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ANIMAL COGNITION AND MORAL STATUS

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Introduction

As employed in the animal ethics literature, *sentience* refers to those conscious experiences with an attractive or aversive quality. These capacities include subjective sensations such as pain and pleasure, suffering, anxiety, and fear (Birch 2017). Sentience plays a central role in many theories of animal ethics. *Animal cognition* involves the study of animal minds, specifically, those mental capacities and processes that generate various flexible behaviors in animals. Animal cognition research investigates the cognitive mechanisms involved in abilities like learning, memory, perception, language, mindreading, and metacognition (Andrews 2020). Precisely what it means to say that animals have minds means different things to different people. Philosophers and researchers working on animal cognition include under that heading a variety of properties and capacities, from sentience to rationality, memory, and language. Loosely speaking, *moral status* is a measure of the moral value of a being (or entity) based on its welfare interests. These interests can used to determine both moral status and relative moral worth or ranking. For example, we can agree that human children have moral status, but what about kittens? Or rats? Or lizards? Or insects? Or trees? Or pebbles along a beach? Measuring the moral value of entities and deciding which ones have moral status and to what degree, occupy a substantial chunk of the work of applied ethicists.

Though few of us have taken the time to reflect upon the connection between sentience, cognition, and moral status, many people believe something like this: that the more intelligent a being is, the greater their moral status. Yet as common as such a belief may be, the justifications for the connection between the sentient and cognitive properties of animals and their moral status are often based on vague intuitions rather than well thought-out ethical principles. When pressed to say precisely which capacities connect to moral status, to what degree they connect to moral status, how they connect to moral status, and why those (but not other) capacities connect to moral status, most of us can do little more than scratch our heads.

This essay will explicate two philosophical views on the connection between sentience, cognition, and moral status. To that end, I will (a) clarify the notion of moral status, (b) explicate two of the prominent philosophical views arguing for increased moral status for nonhuman animals, highlighting the centrality of physiological and cognitive capacities to each theory, (c) discuss recent empirical findings regarding animal sentience and cognition, and (d) briefly look at one connection between animal sentience, cognition, moral status, and environmental ethics.

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Moral Status

Key to understanding the concept of moral status is the notion of *interests*. Unlike rocks and teddy bears, human and nonhuman animals are experiential subjects, that is, there's a subjective "what it's like" *from the inside* to be a human or nonhuman animal. We animals are the kinds of things whose experiences matter to us, beings whose lives can go better or worse, *for us*. It is in this sense that humans and animals have interests, for example, interests in our own well-being. Having interests means two things. First, having interests means that a being can be wronged morally, for example, if its interests are unjustifiably harmed or violated and its well-being compromised. Second, interests create duties and obligations upon us agents to respect the interests of others.

To say that an entity has *moral status* is to say that its interests matter morally for its own sake, and not merely for the sake of the interests of others. This affords the being at least some of the protections afforded by moral norms (Beauchamp and Childress 2019). In the case of nonhuman animals, we can say that an animal has moral status when violating the animal's interests directly harms and wrongs the animal herself, not merely her "owner" or those who love or care about her and her interests.

Moral status need not be an all-or-nothing game. It makes sense to say that one entity has greater moral status than another; that, for example, a normal adult chimpanzee has greater moral status than a flea. Used in this sense, "moral status" specifies not only which entities belong to the moral community, but also the degree to which their interests count. These two senses of moral status reflect a distinction between what some philosophers call moral considerability and moral significance (Goodpaster 1978). On this view, an entity is said to be *morally considerable* just in case it is a bona fide member of the moral community in that it can be wronged in a morally relevant way. In this sense, the fact that a being is morally considerable means that we have moral obligations to that being. Saying that an entity is morally considerable is like saying that it's "in the club" of things whose interests we must consider. Other philosophers cut this distinction even more finely, distinguishing between which entities to consider morally, what considerations are relevant about them, and how much weight must we give to each of these considerations (Hale 2011).

Once a being is morally considerable, we may then need to adjudicate questions of relative moral value between beings. That is a question of moral significance. *Moral significance* speaks to the moral value of the members once admitted to the club (Gruen 2014). Just because two entities are "in the club", it doesn't follow that they are of equal moral value. Surely, all living human persons, chimpanzees, dogs, cats, deer, wolves, and birds are in the club. But does that imply that—all things being equal—a human person and a finch have equal moral worth? Or whether 500 gorillas or 5,000 wolves have less moral value than one human being? Though these are tricky questions, we can give a somewhat clear formulation of the concept of moral status as follows: an entity X has moral status just in case (a) moral agents have moral obligations to X, (b) X has basic welfare interests, and (c) the moral obligations owed to X are based on X's interests (DeGrazia 2008).

