



Speciesism and Human Supremacy in Animal Neuroscience

6

Robert C. Jones

Our anthropocentric way of looking at things must retreat further and further, and the standpoint of the animal must be the only decisive one.

Jacob von Uexküll (quoted in [1], p. 53)

Abstract

Since epistemic access to the mental lives of animals is limited even more than it is in our human conspecifics, caution about cognitive attributions to nonhumans may be prudent. However, too often skepticism regarding animal minds, cognition, and experience (e.g., reluctance to attribute thoughts, beliefs, phenomenal consciousness, and sentience to certain taxa) is justified by reference to physiological heterologies in neural structure/complexity between humans and the other animals. An example is the argument that fish cannot experience pain because they lack the requisite neocortical structures. In this chapter, I contend that these kinds of scientific and philosophical arguments reflect a kind of *anthropodenial* embedded in speciesism and, specifically, human supremacy and neurotypicalism. I further argue that there is good reason to believe that vertebrates such as fish—and even some invertebrates such as crustaceans and insects/arachnids—are experiencing beings, that there is a what-it’s-like to be them, and that these conclusions have ethical implications.

Keywords

Speciesism · Sentience · Human supremacy · Animal cognition · Animal rights · Animal liberation

R. C. Jones (✉)

California State University, Dominguez Hills, Carson, CA, USA

e-mail: rjones@csudh.edu

© Springer Nature Switzerland AG 2020

L. S. M. Johnson et al. (eds.), *Neuroethics and Nonhuman Animals*, Advances in Neuroethics, https://doi.org/10.1007/978-3-030-31011-0_6

99

6.1 Introduction: Speciesism and Human Supremacy

Much of canonical Western philosophical theory (along with Western scientific and cultural thought) is anthropocentrically speciesist. As with other *isms*, anthropocentric speciesism (hereafter “speciesism”) can be interpreted in various ways. Singer sees speciesism as a state of ignorance, a mistaken belief about the moral superiority of all humans over all nonhumans [2]. Sanbonmatsu views speciesism as the central organizing principle of the human project, the basis of a kind of universal, civilizational form of bad faith, wherein speciesism operates as a powerful and pervasive social structure—a mode of self-deception—in which we suppress and deny that speciesism is a way of being that we freely choose and ignore our own conditions of possibility or transcendence [3]. Belcourt argues that speciesism—particularly in North America—is a vestige of the white supremacy manifest in the erasure of Indigenous bodies and the emptying of Indigenous lands for settler colonial expansion [4].

However one conceptualizes it, speciesism assumes that humans occupy a moral sphere separate from and superior to all the other animals by virtue of being human. Seen as a kind of human supremacy, speciesism is committed to the claims that humans are *unique* in their possession of some metaphysical entity (like a soul), divine relation (e.g., uniquely made in God’s image), trait (like species membership), or set of capacities within the physiological or cognitive domains and that the possession of such substances, relations, traits, or capacities makes all and only humans morally superior to beings (such as nonhuman animals) who lack such sundry properties (although this view is compatible with other animals having moral interests). Ignoring the metaphysical and religious aspects of it, the first claim is largely empirical, and the second normative [5]. These two claims constitute the two fronts on which those philosophers seeking to expand the moral status of nonhuman animals mount their attacks in an attempt to dismantle the foundations of human supremacy.

6.2 Sentience and Comparative Neuroscience

Central to the strategy employed by those philosophers who seek to undermine human supremacy and reenvision the moral status of animals has been an attack on its empirical aspects by presenting evidence from science, and increasingly neuroscience, that demonstrates the possession by some nonhuman animals of some set of morally relevant physiological or cognitive capacities. When successful, arguments of this kind undermine the first prong of the human exceptionalist thesis. Thus, one strategy for philosophers of animal ethics has been to question the existence of a clear distinction between all humans and all other animals with regard to the possession of what are seen as morally relevant capacities. The candidate capacities—sentience, self-awareness, memory, and theory of mind (also known as mindreading)—are not the only capacities that bear on the moral status of individuals, but often play a central role in debates regarding the moral status of

nonhuman animals. Since the claim that humans are unique in their possession of some set of morally relevant cognitive capacities is an empirical one, it is quite useful—and, in some cases, indispensable—to see what neuroscience has to say about which animals possess which capacities, making the empirical data on this question central to the question of the moral status and treatment of nonhuman animals. For example, with regard to sentience, if no clear distinction can be empirically drawn between humans and animals, then the foundations of human supremacy may—at least in theory—be substantially reenvisioned.

It's important at this point to briefly clarify what I mean by *sentience*. Though in its broad sense the term *sentience* can refer to the capacity for *any* kind of conscious experience, the more narrow sense of the term as employed in the animal ethics literature (and throughout this essay) refers specifically to conscious experiences with an attractive or aversive quality. These capacities include experiences such as pain and pleasure, suffering, anxiety, and fear [6]. Though capacities implicating sentience are crucial in determining which beings are the proper objects of moral concern, some caution is in order. Since our epistemic access to the experiential lives of animals is arguably even more limited than access to the experiential lives of our conspecifics, it is prudent to be cautious about attributions based on comparative neuroscience, and selective about the kinds of evidence for such attributions we have at our disposal.

