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Animal Minds

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When dogs limp and whine, we think they feel pain. When a chimpanzee uses a stick to access food, we take this as evidence of reasoning.

It's natural to believe that many nonhuman animals think and feel—and therefore have minds—but it's important to consider whether these beliefs are justified.

This essay explores animal minds,[1] the challenges involved in studying them, and why such study matters.

1. What Makes Understanding Animal Minds Difficult

It seems obvious we know what goes on in our own minds, or at least that we *have* minds.[2]

But philosophers have long questioned whether we are justified in thinking that *other* individuals have minds, given that other minds are not directly observable.[3]

Considering what we know about other *humans*—that they have brains like ours and behave in similar ways—it seems reasonable to conclude that they also have minds.

With *nonhuman* animals, however, this conclusion is less clear, especially when their brains and behaviors differ significantly from our own.[4] Historically, many philosophers and scientists have been suspicious of the idea of animal minds, preferring to view animals as mindless machines.[5] Yet, the remarkable complexity and flexibility of animal behavior speak in favor of mindedness, and very few people today deny that at least some animals are minded.

Even if we accept that many animals have some form of mental life, identifying specific mental states—such as particular beliefs, desires, or emotions—is challenging. Adding to this difficulty is our tendency to *over*-attribute humanlike characteristics to animals. For example, it's unlikely that cats would deliberately plot revenge, yet we might still interpret their behavior that way.[6] At the same time, the belief in human uniqueness—the idea that certain abilities are exclusive to our species—can make some of us reluctant to attribute complex mental capacities to other animals.[7]

To accurately interpret animal behavior, we need to consider different interpretations and decide which best explains the evidence.[8] When these interpretations involve mindedness, they ascribe conscious experiences, thinking, or both to animals.

2. Conscious Experience

Human beings are conscious. We experience pain and pleasure, sadness and joy, and sensory qualities like redness. We are also aware of ourselves as distinct individuals moving through the world.[9]

When scientists ask whether nonhuman animals are conscious, they often focus on the experience of pain. It may seem obvious that many animals feel pain, as they recoil from harmful stimuli and tend to their injuries.

But skeptics argue that these behaviors could be explained by reflexive, *fully* unconscious responses to damage to their body. While many animals possess nociceptors—specialized neurons that respond to such damage—they often lack the brain structures that, in humans, are associated with the conscious feeling of pain.[10]

But we shouldn't just assume that similar mental capacities require similar brains, as the same capacities could have evolved separately in different species.[11] Additionally, some behaviors—such as crabs enduring electric shocks rather than abandoning a shelter when exposed to predator smells—are difficult to explain solely in terms of unconscious nociception and reflexive responses. Conscious pain experience seems more likely.[12]

Behavioral evidence has also been used to support arguments for conscious emotions and self-awareness in animals. For example, elephants and chimpanzees show behaviors that suggest grief,[13] octopuses engage in seemingly enjoyable play,[14] and some fish appear to recognize themselves in mirrors.[15] While the possibility of unconscious responses must also be considered, many scientists and philosophers now think

conscious experience is the best explanation in many of these cases.[16]

3. Thinking

In addition to having conscious experiences, human beings also think. If I want to order takeout, I consider where to order from, how much I'm willing to spend, and what my partner might like to eat. Thinking enables me to flexibly navigate a complex world.

When it comes to animals, we are also interested in the kind of thinking that facilitates flexible behavior. While we know that most animals are capable of "associative learning"—responding to environmental cues based on past rewards, punishments, and associations between stimuli—we want to know whether they have beliefs and desires, understand their surroundings, and possess the ability to reason.