Humans, Persons, Agents, and Patients

When discussing moral status, it's important to distinguish the terms "human" from "person", and "moral agent" from "moral patient". Though colloquially the terms "human" and "person" are synonymous, philosophers make an important distinction between the two. The term *human* identifies a biologically descriptive feature of a being, namely, her membership in the species *Homo sapiens*. By contrast, *person* is often used to describe a normative feature of a being that confers moral status. Persons who possess the ability to make moral distinctions, deliberate, and freely choose (or fail to choose) to act morally are *moral agents*. Moral agents are subject to moral obligations and may be held morally accountable for their actions. In other words, moral agents may be held morally praiseworthy or blameworthy for their actions. However, those who lack the ability to morally deliberate and act on the results of those deliberations are termed *moral patients*. Moral patients lack the cognitive abilities required to do things like contemplate moral principles or deliberate about which actions are morally right or wrong and so cannot be held blameworthy for their actions, even in cases where a moral patient causes significant harm to another (Regan 1983).

Philosophically speaking, though neurotypical adult human beings are usually seen as paradigm persons, the question of whether infants, young children, severely cognitively other-abled adults, and permanently comatose humans are considered persons remains philosophically controversial (Andrews et al 2018). Legally, at the time of this writing, the U.S. courts recognize all and only human beings (and some corporations) as persons, whereas nonhuman animals are considered "things". However, what is uncontroversial is that those neuroatypical humans just described are not considered moral agents, but are considered paradigm cases of what are termed human *moral patients*. All but a small minority of philosophers hold that no animals are moral agents (Johnson 1983, Rowlands 2015). Most philosophers agree that nonhuman animals are never robust moral agents, but only moral patients. Given a wolf's or deer's cognitive capacities, it would be nonsensical to hold a wolf morally responsible for killing cattle or a deer for intensely over-foraging a particular habitat. Though moral patients such as human children and nonhuman animals cannot bear duties and responsibilities and thus not be held morally accountable for their actions, it does not then follow that moral patients lack interests or rights that moral agents are obligated to respect and consider. If anything, moral abominations like institutionalized eugenics programs suggest that it is those most vulnerable populations that demand moral vigilance on the part of moral agents.

Though there are quite a number of theories of moral status (Beauchamp and Childress 2019, Tannenbaum and Jaworska 2018), in the following section, I summarize just three.

The Anthropocentric Account

The *anthropocentric account* of moral status holds that merely being a member of the species *Homo sapiens* confers maximal moral status. The anthropocentric account claims that all and only human beings are bona fide members of the moral community. On the anthropocentric account, human beings comprise both a biological natural kind and a unique moral kind.

One virtue of the anthropocentric account is that it secures full moral status for all humans, including infants, the mildly and severely cognitively other-abled, and permanently comatose humans. While there are numerous and extensive problems with the anthropocentric account (Andrews et al 2018), I will address just a few.

According to the anthropocentric account, there exist some set of distinctively human properties that confer full moral status on all and only human beings. In order to justify this claim, the account must (a) identify which properties are *distinctively* human, (b) demonstrate that these properties are possessed universally by *all* humans, (c) provide an account of why *those* properties (but not others) are the morally relevant ones, and (d) explain why those properties are both necessary and sufficient to secure maximum moral status for all and only human beings. Here is where the problems begin.

There are a number of ways to read the anthropocentric account. One, the *species membership* version of the anthropocentric account clearly (though trivially) does indeed identify a property of being human that is both distinctively human and possessed universally by all humans, namely, that of *being human*. Yet, when pushed to justify why a contingent, arbitrary biological property like species membership is morally relevant, the anthropocentric account begs the question since the very question at the heart of the anthropocentric account is this: What is it about membership in the species *Homo sapiens* alone that uniquely confers full moral status? We all agree that morally relevant properties should not be arbitrary; skin or eye color are arbitrary and thus not valid characteristics that should determine one's moral status. So why is species membership not an arbitrary property? To state that species membership alone (in this case membership in the species *Homo sapiens*) is morally relevant tells us nothing whatsoever about *why* being human is morally relevant.

Being a human biological organism alone cannot be *necessary* for moral status. Surely, Spock's Vulcan father, Sarek, from the *Star Trek* series counts morally. Yet, on the species membership version of the anthropocentric account, he does not. Something has gone wrong. Contrary to the species membership version of the anthropocentric account, being a human biological organism alone cannot be necessary for moral status. Whether being a human biological organism is a sufficient condition for moral status is another story, yet even there the advocate of the anthropocentric account must answer the question, what makes membership in the species *Homo sapiens* alone sufficient for full moral status? Not a simple question to answer. Further, critics of the anthropocentric account charge that this kind of human exceptionalism reflects a deeper bias, that of *speciesism*, a bias in favor of the interests of humans over nonhumans based primarily on species membership that posits the moral superiority of all humans over all nonhumans.