Rogers and Kaplan [7] warn that basing the moral status of animals on comparative cognition and other biological measures can be fraught. Take, for example, the well-known mirror self-recognition (MSR) test [8]. Self-awareness as measured in these kinds of tasks is limited to the visual modality, failing to take into account other modalities of self-representation (e.g., auditory, tactile, and olfactory) as well as certain salient anatomical differences [7]. For example, in a study that translates the MSR study for dogs (a species whose primary sensory modality is olfaction) into an “olfactory mirror” test, Horowitz has shown that dogs can recognize and distinguish an olfactory “image” of themselves [9]. Self-recognition is just one example. When it comes to other physiological and cognitive capacities, including things as basic as sentience, of the almost 6000 extant mammalian species, 10,000 avian species, tens of thousands of reptile and amphibian species, a still greater number of fish species, and millions in both the insect and arachnid classes, only a small fraction have been investigated for such capacities. There is nothing close to certainty when it comes to conclusions drawn from comparative physiological and psychological investigations.

Whatever evidentiary bar we commit to regarding the sentience of a particular animal species, we cannot require anything close to certainty before granting legal protections. A common challenge from skeptics of animal sentience involves questions of the form, “How can one ever really know that species X is sentient?” However, that's a very different sense of “know” from the one used in claims of animal sentience [10]. That's not what scientists who make such claims mean by “know” when they say, for example, that we now *know* that fish are sentient. When one asserts that research now supports the claim that teleosts are sentient [11–13], it's important to reiterate that this claim is provisional (as are all scientific claims),

and justified through an inference to the best explanation, a point that Birch makes, and one worth reiterating [6].

Further and related to this worry is the narrow sense in which claims of folk psychology (and, indeed, folk psychology itself) are characterized. For example, the accepted methodological paradigm in animal cognition research characterizes folk psychology as necessarily involving conspecific belief attribution and seeks only evidence of the kinds of behaviors that confirm and conform to this model of psychology. However, Kristen Andrews argues forcefully that the standard account of folk psychology demands more than is necessary, since it assumes that correct prediction of a conspecific's behavior requires the ability to attribute beliefs, false beliefs, and beliefs differing from one's own. Andrews rejects belief attribution as a necessary condition for conspecific behavior prediction, urging researchers to integrate social psychology research on how normal adult humans actually predict behavior [14].

Despite these challenges, given the fact that investigations into nonhuman animal cognition can rarely rely on full-blown intersubjective communication (e.g., spoken language), comparative neuroanatomical methods remain the most reliable metric in our understanding of the mental lives of animals and those capacities that bear on questions of animal welfare.

The research on animal cognition and sentience has mushroomed in the last 20 years, and there are numerous studies on many aspects of animal cognition and sentience. In the remainder of this chapter I'll look only at the issue of animal *pain*, and the current research into animal sentience, with a particular focus on fish pain. The body of research on animal sentience provides an excellent case study for the debate over attributing phenomenal states to nonhumans.

6.3 Sentience: Pain and Suffering

The International Association for the Study of Pain (IASP) provides what seems at first blush to be a reasonable definition of pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” [15]. The definition is followed by a footnote informing us that “pain is always subjective” and that the IASP definition intentionally “avoids tying pain to the stimulus.” However, this definition of pain is both physiologically and philosophically problematic since it emphasizes subjective experience and self-report while supporting conflicting philosophical interpretations of pain (e.g., subjectivist and objectivist views of pain), and it remains silent on the question of the relationship of the physiological bases of pain to its phenomenal aspects [16].

Given that pain and suffering are likely very old phenomenal states, it would be strange if pain did not provide selective advantage, were not widespread across varied species, or did not serve a similar adaptive function in nonhuman animals as it does in humans. Understanding the basic mechanics of pain is imperative to understanding its role in animal sentience. 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. At this first stage, there are no conscious 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—which includes the affective aspect of pain—that remains somewhat mysterious.

When it comes to nonhuman animal pain we can ask which animals possess nociceptors (or exhibit a “nociceptive response”) and whether and how they respond to noxious stimuli, analgesics, and anesthetics. 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.

A solid methodological framework for an investigation into whether an animal is sentient includes investigating whether a particular organism possesses or exhibits:

- A central nervous system and other structures and psychoactive chemicals homologous to those known to control pain response in humans, e.g., neuroanatomical (opioid receptors, nociceptors) and neurochemical (opioids).
- Physiological or behavioral responses to noxious (or positive) stimuli, analgesics, and anesthetics. Noxious stimuli used in pain research on nonhumans include *mechanical* (such as pricking or probing), *thermal* (heating or freezing), *chemical* (exposure to acidic irritants), and *electrical* (shocking).

Though at first blush these capacities seem clear and well-founded, a little reflection reveals that things are not as straightforward as they seem.

Pain is a notoriously difficult phenomenon to understand, in humans and especially in nonhuman animals. The first challenge involves the fact that data on the high variability between the physiological mechanisms and the phenomenal aspects of pain are often confounding, raising puzzles about the connection between the two. For example, the very same kind of stimuli can elicit a pain response of widely varying intensity (or none) in different human individuals or even in the same individual at different times, making generalizations challenging—even more so when generalizing from humans to animals. Though we have a good idea of how the nervous system detects and responds to painful events in humans, exactly how the human brain processes the stimuli and generates the phenomenal aspects of pain induced by injury remains far less clear.