Research in recent decades has provided plausible evidence of complex thinking in many species of animals.[17] For example, crows have been observed constructing and using tools in ways that suggest an understanding of cause and effect and the ability to plan ahead.[18] Similarly, rats seem to maximize foraging success by strategically balancing looking for new food locations with returning to familiar ones.[19]

Some animals might also be capable of understanding the mental states of others, a skill psychologists refer to as "mindreading." For example, chimpanzees behave in ways that suggest they understand what others can see.[20] Similarly, dolphins engage in complex cooperative behaviors and joint action which may require some degree of mindreading.[21]

4. Conclusion: What's at Stake?

Studying animal minds is fascinating in its own right, but it also carries significant implications.

Some are theoretical: if our goal is to understand mental capacities, limiting our focus to human minds may lead to oversimplifications. For example, much of human thought appears to be shaped by language, but it would be shortsighted to conclude that thinking *always* requires language.[22]

Other implications are practical: many of us believe that minded beings deserve moral consideration. If we base this consideration on specific capacities—such as the capacity to feel pain and suffer—then understanding the extent of these capacities across the animal kingdom becomes crucial.[23] We might readily accept that our companion animals—cats, dogs, and so on—can feel pain and suffer, yet be more skeptical about chickens, lobsters, or bees. But it is important to consider whether such skepticism is grounded in reason or simply a reluctance to acknowledge that many of the animals we use and kill without hesitation might, in fact, be thinking and feeling beings.[24]

Studying animal minds pushes us to confront our biases and blind spots, both in theoretical and practical matters. While we may never *fully* grasp what goes on in the minds of rats, crabs, or chimpanzees, it is important we try.

Notes

[1] While humans are also animals, in this essay, I use the term 'animal' to refer specifically to *nonhuman* animals.

[2] For additional discussion, see Self-Knowledge: Knowing Your Own Mind by Benjamin Winokur.

I use the terms "to have a mind," "to have a mental life," and "to be minded" interchangeably. I will not consider the question of what minds themselves are, but those interested in this topic can refer to The Mind-Body Problem: What Are Minds? by Jacob Berger.

[3] This is called the "problem of other minds" in philosophy. Some philosophers dispute the idea that other minds are not directly observable, rejecting the notion that this is a genuine philosophical issue. At its core, the issue is whether the belief that other individuals have minds is epistemically justified and, if so, what the source of that justification is: see Epistemic Justification: What is Rational Belief? by Todd R. Long. For a detailed discussion, see Avramides 2023.

[4] Colin Allen and Marc Bekoff (1997) refer to this as the "other species of mind problem."

[5] A famous example is René Descartes (1596-1650), who considered nonhuman animals to be purely material, mechanistically-driven beings, devoid of minds (see Descartes' *Discourse on the Method* in [CSM]).

[6] The tendency to attribute human-like traits to nonhuman animals, plants, and even inanimate objects is known as "anthropomorphism." Concerns about unwarranted anthropomorphism in the study of animal minds are justified. A notable historical example is the case of "Clever Hans". Hans was a horse believed to perform mental arithmetic, tapping its hoof the right number of times in response to

questions like "What is 2 + 3?" More careful investigation revealed that Hans wasn't solving math problems but was instead responding to subtle cues from his owner. (For additional discussion, see Andrews 2020, Ch. 3.)

The story of Clever Hans is sometimes cited in support of "Morgan's canon," a principle introduced by C. Lloyd Morgan, an early comparative psychologist. Morgan proposed that "in no case is an animal activity to be interpreted in terms of higher psychological processes if it can be fairly interpreted in terms of processes that stand lower in the scale of psychological evolution and development" (1903, 292). The influence of Morgan's canon has declined in recent decades, as many animal minds researchers now consider it vague and biased.

[7] Frans de Waal (1997) warns against exaggerating the uniqueness of the human species, writing: "The ancients apparently never gave much thought to this practice, the opposite of anthropomorphism, and so we lack a word for it. I will call it anthropodenial: a blindness to the humanlike characteristics of other animals, or the animal-like characteristics of ourselves. Those who are in anthropodenial try to build a brick wall to separate humans from the rest of the animal kingdom."