In response, an advocate of the anthropocentric account may concede that it is not merely membership in the species *Homo sapiens*, but those distinctively human species-neurotypical cognitive abilities that do the moral work. These properties include things like intelligence, language, self-awareness, and rationality. This variety of the anthropocentric account—the *cognitive properties* version—claims that it is not merely membership in the species *Homo sapiens* that secures maximal moral status for all humans, but rather those uniquely human capacities that make human beings—and *only* human beings—*moral* beings.

Nevertheless, problems arise for even this modified interpretation of the anthropocentric account. Recall that in order for the anthropocentric account to secure full moral status for *all* humans, it must also demonstrate that the alleged distinctively human properties are possessed universally by all humans. However, if the moral divide between human and nonhuman animals rests on the possession of some set of uniquely human cognitive abilities possessed by all and only humans, then there will always exist some humans who lack these characteristics. That is, for any human cognitive capacity we select, there will always exist some human being who lacks this capacity, and some nonhuman animal who will possess this capacity, to varying degrees. The challenge that neuroatypical severely cognitively other-abled humans pose to the cognitive properties version of the anthropocentric account is significant. Simply put, the challenge for the speciesist is to account for the moral status of those human beings whose supposed morally relevant capacities fall short of whatever is held to justify the attribution of higher moral status to paradigm human beings than to (most or all) nonhuman animals (DeGrazia 2014).

Further, disability rights advocates rightly push back against both the cognitive properties version of the anthropocentric account and animal ethicists' use of neuroatypical severely cognitively other-abled humans to counter the view. Daniel Salomon argues that cases like these trade on a kind of neurotypicalism, the view that characteristics or properties that are species-typical are therefore cognitively normative. Salomon argues that neurotypicalism "privileges a form of cognitive processing characteristic of peoples who have a neurotypical (e.g. non-autistic) brain structure, while at least implicitly finding other forms of cognitive processing to be inferior, such as those natural to autists and nonhuman animals" (Salomon 2010:47). Sunaura Taylor argues persuasively that this kind of ableism is "intimately entangled with speciesism, and is deeply relevant to thinking through the ways nonhuman animals are judged, categorized, and exploited" (2017:58). That the most common and ubiquitous argument used to support the continued domination and oppression of nonhuman animals is that they lack any number of psycho-physical or cognitive processes that are species-typical to human beings "shows the extent to which speciesism uses ableist logics to function" (Taylor 2017:58). There exists an ugly and intimate connection between neurotypicalism, human supremacy, speciesism, and systemic animal oppression. Ableism (and thus, neurotypicalism) helps "construct the systems that render the lives and experiences of both nonhuman animals and disabled humans as less valuable and as discardable, which leads to a variety of oppressions that manifest differently" (Taylor 2017:58).

A common response to the challenge that neuroatypical severely cognitively other-abled humans pose to the cognitive properties version of the anthropocentric account is to modify the account to what I'll call the *species typicalism* version of the account (McMahan 2002). On the species typicalism version of the anthropocentric account, though some humans lack those cognitive abilities required for entrance into the moral club, they remain members of a species (*Homo sapiens*) whose *typical* members possess the requisite capacities, something that cannot be said for any member of a nonhuman animal species. Though a permanently and severely congenitally cognitively other-abled infant may forever lack the cognitive abilities required by the anthropocentric account, because they are a member of a species whose typical member possesses these abilities, they are then afforded full membership in the moral community.

The problem, however, is providing a non-question-begging account of how such "honorary" membership works. That is, in virtue of precisely what does the neuroatypical severely cognitively other-abled infant gain full membership into the moral community? Their honorary membership can't be due to their biological species membership. Were humans able someday through gene therapy to produce a chimpanzee who developed cognitive capacities comparable to those of a human person, surely this "Superchimp" would be entitled to the same moral status due human persons despite their being an atypical member of a species who typical members do not possess the kinds of cognitive capacities she now does (McMahan 2002). Conferring moral status on nonparadigm members of a species based on the capacities of paradigm members is unwarranted.

These and other challenges (Gruen 2011, McMahan 2002) have led philosophers to seek alternative grounds of moral status, grounds that reject speciesism and more robustly expand the bounds of moral status across the species boundary. Though a number of philosophers have offered further animal cognition-heavy accounts, including Rollin (1981), Sapontzis (1987), Rachels (1990), DeGrazia (1996), McMahan (2002), and Nussbaum (2006), in the next section, I explicate the two most influential systematic ethical theories built upon a set of core philosophical principles aimed at expanding the moral status of nonhuman animals and overthrowing the anthropocentric account.