A second challenge arises from pain asymbolia, a type of dissociation in which human subjects report recognizing the sensation of pain (i.e., “feeling” the pain) while being not at all bothered by it. These reports suggest that pain has both a sensory and an affective component. Cases like these only complicate the issue of animal pain by widening the gap between identifying the mechanical aspects of pain in other species and inferences about the unpleasantness, and therefore the badness, of pain [17].

Despite these challenges, it is reasonable to take seriously the massive corpus of data on animal sentience [18] and not disregard inferences based on those data as

worthless in the face of such epistemic challenges. To do so would be to place too high an epistemic warrant on just those inferences that fail to resolve the problem of other minds.

6.4 The Evidence for Pain in Nonhuman Animals

In this section, I want to canvass the neuroscience on vertebrate pain. Following this, I will look at the objections to the inferences that researchers have made from these data as excellent case studies concerning charges of anthropomorphism. I will look specifically at an argument against fish pain and elucidate the philosophical, conceptual, and empirical missteps supporting such arguments.

6.4.1 Consider Fishes

Despite a handful of skeptics, most researchers and philosophers writing on the subject believe that most typically developing/developed cephalized vertebrates are sentient. However, with regard to fish—specifically teleost, or ray-finned fish—skepticism about pain has persisted even among those ready to attribute pain sensation to other, “higher” vertebrates. Popular interest in the question of fish pain and welfare has abounded in recent years. The escalation of interest in the issue of fish sentience and welfare can be traced back to the publication of two papers.

The first, by Lynne Sneddon [19], made three important findings, namely, that fish possess nociceptors capable of detecting noxious stimuli, that nociceptor-to-fish-brain pathways process nociception signals in a quite similar way as those of the “higher” vertebrates (including humans), and that fish behavior is adversely affected by the administration of noxious stimuli. After confirming the existence of nociceptors and the electrophysiological pathways requisite for the transmission of pain signals, experimenters injected noxious chemical stimuli (bee venom and vinegar) into the lips of rainbow trout. The results demonstrated that the noxious chemicals affected both the physiology (increased breathing rate) and the behavior (decreased appetite) of the trout, responses consistent with pain reactions and behaviors in other vertebrates.

As a suggestive example of pain-related behavior, Sneddon et al. [20] also observed that noxiously stimulated rainbow trout do not display classic fear-response behavior when presented with a novel object (Lego blocks). Control trout spent most of their time moving away from the novel object, whereas noxiously stimulated trout spent most of their time in close proximity to the novel object and showed no additional increase in respiration rate to novel object presentation. The researchers concluded that the noxious treatment commanded the majority of the attention capacity in the fish subjects, evidence that the trout were experiencing some level of pain.

A second prominent paper on fish pain by Sneddon [21] found that the administration of morphine to the lips of rainbow trout injected with noxious stimuli significantly reduced pain-related physiological and behavioral responses. Sneddon concluded that if morphine acts as an analgesic in the rainbow trout, then such pain-related behaviors are not simply reflexes but are rather indicators of pain perception in fish. It's crucial to note that the kinds of inferences that Sneddon and others make here—namely, the inference from the fact that opioids can alter an organism's response to noxious stimuli to the conclusion that the organism feels pain—are subject to debate. The fact that opioids can influence *both* the peripheral and central nervous systems, while only the central nervous system appears to play a role in sentience, makes possible a reduction in pain *behaviors* independent of any phenomenal, affective aspects of the experience of pain. Yet, while Sneddon's inference may be debatable, what *is* true is that had the administration of opioids effected no change in pain behavior, then that observation would have counted as *some* bit of evidence against the hypothesis that the organism feels pain. Therefore, the causal connection between the administration of opioids and an observed decrease in pain behavior counts as *some* evidence to confirm the claim that the organism feels pain. If nothing else, such results are at least *consistent with* the suggestion that these organisms feel pain. Since the publication of those two papers, the research on fish pain has increased dramatically.

Based on research like this demonstrating the presence of pain-related neural structures and behavioral responses, one can infer by analogy that a wide range of vertebrate animals can respond to noxious stimuli with nociception or nociceptive-like responses. The evidence is more sparse for invertebrates. Given the complexity of the phenomenon of pain—that it requires not only nociception but neural complexity, perception, and some level of phenomenal consciousness—at present conclusions regarding non-cephalopod invertebrate pain would be premature. However, as Allen et al. point out, analogical arguments for animal pain that rely on similarities between humans and other nonhuman animals are impoverished in that, for all the physiological and behavioral similarities between humans and nonhuman animals, there are dissimilarities that can be used to deny the inference that nonhumans experience pain [22].

Given these difficulties, we may throw up our hands and conclude that animal pain cannot be studied empirically. Alternatively, we may conclude too quickly and without warrant that scientific investigation has already revealed that many other animal species feel pain. The challenge is to find a framework or program to help us decide when similarity and dissimilarity are relevant when taking on the task of assessing comparisons of anatomy, physiology, and behavior. To that end Allen et al. propose a framework in the form of an empirical research program, one that reasonably assumes a functionalist notion of pain and allows sophisticated comparisons to be drawn between the pain experiences of humans and those of other animals. Although the details of their program are beyond the scope of this essay, the takeaway for our purposes is that inferences from anatomical, physiological, or behavioral evidence to conclusions about animal pain need not be simplistic, overly skeptical, or lacking epistemic warrant.