[8] This means that animal minds research, like research in many other scientific fields, relies on Inference to the Best Explanation (IBE). In IBE reasoning, we first identify competing explanations for the same set of data and then assess their relative "goodness." As Gilbert Harman explains, we infer "from the premise that a given hypothesis would provide a 'better' explanation for the evidence than any other hypothesis, to the conclusion that the given hypothesis is true" (1965, 89), or at least *likely* to be true. A key criterion of goodness is explanatory power and depth, though other factors—such as simplicity or consistency with prior knowledge—may also play a role.

[9] Birch et al. (2020) propose a multidimensional approach to studying animal consciousness, distinguishing between five key dimensions: (i) perceptual richness, which refers to the variation in the level of detail with which animals consciously perceive their environment, (ii) evaluative richness, encompassing the range of positive and negative feelings, such as pain, fear, and joy, (iii) the integration of an animal's conscious experience at a given time, (iv) the integration of its conscious experience across time, and (v) self-awareness.

[10] For a more detailed discussion of the distinction between nociception and pain, see Philosophy of Pain by Tiina Carita Rosenqvist.

[11] Philosophers of mind often say that mental states and capacities are "multiply realizable." What this means is that the same mental state or capacity can arise from different physical structures and mechanisms. While this concept is frequently invoked to support the possibility of artificial minds, it also suggests that animals with vastly different brain structures may share similar mental capacities.

A relevant idea from biology is that of convergent evolution, which refers to the independent evolution of similar traits in different animal lineages (at different times), often as a response to similar challenges. A classic example is the independent evolution of wings in bats and birds. While the evolution of a basic pain system may have occurred early in evolutionary history, with subsequent selection refining its specifics in different species (with the possibility of "novel structures taking on ancient functions," as Brown (2016) puts it), other mental capacities—such as high intelligence—may have evolved independently in multiple lineages (see, e.g., Roth 2016).

[12] Magee and Elwood (2016) administered small electric shocks to crabs while they were hiding in their shelters (found shells). In response, the crabs generally abandoned their shelters—except when predator cues were present, in which case they often endured the shocks. This is an example of a trade-off behavior, where an animal appears to balance two competing needs—in this case, pain relief and the protection provided by the shell. Such behaviors are often cited as evidence of conscious pain experience, as they suggest the animal is weighing discomfort against another priority instead of just reacting reflexively. While trade-off behaviors do not prove that crabs experience pain, they offer "reasonably good evidence," as Peter Godfrey-Smith notes (2020, 91).

[13] On elephant grief, see, e.g., Pokharel et al. 2022. On chimpanzee grief, see, e.g., Lonsdorf et al. 2020.

[14] For example, Kuba et al. (2006) discuss octopuses showing play-like behavior with LEGO bricks.

[15] See Kohda et al. 2022. Recognizing oneself in a mirror is generally considered evidence of self-awareness. A common method for testing this is the mirror mark task, where an animal is given a colorful mark visible to it only in the mirror (in Kohda et al.'s

study, the fish were marked on their throats). If the animal attempts to remove the mark upon seeing it, and no plausible alternative explanation for the behavior exists, they are considered to have passed the test. Few animals have passed mirror mark tests, which makes the results of this study all the more remarkable. As the authors themselves conclude, "either self-awareness in animals or the validity of the mirror test needs to be revised."

[16] This represents a major shift from just a few decades ago when skepticism about animal consciousness dominated the scientific community. Today, that skepticism has largely been replaced by a more balanced and open-minded approach. Pioneers like Donald Griffin were instrumental to this shift. In the introduction to the second edition of his book *Animal Minds*, Griffin wrote: "In a sharp break with the traditional conviction that the mental experiences of animals cannot be studied scientifically, some of us have begun to try" (2001, xiii).

