, arguments for the intrinsic value of diversity within human populations (e.g., diversity of race or culture; Levy, 2002; Sarkar, 2010) could conceivably apply to certain artificial populations, such as populations of sufficiently advanced AIs. These sorts of possibilities would benefit from dedicated research attention.

### 3.6 Aesthetic Quality

Aesthetic quality includes concepts such as beauty and tastefulness. Aesthetic value is often taken to be separate from moral value, in which case it falls outside the scope of this paper. However, aesthetic value is also sometimes taken to be a form of intrinsic moral value (Brady, 2003; O'Neill, 2003; Stecker, 2006; Parsons, 2008). Aesthetics is often seen as being subjective ("in the eye of the beholder"), suggesting a link with subject-based moral theories, in which case issues of nonhumans discussed in Section 2 may apply. There are also object-

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<sup>13</sup> Richness could be treated as a stand-alone conception of intrinsic value in its own right, but for the sake of brevity, we only discuss it here.

based aesthetic theories, such as the idea that something can be inherently beautiful even if nobody recognizes it as such (Moore, 1965; Renoult, 2016), or the idea that moral subjects can consider something to be intrinsically valuable for aesthetic reasons (Carlson, 2000; Parsons, 2008). The latter idea should be distinguished from the instrumental value of something that causes some sort of aesthetic enjoyment or appreciation in someone who observes it. Finally, some conceptions of aesthetic intrinsic value reject the subject/object and natural/artificial distinctions (Izutsu & Izutsu, 1981).

### 3.6.1 Natural Aesthetic Quality

The field of environmental aesthetics has developed numerous conceptions of natural intrinsic value. These include (1) aesthetic impressions of an observer at the moment of observation; (2) aesthetic quality of individual natural objects deriving from intrinsic attributes such as color, shape, and symmetry; and (3) landscape, as in the idea of scenic beauty (Stecker, 2010; Brady & Prior, 2020). One view holds that scientific knowledge is essential for aesthetic appreciation of nature, similar to history and art criticism for the aesthetic appreciation of art (Carlson, 2000). Another holds that the aesthetic qualities of nature should be appreciated through immersion in the natural setting so as to minimize the cognitive and sensory distance between observer and nature (Berleant, 1992). A third view holds that nature has aesthetic quality independent of any observer (Rolston, 1988).

While aesthetic appreciation of nature often involves environments that include life, theories of natural aesthetic quality emphasize abiotic nature to a greater degree than other conceptions of natural intrinsic value. Abiotic entities or landscapes can be appreciated aesthetically for the harmonious composition of elements or the scenic grandeur of, for example, mountains (Parsons, 2008) or even extraterrestrial environments (Milligan, 2015), the latter of which may offer particularly distinctive aesthetic experiences to Earth-based observers (Cockell & Horneck, 2004).

### 3.6.2 Artificial Aesthetic Quality

The intrinsic value of artificial aesthetic quality is perhaps most commonly discussed regarding art. The intrinsic value of art is heavily debated (Stecker, 2010; Kreitman, 2011; Stang, 2012). While not all arguments for the intrinsic value of art are rooted in aesthetic quality, two major arguments are. The first is that the experience of appreciation of an artwork derives from aesthetic qualities of the artwork, and that the artwork is intrinsic to the experience and therefore is intrinsically valuable (Budd, 1995). The second is that specific properties of artworks, such as color, form, and symmetry, have aesthetic qualities that are observer-independent and hence objective (Eaton, 2001) or are determined by the knowledge and attitudes of the experiencing observer (Goldman, 1995).

In addition to art, a wide range of other artifacts have been seen as having aesthetic quality. These include a variety of artificial places, including cities (Haapala, 1998), industrial sites (Kover, 2014), shopping centers (Brottman, 2007), and cultural places (Saito, 1985; Nomikos, 2018), as well as technological artifacts, including robots (Lupetti, 2017) and AI (Manovich, 2018).<sup>14</sup> Finally, recent work has considered art created by AI (Coeckelbergh, 2017). In short, if aesthetic quality is intrinsically valuable, then a wide range of artifacts may be as well.

## 3.7 Everything

Finally, a small literature suggests that there may be intrinsic value in more or less everything. We propose the term *omnism* for this category of moral theory. *Omnism* intentionally omits the “-centrism” common to other intrinsic value terminology. If

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<sup>14</sup> For general discussion, see Schummer et al. (2009).

everything is intrinsically valuable, then there is no center, no basis for saying “value is centered on X and everything else is valuable in relation to X”. The lack of center is one distinctive aspect of omnism. Another is that it applies equally to nature and artifacts (and humans): all are part of everything. Therefore, this section is presented without subsections.

Several omnist theories have been discussed. First, Davison (2012) argues that everything that exists, both material (e.g., an organism) and abstract (e.g., the number 7), may be intrinsically valuable, due to the lack of a clear demarcation between what is and is not intrinsically valuable and because it is better for something to exist than to not exist. Second and similarly, Floridi (2002) argues there may be no good reason to deny the intrinsic value of anything that holds some information content, and further that everything holds some information content. Third, Lupisella (2016) proposes that the universe itself could be intrinsically valuable because it is evolutionary, productive, creative, and self-realizing. Fourth, Mathews (1991) considers that all matter throughout the universe may be fundamentally interconnected and therefore argues on ecocentric grounds that all matter is intrinsically valuable.