6.4.2 Reconsidering Fishes

Critics of claims of fish sentience argue that fish lack the requisite brain structures for pain and that conclusions about fish sentience are nothing more than anthropomorphism. The work of Rose [23] and, more recently, Key [24] are emblematic of these kinds of responses. The basic argument denying sentience in teleosts (as well as invertebrates) turns on the claim that *human* neocortical structures are required for pain. These arguments share a similar structure and look like this:

- P1. Conscious neural processing (M) requires a unique neural architecture (N).
 P2. Thus, N is a necessary condition for M (i.e., no N entails no M).
 P3. Species X (e.g., rainbow trout) lacks N.
 C. Therefore, species X lacks M.

Looking closely and critically at this argument can be quite instructive, specifically with regard to views denying phenomenal consciousness to teleosts (and invertebrates) and more generally to charges of anthropomorphism.

First, these kinds of arguments are rooted in the “bioengineering principle” that structure determines function. However, this kind of reductive analysis of function is problematic. Although biologists commonly *correlate* structure with function, it is an error to argue that an understanding of the neuroanatomical structure of an organism reveals that structure’s function. For example, the recent discovery of a heretofore unknown structure of the human cornea (e.g., Dua’s layer) certainly did not ensure the identification of its function through only structural information. Furthermore, different structures—for example, teeth and gastric acids—often carry out the same function. Arguments like Key’s rely on the assumption that pain is a functional result of one set—and *only one set*—of neuroanatomical structures that humans possess and fish lack. However, this type of structural-functional determinism overlooks the quite real possibility that phenomenal states like pain in fish are realizable by multiple, different means. Allen [25] notes, “[t]he possibility of convergent evolution at the behavioral and cognitive levels despite morphological and anatomical differences at the neurological level makes fish an enormously interesting testing ground for ideas about multiple realizability of cognition” [23].

Second, the central premise—that human neocortical structures are required for pain—begs the question. The claim that because neural structure N is required for mental state M in humans, N is a necessary condition for M in fish is problematic both empirically and philosophically. Biologically speaking, convergent evolution may implement similar functions in structures that are or are not homologous. For example, while it’s true that the bone structure of the wings of bats is required for bats to fly, it does not follow that organisms lacking such structures, such as bees, cannot fly. Philosophically, to say that certain human structures are required for fish pain again begs the very question. For even if particular neocortical structures that fish lack but that humans possess are required for *human* pain experience, it does not follow that they are required for fish pain experience.

Third, critiques of this kind trade on a kind of *neurotypicalism*. The term emerged from autistic and neurodiversity communities and describes a species both of human supremacy and *ableism*, rooted in the view that characteristics or properties that are species-typical are therefore cognitively normative. Disability theorists like Sunaura Taylor [26] argue that ableism—a bias favoring abled human embodiment and neurotypical human intelligence—is intimately connected with human supremacy, speciesism, and systemic animal oppression. According to Taylor, ableism and, thus, neurotypicalism help “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” (p. 59). Salomon [27] 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” (p. 47). Taylor argues persuasively that “ableism is intimately entangled with speciesism, and is deeply relevant to thinking through the ways nonhuman animals are judged, categorized, and exploited.”

6.5 Domination and Oppression

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 psychophysical or cognitive processes that are species-typical to human beings “shows the extent to which speciesism uses ableist logics to function” [26] (p. 58). Both the claim that a unique neural architecture is required for conscious neural processing in humans and the claim that the same neural architecture is a necessary condition for conscious pain in fish conceal the same neurotypicalist bias that has been used to justify the oppression of both animals and some humans. We need not look to the treatment of nonhuman animals to find the ethical dangers of such an assumption for both animals and humans. For example, in *Buck v. Bell*, [28] the United States Supreme Court approved the forced sterilization of the 18-year-old “feebleminded” Carrie Buck “for the protection and health of the state.” In actuality, Carrie Buck was not cognitively disabled, but rather was a victim of pregnancy by rape, and was deemed “promiscuous.” Such cases speak to how dangerously easy it is to go from the claim of neuro-atypicalness to a claim of reduced moral status both within and between species.

Domination and oppression are terms usually reserved exclusively for humans. I have written at length elsewhere on this topic [29], but let me just gesture towards what it means to say that animals are oppressed and dominated. *Domination* in the sense that I am using it here refers to a structural or systemic condition that prevents individuals from determining the conditions of their actions. Since humans can determine the conditions of animals’ actions, some (or, it may be argued, *all*) nonhuman animals live within structures of domination. *Oppression* in the sense that I am using it here refers to a systematic institutional process that immobilizes or

diminishes a particular group (which can include particular species) through the exercise of systemic violence and exploitation. Applying the concepts of domination and oppression to nonhuman animals may seem confused or even misguided, yet these concerns dissolve once we see animals as agents. Following Steward [30], I see the concept of agency as an outgrowth of the concept of animacy. The concept of animal agency involves the ability of the animal to move the whole or parts of their body, the possession of some form of subjectivity and rudimentary intentional states (e.g., trying, wanting, perceiving), and the animal as the “settler of matters” concerning certain of the movements of its own body. Ultimately, “[v]ariations among species should be embraced and cherished rather than used to justify human dominance” [31] (p. 27).

