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# **The Cognitive Animal**

## **Empirical and Theoretical Perspectives on Animal Cognition**

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### **OA Funding Provided By:**

The open access edition of this book was made possible by generous funding from Arcadia—a charitable fund of Lisbet Rausing and Peter Baldwin.

The title-level DOI for this work is:

[doi:10.7551/mitpress/1885.001.0001](https://doi.org/10.7551/mitpress/1885.001.0001)

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# 8 Animal Minds, Human Minds

Eric Sidel

*Every consideration whatsoever which contributes to my perception of ... any other body cannot but establish even more effectively the nature of my own mind.*

—Descartes (1641/1984, p. 33)

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## What Do Minds Do?

My research in animal cognition is centered on questions about the role(s) representations play in causing animal behavior. I ask if animals represent the world, or if they simply respond to it, and then, for animals that do represent the world, if those representations—specifically the content of those representations—are involved in their behavior. Exactly why I ask these questions, why I take the approach I do toward answering them, and what I think the questions and answers have the potential to reveal about all animal minds—not just the minds of non-human animals—is an involved tale.

Philosophers typically answer questions by asking questions. When asked if animals have minds, or asked about the nature of animal minds, the philosopher will want to start by asking what a mind is, for only when we know what a mind is can we know if animals have minds, or what animal minds are like. But the answer to that question is at best an ending point, not a useful starting point. Consider a similar question.

Is Duchamp's Fountain (a urinal that is like any other factory-made urinal except for the artist's signature) a work of art? In order to answer this question, we might examine paradigm examples of art for common properties and then ask if Duchamp's Fountain shares these properties. However, this could lead us astray by focusing our attention on shared properties that are irrelevant. More important, the examples of art are paradigms not simply because they are clearly works of art, but also because they do not challenge our preconceived notion of what a

work of art is. This method would not permit challenges to that notion to be ratified as art.

Another way to answer the question would be to theorize about what property (or properties) a work of art has that makes it art. However, this approach is too essentialist; it makes an object a work of art if it has one (or more) essential property. It might be the case that an object is art if it has some of a range of properties, none of which are shared by all works of art. Furthermore, our choice of property is going to be determined largely by what we think are the paradigm works of art. For example, if we are strongly influenced by the Old Masters, we might think that having the right subject or meeting certain formal standards is necessary for something to be a work of art. The conclusions we draw are determined by the paradigm works of art with which we started.

Still another way to answer this question would be to ask what it is that a work of art does or is supposed to do. Then things that fulfill that function are works of art. Call this a functional definition of art. Such a definition has the advantage of freeing us from the constraints that are invariably attached to definitions of art that are derived from paradigms. This allows challenges to our preconceived notion of what a work of art is.

The pitfalls we face when trying to define "mind" are similar to those we face in trying to define "art." We might start by looking at what we think of as the paradigm of a mind: the human mind. Then we might claim that an object is a mind if it is sufficiently similar to this paradigm. However, this raises several problems similar to those described above. Any paradigm-driven definition is going to be a slave to the properties shared by the paradigms; it will not be able to encompass things that differ strongly from the paradigms. It may be that things that are wildly different from human minds are not

minds, but we should not begin our investigation into the nature of animal minds by assuming this. It should be something we discover as a result of our empirical work rather than a boundary condition that we impose on our work at the outset. Nor should we adopt the second approach, choosing properties that are essential for being a mind. This also binds us to our preconceived notions of what is and is not a mind. So perhaps here too we should adopt a functional definition; something is a mind if it does what a mind does (or if it is supposed to do what a mind is supposed to do).<sup>1</sup>

This is a step in the right direction, but it leaves us with another important question: What do minds do? I am not going to try to answer this question, although I do suggest some answers. [See Godfrey-Smith (1996) for a discussion of the function of minds.] Not only is it as difficult to answer as the question “What is a mind?” it is also, as I argue here, a question with many correct answers. However, it is a more helpful question; it opens the door to fruitful research questions. Once we postulate a trait (an ability) that some minds have, we can ask if particular organisms have that trait. Then we can ask how the organisms accomplish that task. This tells us more about cognition in that animal and more about cognition in general. [See Allen (forthcoming) for a discussion of the importance of focusing on traits.]