The implications of omnism are ambiguous. If everything in the universe is equally intrinsically valuable, then it may be tantamount to nihilism, with no basis for favoring any one action or state of the world over another (Owe, 2019, p. 90). The omnism literature does not embrace the nihilism of universal equality. Indeed, Floridi (2002) advocates for expanding and protecting the information content of the universe, Davison (2012) posits that objects of greater complexity are of greater intrinsic value, and Mathews (1991) intrinsically values objects according to their complexity and interconnectedness. The rejection of universal equality is encouraging, but further research is needed to clarify the exact implications of omnistic moral theories.

#### **4. Conclusion**

This paper began by asking, in what ways may nonhumans be intrinsically valuable? As the survey presented in the paper documents, there are many conceptions of the intrinsic value of nonhumans. Some of these locate intrinsic value within nonhuman moral subjects or within nonhumans that human subjects intrinsically value. Others locate intrinsic value within nonhuman objects. These moral theories have been detailed in a wide body of existing work in environmental ethics, environmental psychology, the philosophy of technology, the philosophy of art, and a broad mix of related fields. Those who reject ethical anthropocentrism—and we believe it should be rejected—have considerable resources to draw upon.

That said, the existing literature does have significant gaps. Some research has examined the science and philosophy of the sorts of traits that could qualify nonhumans as moral subjects, but more is needed to unpack the implications for subject-based moral theory, such as on the challenge of communication with nonhuman animals or the handling of mass production of AI moral subjects. Some research has studied the moral psychology of human intrinsic valuation of nonhumans, but more is needed to inform subject-based moral theory, especially for the intrinsic valuation of artificial nonhumans and the context-specific nuances of particular human-nonhuman relationships. Within object-based moral theory, several object types have been well studied for natural nonhumans but not for artifacts; these include life, wellbeing, species, ecosystems, and diversity. Diversity and aesthetic quality have both been studied extensively, especially within environmental ethics and philosophy of art, respectively, but the intrinsic value of diversity and aesthetic quality both remain inadequately explored. Omnism has received especially little attention; this is a very distinctive topic with potentially profound implications. Finally, there would be value in work on intrinsic value that transcends the human/nonhuman and nature/artifact binaries, which are



organizing conveniences for this paper but not truly distinct categories. This work could include engagement with Indigenous and other non-Western philosophies, which we have unfortunately been unable to review as thoroughly in this paper.

Despite the breadth of this paper, it has not covered every possible theory of the intrinsic value of nonhumans. There is a virtually unlimited scope of object types that could conceivably be considered. Intelligence is an example of something that is sometimes proposed but was not included in the paper. Being the “subject-of-a-life” (Regan 1983) is another example. Other theories do not fit neatly within the subject-based/object-based categorization. Virtue ethics is an important example. Virtues are attributes of moral subjects, but normative arguments about which virtues are valuable make virtue ethics different from the subject-based moral theory of Section 2. Virtue ethics intrinsically values virtues, but the literature focuses overwhelmingly on the value of human virtues and some even arguing that nonhumans cannot have virtues (e.g., Rolston, 2005). But is that correct? If nothing else, the possibility of extraterrestrial intelligence and advanced AI suggests that at least some nonhumans could be virtuous. Another example is relational approaches to moral standing, which locates moral value in specific relationships between humans and the “others” they relate to, including both natural and artificial nonhumans (Coeckelbergh, 2012, 2021; Coeckelbergh & Gunkel, 2014).<sup>15</sup> Existing research on relational approaches to moral standing can be interpreted as emphasizing the extrinsic value of nonhumans. New research could explore what relationships could mean for the intrinsic value of nonhumans and could ask what a relational approach implies for the distinction between intrinsic and extrinsic. There is also a need for research into the relationships among nonhuman moral subjects.

In closing, it is worth stressing the high stakes associated with how nonhumans are valued. Factory farms, deforestation, global warming, the “Anthropocene”, space exploration, the ongoing and potential future rise of more intelligent and more autonomous AI and robotics, the creation of hybrid natural/artificial entities, and the great world of art, are all among the very important issues in which the intrinsic valuation of nonhumans can play a significant or even dominant role. These issues also affect humans and can be important even if nonhumans are not intrinsically valued. However, whether nonhumans are intrinsically valued may be the difference between extremely good or catastrophically bad outcomes for nonhumans. It is similarly important to intrinsically value the right nonhumans and in the right ways, since not all nonhumans should necessarily be intrinsically valued.

For these reasons, the study of the intrinsic value of nonhumans is much more than a very interesting intellectual project, though it is that, too. It is a vital endeavor to pursue for the good of the world, and indeed possibly also for the good of the universe.

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<sup>15</sup> A separate line of research proposes “relational value” as a type of moral value, supplementary to or in replacement of intrinsic and instrumental value (Chan et al. 2016; Pascual et al. 2018).

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