Though the domination and oppression of animals is manifest in practices such as sport hunting, medical and military experimentation, and industrial fur production, let me focus only of the role of animals in global food production. Worldwide, 300 million cows, 1.5 billion pigs, and 66 billion chickens are slaughtered for food annually [32]. Most of those animals are raised in high-density confinement for the production of meat, eggs, and dairy products. Cattle raised for beef are castrated, dehorned, and branded, all without anesthesia or analgesics. Sows live out most of their lives in cramped, individual gestation crates where they give birth to between four to eight litters. Male piglets have their testicles removed, their tails and ears docked, and their teeth clipped, all without anesthesia or analgesics. Laying hens live out their lives in small, restrictive battery cages. To prevent stress-induced behaviors caused by overcrowding, hens undergo debeaking without anesthesia or analgesics. Laying hens on concentrated animal feeding operations (CAFOs) are “spent” and unable to produce eggs after just 2 years, at which time they are slaughtered.

The figures on the number of fishes slaughtered for food annually are tougher to pinpoint since industry figures are provided in terms of mass not numbers of individuals. That said, reliable estimates put the numbers at about 0.97 to 2.7 trillion fishes caught from the wild annually [33]. Fishes undergo a number of standard industry procedures that inflict pain, including handling and transport which involves the removal of fishes from the water and air exposure, the causing of abrasions and the removal of scales (which removes a fish’s protective mucous coat), and excessive weight loading on fish at the bottom of nets and brailles, as well as excessive crowding of fish by increased stock densities. Fish slaughter techniques include removal from water, asphyxiation in ice, asphyxiation in CO₂-saturated water, and gill cutting [34]. I trust these cases make clear some of the ways that nonhuman animal agents suffer systemic domination and oppression.

6.6 Anthropomorphisms and Anthropocentrism

Critics like Key [24] exhort us to overcome our “anthropomorphic tendencies that bias interpretations of behavioral observations” (p. 2) and warn against jumping to “unsupported anthropomorphic conclusions” (p. 3) that fish feel pain. Charges like these of anthropomorphism obscure and conflate numerous distinct and important

senses of “anthropomorphism.” Regarding attributions of mental states, critics charge that generalizations from linguistic humans to nonlinguistic animals are bad science; thus in order to do “good” science, anthropomorphism must be rejected and overcome. However, the role that anthropomorphism plays in science—especially comparative neuroscience—involves not only empirical arguments about specific experimental setups and inferences made from their results, but, more importantly, methodological and theoretical arguments that concern the proper methods of science, the scope of science, and the interpretation of data [35–37]. That is, the use of animal models already accepts and employs anthropomorphism, in that by definition researchers attribute human characteristics or biological homologies to other animals at the ground floor. Research on animal pain is sometimes research on a pain model, the assumption being that studying animal pain can tell us something useful about human pain. It’s worth noting here how anthropomorphism is already “baked in the cake” in much of comparative psychology and neuroscience. For example, the reason that hippocampal activity in rats is perceived as evidence that rats deliberate during decision making relies on the fact that hippocampal activity is evident in human brains when humans deliberate [38].

Various senses of “anthropomorphism” can be lost in such debates, but even a cursory understanding of the different connotations can help clarify the fact that those engaged in these debates may sometimes be talking past each other. What critics of fish sentience mean by “anthropomorphism” is what I will call *unnecessary anthropomorphism*. Unnecessary anthropomorphism involves explaining behavior by attributing what are believed to be uniquely human traits and characteristics to beings or objects whose behavior can be better explained without such an attribution. For example, the explanation for my computer not booting up despite my having pressed the power button is not that my computer is angry with me (which would require *unnecessary anthropomorphism*), but rather that there is some malfunction with the powering-up mechanism.

By contrast, a number of alternate notions of anthropomorphism have been proposed, concepts that are useful (some say indispensable) to doing *good* science. Bekoff [39] argues for what he calls *biocentric anthropomorphism* which involves the indispensable use of human terms to explain animals’ phenomenal states. According to Bekoff, “[a]nthropomorphism allows other animals’ behavior and emotions to be accessible to us,” and we can be “biocentrically anthropomorphic and do rigorous science” (p. 867). Burghardt [1] advocates for what he calls *critical anthropomorphism*. Critical anthropomorphism involves employing various sources of information when trying to understand the mental and phenomenal states of nonhuman animals, including “natural history, our perceptions, intuitions, feelings, careful behavioral descriptions, identifying with the animal, optimization models, previous studies and so forth in order to generate ideas that may prove useful in gaining understanding and the ability to predict outcomes of planned (experimental) and unplanned interventions” [1, p. 73]. de Waal [40] warns against exaggerating the uniqueness of *Homo sapiens*, a tendency he terms *anthropodenial*, a “blindness to the humanlike characteristics of other animals, or the animal-like characteristics of ourselves” (p. 2). Among its other vices of hubris and moral superiority,

anthropodenial ignores the Darwinian notion of continuity across species. Andrews and Huss [41] caution against the bias denying a mental or phenomenal state to an animal who actually possesses that state, a bias they call *anthropectomy*. Arguments denying sentience can also trade on what Sheets-Johnstone calls “reverse anthropocentrism.” According to Sheets-Johnstone [42], reverse anthropocentrism occurs when “nonhuman creaturely life is interpreted in a way which exalts the measure of humanness: humans become special creations” (p. 346). Broader than anthropomorphism, reverse anthropocentrism assumes “humans as the center of the animate world such that, for example, any assessment of nonhuman mental powers must take as its standard of measurement a human mind” (p. 350).