The Sentientist Account

In contrast to the anthropocentric account, a number of philosophers have formulated non-speciesist, egalitarian accounts of moral status intended to expand the moral sphere to include nonhuman animals as robust members of the moral community. Easily, the most influential theory advocating increased moral status for nonhuman animals is that of Peter Singer. Singer's *Animal Liberation* (1975) remains the *locus classicus* of the contemporary animal liberation movement. Singer provides what can be described as a *sentientist account* of moral status. According to the sentientist account, the capacity to experience pain or pleasure is both necessary and sufficient for having morally considerable interests.

The central principle driving Singer's view is what he calls the *principle of equal consideration of interests* which requires that we give equal weight in our moral deliberations to the like interests of all those affected by our actions. However, since the possession of sentience is what grounds interests, and since humans are not the only sentient beings, to be consistent, we must extend the principle of equal consideration of interests to *all* sentient creatures. On Singer's utilitarian sentientist account, if a being suffers, there can be no moral justification for refusing to take that suffering into consideration. Privileging the interests of humans over nonhumans solely in virtue of species membership is yet another form of speciesism. Thus, no matter what the nature of the being, the principle of equality requires that its suffering be counted equally with the like suffering of any other being (Singer 1975).

Beyond sentience, Singer enumerates various cognitive capacities the possession of which may weigh moral status beyond mere sentience, where "the superior mental powers of normal adult humans make a difference: anticipation, more detailed memory, greater knowledge of what is happening, and so on" (Singer 2011:52). Thus, on the sentientist account, sentience and complex cognitive capacities bear on questions of interests, moral considerability, and moral significance.

The Rights Account

In *The Case for Animal Rights* (1983), Tom Regan rejects utilitarian arguments for animal liberation and provides instead a *rights-based account* of animal liberation. For Regan, what matters morally is the capacity to be the subject of experiences *that matter to oneself.* Possessing certain physiological, emotional, psychological, and cognitive capacities-over-and-above mere sentience makes one a *subject-of-a-life*:

> To be the subject of a life… involves more than merely being alive and more than merely being conscious…. [I]ndividuals are subjects-of-a-life if they have beliefs and desires; perception, memory, and a sense of the future, including their own future; an emotional life together with feelings of pleasure and pain; preference and welfare-interests; the ability to initiate action in pursuit of their desires and goals; a psychophysical identity over time; and an individual welfare in the sense that their experiential life fares well or ill for them, logically independent of their being the object of anyone else's interests.
>
> *(Regan 1983:243)*

This passage makes clear how crucial are facts about animal cognition to Regan's view of animal rights. He argues that since a great number of nonhuman animals are subjects-of-a-life whose individual value cannot be reduced to their utility to humans, it follows that animals possess what he calls *inherent value*, a type of moral worth independent of how animals are instrumentally valued by—or valuable to—humans. Importantly, on Regan's view, all who possess inherent value possess it equally. If individuals have equal inherent value, then any principle that declares what treatment is due them as a matter of justice must take their equal value into account. Possession of inherent value merits the respect due a subject-of-a-life. Inherent value, in combination with what Regan calls the Respect Principle—we are to treat those individuals who have inherent value in ways that respect their inherent value—confer upon nonhuman animals an absolute and (usually) inviolable *moral right* to the protection and maintenance of those conditions essential to their welfare and existence. Thus, for Regan, practices such as "wildlife management" that promote hunting or culling are morally wrong, irrespective of human or environmental demands, context, or culture (Gruen 2014).

Hopefully, the relationship between sentience, animal cognition, and moral status is clear. Let's now turn to what our best science can reveal about those aspects of sentience and animal cognition that bear on animals' moral status.

Sentience, Animal Cognition, and Moral Status

The query, which animals possess which morally relevant physiological and cognitive properties and to what extent? sits at the foundation of questions regarding the moral status of animals, their interests, rights, and treatment. Since a thorough discussion of the results of research into animal sentience and cognition is beyond the scope of this essay, I will provide only a summary of a few areas with implications for the moral status of animals. We start with research on animal pain and suffering, followed by a summary of one capacity that bears on the moral status of animals, namely, awareness.

Sentience

Common sense suggests that vertebrates experience pain and suffering, but what about invertebrates? Do scallops feel pain when shucked? Lobsters, when thrown into a pot of boiling water? Insects, when trampled? Here, intuitions break down. Since the answers to these questions bear on moral status, science can step in where commonsense intuitions falter.