Ideally, behavioral data is complemented by additional forms of evidence. As Marc Bekoff writes about research on animal emotions, "A broad and motivated assault… will require that researchers in various fields—ethology, neurobiology, endocrinology, psychology, and philosophy—coordinate their efforts. No one discipline will be able to answer all of the important questions that still need to be dealt with…" (2000, 867) For a discussion of the complexities involved in the attribution of conscious emotions to animals, see Dawkins 2000.

[17] You might wonder why such research is necessary in the first place. It may seem clear that animals think, given their ability to navigate their environment and perform various tasks. However, it's possible that they are simply responding mechanistically to stimuli without engaging in true thinking. To rule out these alternative explanations and provide compelling evidence of complex cognition, we need scientific methods.

[18] See, e.g., Hunt 1996, Boeckle et al. 2020.

[19] See Jackson et al. 2020.

[20] For a balanced discussion of the research on chimpanzee mindreading, see Andrews 2017.

[21] In the wild, dolphins engage in cooperative hunting and herding. In a controlled experiment, Jaakkola et al. (2020) found that bottlenose dolphins were able to work together with "extreme precision" on a simultaneous button-pressing task, even when it meant waiting for their partner.

Successful joint action may require understanding your partner's intentions, which would qualify as mindreading. While some instances of joint action might be explainable in terms of responses to environmental cues alone, Jaakkola et al. suggest that the precision observed in their study "makes it virtually impossible that the dolphins were reacting to a general cue like 'press when a partner is near the apparatus,' and highly unlikely that they were responding to a more specific perceptual cue indicating their partner had pressed the button."

It is also worth considering why animals may have evolved mindreading abilities in the first place. The Social Intelligence Hypothesis suggests that the evolution of complex cognitive abilities in humans and some other animals was driven by the challenges of living in complex social groups. There are two main versions of this hypothesis. The Machiavellian version suggests that intelligence—including social intelligence and mindreading—evolved to outsmart rivals and gain a competitive advantage. In contrast, the Mengzian version emphasizes cooperation as the driving factor and suggests that mindreading evolved to help individuals understand the intentions of others (see Andrews 2020, Ch. 7).

[22] You might wonder whether animals have languages that we simply do not understand. While many animals appear to communicate—bees dance, chimpanzees vocalize and gesture, and birds sing—it remains an open question whether any nonhuman animal communication systems qualify as genuine language. Language, in this sense, is more than just communication; it is a structured system of symbols and rules that allows for the creation of new meanings. For a discussion of animal communication, see Andrews 2020, Ch. 6. For an in-depth discussion of non-linguistic thought, see Bermúdez 2003. For a discussion geared toward a general audience, see Grandin and Johnson 2005.

The common tendency to use human cognition as the baseline for comparative psychology has attracted increasing criticism. For example, Bräuer et al. (2020) write that "we tend to overrate those cognitive skills that are human-like… and… run the risk of overlooking cognitive skills that play only a minor role or no role in human psychology."

[23] For a deeper exploration of the moral significance of animal pain and suffering, see "Can They Suffer?": Jeremy Bentham on our Obligations to Animals by

Daniel Weltman. For additional discussion of moral considerability, see Theories of Moral Considerability: Who and What Matters Morally? by Jonathan Spelman.

[24] Though many scientists and laypeople alike agree that mammals—and perhaps birds—experience pain, there is more debate over whether invertebrates, reptiles, amphibians, and fish have conscious experiences. Jonathan Birch (2017) argues that when evidence for an animal's capacity for conscious experience is inconclusive, we should err on the side of caution and assume the animal is conscious when formulating animal protection laws (he calls this the "precautionary principle").

Even if we accept that many nonhuman animals are owed moral consideration by us, it does not automatically follow that their interests should be weighted equally with those of humans. For example, Michael Tye defends a view he calls "centered speciesism," which holds that moral value is distributed in a way that favors members of one's own species. Still, Tye argues against the unnecessary harming and killing of animals for food and other purposes, writing that "even if it is correct for us to favor other humans over nonhuman animals, it does not follow that we should not treat them with respect" (2016, 219).

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