As regards fish (and other nonhuman animal) sentience, by employing alternate senses of anthropomorphism, we can attribute pain states to fish based on reasonable interpretations of the overwhelming behavioral and neuroanatomical evidence. Epistemological worries about the mental states of nonhuman animals present unique challenges to claims of knowing their phenomenal states. To address the epistemological puzzle, it’s not necessary to solve the mind-body problem or the problem of other minds. What we need is the ability to aggregate and synthesize our best physiological and behavioral data on the question of nonhuman animal pain and, from that, make a reasonable inference regarding the experiences and phenomenal aspects of our fellow earthlings, like fish. Surely, though not uncontroversially, the corpus of such evidence currently weighs in favor of fish sentience.

6.7 The Precautionary Principle: Is It So Much Anthropomorphic Sentimentalism?

There is a growing body of physiological and behavioral evidence of fish sentience. Although the usual epistemological challenges arise whenever we encounter proclamations about the mental states of other beings (especially with creatures like reptiles, amphibians, and teleost fishes), the most sensible approach to issues of vertebrate pain and welfare is the precautionary principle. The precautionary principle states that where there is a reasonable potential for harm (such as causing a sentient creature to experience pain), precautions should be taken to prevent it. Advocates of the precautionary principle advise that given the lack of scientific consensus on the question of fish sentience, it is more prudent to assume that fish are indeed sentient and that this assumption should inform fish welfare policy and practice [6, 43]. Critics like Key [24] warn *against* applying the precautionary principle in questions of fish welfare for fear of “catastrophic effects” including “inappropriate approaches to fish welfare” and negative economic impacts for the fishing industry [32, p. 3]. However, as with any decision informed by the precautionary principle, the proportionality of the risk of harm must be weighed against the cost and feasibility of a proposed action. In the case of fish, the conclusion that we should abandon the principle is premature.

It’s important to note that when it comes to the attribution of sentience to nonhuman animals and a warranted application of the precautionary principle,

there is a bit of burden shifting going on. Historically, many philosophers and scientists—from the Cartesians to the logical positivists—writing on and investigating nonhuman animal cognition have assumed an equally strong inverse precautionary principle (a kind of *decautionary* principle), advising that in cases where uncertainty exists about the sentience of a particular species, we should treat each member of that species as though they were *not* sentient, unless rigorously demonstrated otherwise. This decautionary principle is captured most pithily by that fundamental precept of parsimony in comparative psychology, Lloyd Morgan's Canon,¹ according to which, with regard to an animal's behavioral states, "in no case is an animal activity to be interpreted as the outcome of the exercise of a higher psychological faculty, if it can be fairly interpreted as the outcome of the exercise of one which stands lower in the psychological scale" [44] (p. 59). But this assumption is implausible and unreasonably strong, in addition to introducing scientific biases that could unduly influence the design of experiments and inhibit discovery and the acquisition of knowledge.

If history is any indication, no matter what evidentiary bar we choose short of full-blown first-person introspective, intersubjective verbal self-reports, skeptics will seek (and sometimes find) counterexamples that maintain human supremacy. To that end, it is important to make explicit the connection between the historical denial of cognitive and affective states (such as pain and suffering) in both animals and humans as reflecting abysmal, anti-scientific, and dangerous uses of science to support and further social and political ideologies. For example, in his study of the use of anesthesia in nineteenth century American hospitals, Pernick [45] found that the amount of anesthesia provided to white women during childbirth was decreased since it was believed that women would not bond with their child unless they felt pain. And black women, even when being used for painful experiments, received no anesthesia at all. Such attitudes are not mere relics, but persist today. A 2016 study by Hoffman et al. [46] found that *half* of a sample of white medical students and residents endorsed false beliefs about biological differences between blacks and whites (e.g., "Black people's skin is thicker than White people's skin"). As Rollin demonstrates, the history of science is rife with instances in which science is used to support a social or political ideology [47]. To claim that science is value-free is to ignore the history of institutional paradigms of scientific racism, ableism, and neurotypicalism as evidenced in practices such as craniology, eugenics, and the use of nonhuman animals in basic research.

¹Interestingly, Morgan—himself a *panpsychist*—would most certainly disagree with such a decautionary principle.

6.8 Conclusion: Ethical Ruminations

As I claimed at the opening of this chapter, canonical Western philosophy has been (and remains) rife with arguments denying reason, thought, and sentience to animals. Although Descartes's is the most notorious and perhaps extreme view in this regard—a view known as the *bête machine* wherein animals are nothing more than reflexive automata—many philosophers, ancient and contemporary, deny mentation [48] or even sentience [49] to animals.

In response to immoderate views like Descartes's, Hume boldly opens Book I, Section 16 of *A Treatise of Human Nature*, “Of the reason of animals,” by attacking such views:

Next to the ridicule of denying an evident truth, is that of taking much pains to defend it; and no truth appears to me more evident, than that beasts are endow'd with thought and reason as well as men. The arguments are in this case so obvious that they never escape the most stupid and ignorant [50].