Pain in humans is at least a two-step process. The first step involves the stimulation of special receptors called *nociceptors* that transmit injury detecting electrical impulses to the spinal cord, triggering an automatic reflex response (Tracey Jr 2017). At this first stage, there are no conscious, phenomenal aspects of the experience. In the second stage, the signal moves from the spinal cord to the neocortex at which point the phenomenal aspects of pain kick in and we experience the unpleasant sensation associated with tissue damage. Though researchers are clear about the mechanisms involved in the first stage, it is the second stage of the process—the affective aspect of pain—that remains somewhat mysterious. In addressing nonhuman animal pain, we can start with the following questions. First, which animal groups possess nociceptors (or exhibit a "nociceptive response"), and (how) do they respond to noxious stimuli, analgesics, and anesthetics? Do they exhibit pain-avoidance behavior? Do their responses to noxious stimuli involve tradeoffs between stimulus avoidance and other motivational requirements? We can further explore which organisms possess neural organs more complex than simple neural nets (e.g. organs such as ganglia, brain masses, or brains), and of these, which possess nociceptor-to-brain pathways (Elwood 2011). For the purposes of this essay, I assume—for sound scientific reasons—that all vertebrate species are sentient (Proctor 2012). However, the question of invertebrate sentience is by no means a settled issue.

Invertebrates

Since invertebrates are widely seen as evolutionarily less sophisticated than vertebrates and thus less likely to be sentient, the question of invertebrate pain remains open to debate (Carere and Mather 2019). While *Drosophila* have been found to possess transient receptor potential channels, structures central to mammalian pain (Neely et al 2011, Tobin and Bargmann 2004), one recent study suggests that insects may experience pain after injury (Khuong et al 2019). Other evidence of insect pain includes the discovery of opioid receptors in crickets (Dyakonova et al 1999), and nociceptive response in insect larvae (Neely et al 2011, Walters et al 2001). Though insects possess miniature brains, they exhibit sophisticated behaviors that seem to go beyond simple associative learning (Giurfa 2013). Chittka and Niven (2009) argue that it is the *neural circuitry* of insects' tiny brains—not brain region size—that facilitates highly differentiated motor repertoires, extensive social structures, and impressive cognitive feats. Barron and Klein (2016) argue persuasively from comparative functional neurobiology that the insect brain is capable of subjective experience. Whether such experience is sentient, or just conscious but insentient remains a matter of some discussion (DeGrazia 2020, Tye 2016). In their work on spider pain, Eisner and Camazine found that "[t]he sensing mechanism by which spiders detect injected harmful chemicals such as venoms…may be fundamentally similar to the one in humans that is coupled with the perception of pain" (1983:3382).

The question of crustacean pain is one that interests not only philosophers and scientists, but also the general public (Jones 2014, Wallace 2004). Physiologically, crustaceans possess nociceptors, ganglia, and nociceptor-to-ganglia pathways (Ross and Ross 2009). Though crustacean pain attribution is not widely accepted, some findings support crustacean sentience. For example, Puri and Faulkes (2015) found that crayfish appear to possess specialized nociceptors that respond quickly and strongly to high-temperature thermal stimuli. Barr et al (2008) observed that the behavioral pain response in prawns is inhibited by the application of benzocaine, a local anesthetic. Lozada et al (1988) showed that blocking the activation of opioid receptors in crabs reduced response to electric shock, and Elwood and Appel (2009) found that hermit crabs more willingly abandon their shells as the intensity of electrical shock increases. Barr et al conclude that such findings are "consistent with the idea that these crustaceans can experience pain" (2008:745). Though jellyfish and sea anemones exhibit a nociceptive response, since the nervous systems of these invertebrates take the form of neural nets, skepticism persists about pain in these creatures.

Nociceptors are found in a wide range of bilateria such as annelids, nematodes, and mollusks (Ross and Ross 2009, Smith and Lewin 2009, Tracey Jr 2017). Both marine and terrestrial worms are found to possess not only nociceptors but a ganglion and nociceptor-to-ganglia pathways (Ross and Ross 2009). Behaviorally, worms react to noxious stimuli, while anatomically, some terrestrial snails and earthworms are found to produce neurochemical opioids (Dalton and Widdowson 1989, Kavaliers and Ossenkopp 1991, Ross and Ross 2009).

Though bivalves appear to lack a sufficiently complex nervous system sufficient for sentience, researchers studying anesthesia in oysters found that magnesium chloride induced "anesthesia quickly, allowing rapid recovery with minimal stress and mortality" (Culloty and Mulcahy 1992:249), while both mussels and scallops show increased heart rate under predation threat (Kamenos et al 2006). Further, the presence of antibody-producing immunocytes and an increase in opiates in mussels and leeches subjected to trauma mirror the physiological changes seen in humans after coronary artery bypass surgery (Stefano et al 2002).

By contrast, cephalopod mollusks like cuttlefish, squid, and octopuses have a large and well-centralized nervous system condensed into a brain-like structure. Sentience and aspects of cognition like memory appear to have evolved not from a single evolutionary path but instead seem to have evolved in parallel with and distinct from vertebrates (Godfrey-Smith 2016). Octopuses possess a central nervous system that rivals in complexity that of phylogenetically distant vertebrates such as mice (Wollesen et al 2009). Researchers note that the stress response system present in these invertebrates is neuronally and endocrinologically similar to that of vertebrates (Mather and Anderson 2007, Stefano et al 2002). Octopuses are repelled by a natural stimulus (e.g. sea anemones), exhibit nociception when stung, and engage in tradeoffs when presented with such noxious stimuli (Mather 2008).

Though fish are obviously not invertebrates, the question of fish pain demands a brief discussion. Skepticism about pain in ray-finned fishes, specifically teleosts, persists. Since the economic costs of changing our commercial fishing practices would be great, there remain commercial interests in denying fish sentience (Brown 2015, 2016). Work by Sneddon and colleagues (2003, 2003a, b) suggests that fish experience pain in a manner similar to other vertebrates, and that fish perception and cognitive abilities match or exceed other vertebrates, exhibiting even psychological suffering in the form of fear and stress. The broad consensus from the scientific community is that fish are sentient (Brown 2016).

In some jurisdictions, scientifically based fish welfare guidelines have been implemented. For example, in Germany, all fish captured by anglers must be retained in accordance with animal welfare regulations. Policies in New South Wales, Australia recommend minimizing air exposure of caught fish, and using barbless hooks (Cooke and Sneddon 2007). In the UK, *Octopus vulgaris* has been added to the list of animals protected by the Animals (Scientific Procedures) Act of 1986, a group of protected animals that, before the octopus, contained solely vertebrates. In 2012, a group of prominent scientists released the "Cambridge Declaration on Consciousness". The declaration concludes that

> non-human animals have the neuroanatomical, neurochemical, and neurophysiological substrates of conscious states along with the capacity to exhibit intentional behaviors. Consequently, the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness. Non-human animals, including all mammals and birds, and many other creatures, including octopuses, also possess these neurological substrates.
>
> *(Low et al 2012)*

Given the complexity of the phenomenon of pain—that it requires not only nociception but neural complexity, perception, and some level of consciousness—conclusions with any degree of certainty regarding invertebrate pain seem far off. However, considering the growing body of physiological and behavioral evidence combined with the central role that sentience plays in theories of the moral status of nonhuman animals, the most prudent course of action may be to employ the precautionary principle with regard to treatment that may potentially cause pain and suffering to some invertebrates and vertebrates (Jones 2016).

Self-Awareness

What does it mean to say that an animal is self-aware and what might self-awareness have to do with ethics? As we've seen, for Regan, being the subject of a life—having things like a sense of self and one's future—confers inherent value and ultimately, rights. But there are many senses of the term "self-awareness" (DeGrazia 2009). Exploring them is beyond the bounds of this essay. The kind of self-awareness that I want to examine here is of two parts. The first is the ability to recognize or conceptualize oneself as an independent self, for example, understanding one's own image as an image of one's *self.* The second involves a type of self-awareness associated with memory called autonoetic (self-knowing) awareness. In this section, we'll look at the question of self-recognition; in the following section, we'll investigate autonoetic awareness as it constitutes what is called episodic memory.

The experimental paradigm related to self-awareness in nonhumans that has received the most attention is mirror self-recognition (MSR) (Gallup 1970). MSR intends to demonstrate whether subjects can recognize themselves in a mirror. "Passing" the MSR test involves touching a mark placed on the subject's forehead (or other part of its body not readily visible to itself) more frequently when there is a mirror available than when there is not.

Though many regard MSR as the "gold-standard" of self-awareness, some caution against seeing MSR as the only viable metric of self-awareness in nonhumans (Bekoff 2001, Rogers and Kaplan 2004), while others dispute the results of MSR altogether (Heyes 1994). Some note that self-awareness as measured in these kinds of tasks is limited to the visual modality and fail to take into account other modalities of self-representation (for example, auditory, tactile, and olfactory) as well as certain salient anatomical differences (Andrews 2011, Bekoff 2001, Rogers and Kaplan 2004). Others note that some species (for example, gorillas) exhibit gaze aversion which would contribute to their "failing" the test (Gallup 1994). Despite these challenges, MSR results remain central to questions of nonhuman animals' self-awareness.