What reasons have philosophers and scientists offered to deny such an “evident” truth? Sneddon et al. suggest that sentience is often denied because “sentience is at the heart of the decision about whether to provide animals with legislative protection” [51, p. 3]. This sentiment suggests that unwelcomed moral, social, and practical implications may motivate claims for sentience denial rather than objective empirical data employed in the pursuit of truth.

“Unacceptable” moral, practical, or economic consequences should not drive answers to empirical questions regarding animal sentience and, specifically in this case, fish sentience. This is bad faith, plain and simple [3].

Although I applaud the work of those researchers dedicated to the empirical demonstration of animal sentience, I think the question of animal sentience is actually a moral canard. Currently approximately 68 billion vertebrate land animals [52]—*whom we know, with as close to scientific certainty as is currently possible, are sentient*—live lives of abject misery and suffer and die in grisly, ghastly, ghoulish ways, all for human consumption. Our best neuroscientific understanding regarding the cognitive and sensitive properties of these beings makes unnecessary the implementation of a kind of precautionary principle regarding their abilities to experience pain and suffering. Better science, near-certainty regarding sentience, or increased welfare legislation alone will not end the suffering that is visited upon billions of animals under cover of speciesism and human exceptionalism. That task requires transcending our own bad faith by untelling the stories we tell ourselves about the meaning and necessity of animal pain and suffering. As 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” [3] (p. 43).

What all this shows is that the question of animal sentience is less about the pursuit of truth and more about supporting a speciesist agenda—a moral conclusion

in search of data, scientific findings, and legitimating arguments. In this sense, it is similar in kind to the eugenics research in vogue in the USA and Europe in the early twentieth century, which was motivated not by a search for truth, but rather to give a scientific imprimatur to classism, white supremacy, and an ableist sociopolitical agenda. Near-certainty regarding animal sentience will not end speciesism nor human supremacy. That enterprise does not require better neuroscience, research methodologies, or conceptual arguments. That enterprise requires transcendence of our moral bad faith and the hubris of unfounded human supremacy.

References

1. Burghardt GM. Cognitive ethology and critical anthropomorphism: a snake with two heads and hog-nose snakes that play dead. In: Ristau CA, editors. *Cognitive ethology*. Psychology Press; 1991. p. 53–90.
2. Singer P. *Animal liberation*. New York: Random House; 1995.
3. Sanbonmatsu J. The animal of bad faith: speciesism as an existential project. In: Sorenson J, editor. *Critical animal studies: thinking the unthinkable*. Toronto: Canadian Scholars Press; 2014. p. 29–45.
4. Belcourt B-R. Animal bodies, colonial subjects: (re)locating animality in decolonial thought. *Societies*. 2015;5:1–11.
5. Gruen L. *Ethics and animals: an introduction*. Cambridge: Cambridge University Press; 2011.
6. Birch J. Animal sentience and the precautionary principle. *Anim Sentience*. 2017;2:1.
7. Rogers LJ, Kaplan G. All animals are not equal: the interface between scientific knowledge and legislation for animal rights. In: Sunstein CR, Nussbaum MC, editors. *Animal rights: current debates and new directions*. Oxford: Oxford University Press; 2004. p. 175–201.
8. Gallup GG. Chimpanzees: self-recognition. *Science*. 1970;167:86–7.
9. Horowitz A. Smelling themselves: dogs investigate their own odours longer when modified in an “olfactory mirror” test. *Behav Process*. 2017;143:17–24.
10. Jones R. The lobster considered. Dietary choice and foods of animal origin [Internet]; 2014. Available from: <https://animalstudiesrepository.org/diecfaori/3>
11. Brown C. Fish intelligence, sentience and ethics. *Anim Cogn*. 2015;18:1–17.
12. Brown C. Fish pain: an inconvenient truth. *Anim Sentience*. 2016;1:32.
13. Sneddon LU. Pain in aquatic animals. *J Exp Biol*. 2015;218:967–76.
14. Andrews K. *Do apes read minds?: Toward a new folk psychology*. Cambridge, MA: MIT Press; 2012.
15. IASP Terminology - IASP [Internet]. [cited 2019 May 13]. Available from: <https://www.iasp-pain.org/Education/Content.aspx?ItemNumber=1698#Pain>
16. Aydede M. Defending the IASP definition of pain. *Monist*. 2017;100:439–64.
17. Shriver A. The unpleasantness of pain for nonhuman animals [Internet]. *The Routledge handbook of philosophy of animal minds*; 2017 [cited 2019 May 13]. Available from: <https://www.taylorfrancis.com/>
18. *Animal Sentience: An Interdisciplinary Journal on Animal Feeling* | Animal Studies Repository [Internet]. [cited 2019 May 13]. Available from: <https://animalstudiesrepository.org/animalsent/>
19. Do fishes have nociceptors? Evidence for the evolution of a vertebrate sensory system | *Proc R Soc Lond B Biol Sci*. [cited 2019 May 13]. Available from: <https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2003.2349>
20. Sneddon LU, Braithwaite VA, Gentle MJ. Novel object test: examining nociception and fear in the rainbow trout. *J Pain*. 2003;4:431–40.
21. Sneddon LU. The evidence for pain in fish: the use of morphine as an analgesic. *Appl Anim Behav Sci*. 2003;83:153–62.