Positive MSR results have been reported for a number of species, including chimpanzees, gorillas, orangutans, dolphins, Asian elephants, magpies, rhesus macaques (Andrews 2016), and orcas (Delfour and Marten 2001). Horowitz (2017) has demonstrated that dogs pass an "olfactory" MSR test, while evidence seems to indicate that perhaps even goldfish pass the MSR (Kohda et al 2018). When presented with a mirror, dolphin subjects use the mirror to examine the insides of their mouths, and even engage in sexual behavior much more often in front of the mirror. Upon being marked for the first and only time on the tongue, one dolphin engaged in a mouth opening-and-closing sequence never before observed (Reiss and Marino 2001). Though pigs have not passed the MSR test, research has shown that pigs can utilize information obtained from a mirror (Broom et al 2009).

We have been looking at just one aspect of self-awareness. Given that there are various morally relevant sorts of self-awareness, it would seem that many animals are self-aware (DeGrazia 2009).

Episodic Memory

Though memory can generally be characterized simply as the encoding, storage, and retrieval of information, of the various types of memory identified in the literature on memory, e.g. remembering facts (semantic memory) or remembering how to ride a bicycle (procedural memory), episodic memory is most relevant to the moral status of animals. *Episodic memory* involves the conscious recollection of unique personal experiences or episodes (Queensland Brain Institute 2016). Episodic memory in humans is believed to require *autonoetic* awareness, the ability to mentally situate oneself in a particular time and place accompanied by the one's perspectives and attendant emotions (Wheeler 2000). Evidence of conscious recollection of personal experience in most humans involves linguistic reports of vivid subjective experiences, so assessing episodic memory in nonhuman animals presents challenges. Since only the behavioral aspects of episodic memory can be observed in nonhuman animals, researchers refer to episodic memory in nonhumans as "episodic-*like*" memory.

That said, in a landmark study of episodic-like memory in nonhuman animals, Clayton and Dickinson (1998) demonstrated that Western scrub jays possess the ability to remember the location, time, and identity of various food items they cached, while later studies further demonstrated that scrub jays' memory for their caches incorporated an impressive degree of flexibility (Salwiczek et al 2008). Martin-Ordas et al (2010) noted episodic-like memory in chimpanzees, orangutans, and bonobos, while Jozet-Alves et al (2013) noted episodic-like memory in cuttlefish.

Similar results were obtained in a study of hummingbirds (Henderson et al 2006), while rats and mice exhibit episodic-like memory in their capacity for detailed representations of remembered events (Dere et al 2006, Panoz-Brown et al 2016). Episodic memory has been observed in bottle-nosed dolphins (Mercado et al 1998), while Hoffman et al (2009) and Basile and Hampton (2013) report episodic-like memory in rhesus macaques. There is even some evidence of episodic-like memory in bees (Pahl et al 2007). Not only has episodic memory been observed in the common domestic chicken, but hens demonstrate delayed gratification, self-control, and the ability to anticipate the future, all associated with the capacity for pre-emptive anxiety and the generation and frustration of expectations (Marino 2017). The evidence seems to support the inference that neither self-awareness nor episodic-like memory is unique to human beings, a conclusion that as we have seen carries significant moral relevance.

The ethical upshot of these results is that if folks like Singer and Regan are right, then a staggering number of nonhuman animals across countless species who currently possess little to no moral status are actually robust, bona fide members of the moral community. And if that's the case, then our treatment of them constitutes a moral atrocity.

Animal Liberation versus Environmentalism

Questions regarding the practical implications of the moral status of animals arise in varied human practices such as animal agriculture, biomedical research, entertainment (rodeos and circuses), and captivity (zoos and aquaria). However, in this section, I want to outline the deep philosophical divide between environmentalists and advocates of animal liberation.

As we have seen, the anthropocentric view of moral status holds that all and only humans have full moral status. Animal rights philosophers reject this view, holding that the primary units of moral concern are sentient, cognitively complex *individuals*. By contrast, environmentalists tend toward *holism*, where the focus of moral concern centers not on individuals, but on the integrity of ecological wholes such as ecosystems, the "land", and biotic communities.

While none of these collective entities is sentient or a subject-of-a-life, the preservation of these entities is a central concern for environmentalists. Further, environmental ethicists tend to see the goals of animal rights as anti-environmental (Varner 2011). As a consequence, the aims of animal rights advocates and environmentalists seem often to conflict (Brennan and Lo 2020). For example, when the stability of a particular ecosystem appears threatened by a so-called "invasive" species, environmentalists may call for a culling of the "invasive" animal population, while an animal liberationist may advocate for "compassionate conservation" (Bekoff 2013).