22. Allen C, Fuchs PN, Shriver A, Wilson HD. Deciphering animal pain. In: Aydede M, editor. *New essays on its nature and the methodology of its study*. Cambridge, MA: MIT Press; 2005. p. 351.
23. Rose JD. Anthropomorphism and 'mental welfare' of fishes. *Dis Aquat Org*. 2007;75:139–54.
24. Key B. Why fish do not feel pain. *Anim Sentience*. 2016;1. Available from: <https://animalstudiesrepository.org/animsent/vol1/iss3/1>
25. Allen C. Fish cognition and consciousness. *J Agric Environ Ethics*. 2013;26:25–39.
26. Taylor S. *Beasts of burden: animal and disability liberation*. New York: The New Press; 2017.
27. Salomon D. From marginal cases to linked oppressions: reframing the conflict between the autistic pride and animal rights movements. *J Crit Anim Stud*. 2010;8:47–72.
28. *Buck v. Bell*. US. 292AD. p. 200.
29. Jones RC. Animal rights is a social justice issue. *Contemp Justice Rev*. 2015;18:467–82.
30. Steward H. *A metaphysics for freedom*. Oxford: Oxford University Press; 2012.
31. Bekoff M. *The animal manifesto: six reasons for expanding our compassion footprint*. Novato, CA: New World Library; 2010.
32. Global Animal Slaughter Statistics and Charts – Faunalytics [Internet]. [cited 2019 May 13]. Available from: <https://faunalytics.org/global-animal-slaughter-statistics-and-charts/>
33. fishcount.org.uk: towards more humane commercial fishing [Internet]. [cited 2019 May 13]. Available from: <http://fishcount.org.uk/>
34. Ashley PJ. Fish welfare: current issues in aquaculture. *Appl Anim Behav Sci*. 2007;104:199–235.
35. Keeley BL. Anthropomorphism, primatomorphism, mammal morphology: understanding cross-species comparisons. *Biol Philos*. 2004;19:521–40.
36. Bekoff M, Allen C. Cognitive ethology: slayers, skeptics, and proponents. In: Mitchell RW, Thompson N, Miles L, editors. *Anthropomorphism, anecdotes, and animals: the emperor's new clothes?*. Albany, NY: SUNY Press; 1997, p. 313–334 [cited 2019 May 13]. Available from: <http://cogprints.org/160/>
37. Andrews K. Animal cognition. In: Zalta EN, editor. *The Stanford encyclopedia of philosophy*. Summer 2016. Metaphysics Research Lab, Stanford University; 2016 [cited 2019 May 13]. Available from: <https://plato.stanford.edu/archives/sum2016/entries/cognition-animal/>
38. Frontiers | The neural substrates of deliberative decision making: contrasting effects of hippocampus lesions on performance and vicarious trial-and-error behavior in a spatial memory task and a visual discrimination task. *Front Behav Neurosci*. [cited 2019 May 13]. Available from: <https://www.frontiersin.org/articles/10.3389/fnbeh.2012.00070/full>
39. Bekoff M. Animal emotions: exploring passionate natures: current interdisciplinary research provides compelling evidence that many animals experience such emotions as joy, fear, love, despair, and grief—we are not alone. *Bioscience*. 2000;50:861–70.
40. Waal FD. Are we in anthropodenial? *Discover magazine*. 1997. <https://www.discovermagazine.com/planet-earth/are-we-in-anthropodenial>
41. Andrews K, Huss B. Anthropomorphism, anthropectomy, and the null hypothesis. *Biol Philos*. 2014;29:711–29.
42. Sheets-Johnstone M. Taking evolution seriously. *Am Philos Q*. 1992;29:343–52.
43. Jones RC. Science, sentience, and animal welfare. *Biol Philos*. 2013;28:1–30.
44. Morgan CL, Conwy L. *An introduction to comparative psychology*. London, W. Scott, Limited; 1894 [cited 2019 May 13]. Available from: <http://archive.org/details/anintroduction00morgoog>
45. Pernick MS. *A calculus of suffering: pain, professionalism, and anesthesia in nineteenth-century America*. New York: Columbia University Press; 1985. [cited 2019 May 13]. Available from: <https://repository.library.georgetown.edu/handle/10822/806360>
46. Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. *PNAS*. [cited 2019 May 13]. Available from: <https://www.pnas.org/content/113/16/4296.short>
47. Rollin BE. *Science and ethics*. Cambridge University Press; 2006.

48. Davidson. Rational animals. *Dialectica*; 1982. Wiley Online Library [Internet] [cited 2019 May 13]. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1746-8361.1982.tb01546.x>
49. Carruthers P. Brute experience. *J Philos*; 1989 [cited 2019 May 13]. Available from: https://www.pdcnet.org/pdc/bvdb.nsf/purchase?openform&fp=jphil&id=jphil_1989_0086_0005_0258_0269
50. Hume D. *A treatise of human nature: volume 1: Texts*. Oxford: Oxford University Press; 2006.
51. Sneddon L, Lopez-Luna J, Wolfenden D, Leach M, Valentim A, Steenbergen P, et al. Fish sentience denial: muddying the waters. *Anim Sentience*. 2018;3. Available from: <https://animalstudiesrepository.org/animsent/vol3/iss21/1>
52. Animal advocacy by numbers. *Faunalytics*; 2016 [cited 2019 May 13]. Available from: <https://faunalytics.org/animal-advocacy-by-numbers/>.