In his influential essay "Animal Liberation: A Triangular Affair" (1980), J. Baird Callicott outlines the central issue dividing animal liberationists from environmentalists. For holists, biotic communities are what have intrinsic value with the ecological whole being the ultimate measure of moral value. The value of individual organisms lies in their ecological function, and their well-being should be considered only inasmuch as they contribute to the ecological whole. Aldo Leopold's Maxim captures the moral heart of environmental holism: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community; It is wrong when it tends otherwise" (Leopold 1989:224–225). This tension between the primacy of individual sentient beings and environmental wholes remains the "most fundamental theoretical difference between environmental ethics and the ethics of animal liberation" (Callicott 1980:337).

Callicott sees environmental holism as life-affirming in its celebration of the value of ecosystems and biotic communities, whereas he sees animal liberation as "life-loathing" and "world-denying" and too narrowly individualistic (1980:333). When the interests of the wholes clash with the interests of the individuals that comprise it, the interests of individuals must be sacrificed. However, since environmentalists see human populations as, themselves, members of the biotic community, folks like Callicott are pressed to provide some non-speciesist principle that exempts humans from similar sacrifice (Callicott 1989, Varner 2001, 2011).

For example, environmental holists would condone "culling" rabbits to preserve a particular plant species—but they are reluctant to sacrifice human interests in similar situations. Yet, the most abundant species destroying biotic communities is *Homo sapiens*. If human individuals are just another element within the larger and more important biotic community as environmental holism would seem to imply, then environmental holists should call for us to "control" or "eliminate" some of these individuals for the sake of the larger whole, an implication Tom Regan labels "environmental fascism" (Regan 1983/2004:362).

But if humans cannot be sacrificed for the good of the whole, why can rabbits, deer, and wolves? Environmental holists reply by claiming that while the biotic community matters morally, it is not the only community that matters. We humans are part of various "nested" human communities, all of which have claims upon us; we are part of a tight-knit human community, but only a very loose human-rabbit community. Thus, our obligations to the biotic community may require the culling of rabbits, but may not require the culling of humans (Callicott 1999).

However, it would seem now that some relations within the biotic community carry more moral weight than others, namely, the relations between individual *human* members of a given biotic community. But the environmentalist reply will not suffice. It would seem now that some relations within the biotic community carry more moral weight than others, an implication derived not from Leopold's Maxim, but from the point of view of individual human members of a given biotic community. If our moral commitments to the biotic community are trumped by our obligations to the human community, and if other members of the biotic community are merely instrumentally valuable, then environmental holism collapses to just another anthropocentric view. And if that's the case, then animal liberation never really was a "triangular affair." Unacceptable implications of environmental holism such as these should give one pause before rejecting animal liberation as too individualistic. (Jones 2021) Folks like Callicott remain pressed to provide some non-speciesist principle that exempts humans from similar sacrifice (Callicott 1989, Varner 2001, 2011).

A Final Rumination

That Western scientific, philosophical, and cultural thought is speciesist is an indisputable fact. The denial of mind to animals has been a keystone to their exploitation and the exploitation of their habitats and the natural world. Eileen Crist argues persuasively that Western philosophy's denial and disparagement of animal minds is "causally implicated in the devastation of the biosphere", facilitating the "objectification of the natural world and its transformation into a domain of resources" (2013:45). Despite scientific consensus on animal consciousness and sentience, and despite legislative welfare regulations, billions of animals suffer unspeakable pain, suffering, and death, while their (and our) habitats, biotic communities, and ecosystems are poisoned, denigrated, and destroyed. Better science, near-certainty regarding animal consciousness, cognition, or sentience, or increased welfare legislation alone will not end the exploitation of the environment or the suffering that is visited upon billions of animals annually at the hand of speciesism and human supremacy. As John Sanbonmatsu argues, "[b]y telling ourselves that we have no 'choice' but to kill and to consume animals, thereby refusing responsibility for our participation in terror, we undermine our claims to being the kind of being that alone can exercise autonomous judgment" (2011:43). Our task then is to transcend our bad faith by untelling such stories about the supremacy of *Homo sapiens* and our domination of the natural world and its inhabitants.

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See also Eating (Chapter 2), Experimentation (Chapter 3), Companion Animals (Chapter 4), Species and Wildlife (Chapter 5), Wild Animals (Chapter 6), Hunting (Chapter 6), Remediation (Chapter 43), Restoration (Chapter 44), Assisted Migration and Reintroduction (Chapter 45), Zoos and Conservation (Chapter 46), and Rewilding (Chapter 47).

Further Reading

Kristin Andrews' entry "Animal Cognition" in *The Stanford Encyclopedia of Philosophy* <http://plato.stanford.edu/archives/fall2014/entries/cognition-animal/> as well as her book *The Animal Mind: An Introduction to the Philosophy of Animal Cognition*, Routledge (2020), are excellent sources of the details of animal cognition. Lori Gruen's *Ethics and Animals: An Introduction*, Cambridge University Press (2011) is an excellent and comprehensive introduction to animal ethics.