Of course, this functional definition is just as mired in our anthropomorphic sense of what a mind is as are the paradigm-based and essential property definitions. Here that is acceptable; our interest in minds is an interest in the nature of things that accomplish tasks similar to those our own minds accomplish. Among the things we want to know are how they manage to accomplish those tasks, what aspects of the mind are essential for accomplishing those tasks, and why minds are organized the way they are. Our interest, that is, is not confined to things that do what our minds do in the way our minds do; we are more broadly interested in things that may

do what our minds do, in any way that they do them. In investigating the minds of other creatures it may be impossible to escape anthropomorphism in our assessment of what minds do, but that anthropomorphism frees us from thinking that only things like our own minds are indeed minds.

Does this mean that all things that do what minds do are themselves minds? If one cognitive function is to gather information from the environment and categorize it so that it can be acted upon at some later date, then are we obliged to say that simple machines that are sensitive to only a few aspects of the environment, but are able to act on that information, have minds? For example, in the late 1980s the MIT Mobile Robot Laboratory designed a robot (dubbed “Herbert”) that was able to collect empty soda cans from the tops of tables in a laboratory (Connell 1989; for discussion, see Clark 1997 and Sidel 1999). Herbert accomplishes a task that human beings use their minds to accomplish. Does that mean that Herbert has a mind and uses it when he is collecting empty soda cans?

Rats are apparently able to navigate through complex terrains, even to the extent of quickly finding alternative routes when their preferred route is blocked (Gallistel 1980, pp. 334–354). Again, this is a task that humans accomplish by utilizing various mental abilities. Does it follow that the rats have minds?<sup>2</sup>

This is at best an unhelpful question. Instead of focusing on whether an animal has a mind (something that depends solely on whether they have minds, not on the nature or variety of their cognitive abilities, or the nature of our evidence in support of the proposition that they have minds), we should focus our attention on the evidence and what that evidence reveals about the cognitive processes of that animal. That is, we should worry about the nature of the evidence, what the evidence tells us about the animal we are studying, and what it tells us about mental traits more generally. We can look at the evidence, not as evidence for some abstract organ—

identified with the mind—but as evidence for some simpler trait, one of the many that goes into composing the mind. Thus, in the case of the rats and Herbert, I want to ask if there is evidence that representations of the world are part of the causal nexus of their behavior.

This question is important in part because philosophers have long thought that intentionality—the characteristic that representations have of being about something—is the mark of the mental. More important than that (especially because to look for a sign that something is a mind is to embrace the vague pursuit of minds over the more productive pursuit of cognitive capacities), representation introduces a special kind of distance between the organism and the world. When an organism uses representations, it is not responding to the world, but instead is responding to the way it *pictures* the world. Perhaps the best way to understand this is in contrast to von Uexküll's *Umwelt*. The *Umwelt* of an organism is defined by its perceptual abilities and limitations; an ant detects and removes deceased members of its nest by detecting folic acid, something to which members of other species (e.g., human beings) are blind. The folic acid is part of the ant's *Umwelt*, but not the human's. However, the ant does not need to represent its nestmate as dead, it only needs to respond to the folic acid it perceives.

Organisms that navigate the world without representations are merely responding to the cues to which they are sensitive. Organisms that use representations are responding instead to the way they represent the world. [Von Uexküll's interest in the *Umwelt* of an organism was in the way that the *Umwelt* meshed with the organism's structure to create an internal world shaped by those features of the external world to which the organism was sensitive. As I read von Uexküll, this *Innenwelt* is not quite the same thing as the representational world discussed here. The *Innenwelt* is the way the organism's structure responds to the *Umwelt*, whereas the representational world introduces an even greater distance between an organism and the world, so that

the organism is responding, not to its *Umwelt*, but to its representation of its *Umwelt*; see von Uexküll (1909/1985).] This layer introduces the possibility of error (which means that organisms that use representation must be able somehow to overcome error) and the possibility of overcoming obstacles because an organism that uses representation has the ability to relinquish the means to a goal while remaining directed toward that goal; see Saidel (1998). Thus, by focusing on representations, I am focusing on the cognitive ability some organisms apparently have to interact plastically with their environments, to experiment, and to make mistakes.

Another advantage of focusing on what minds do—in this case, represent—is that it prompts more directed questions. For example, in looking for evidence that an organism uses representations, we might look for evidence that it is able to overcome obstacles. Or we might look for evidence that a behavior that is not productive is not simply triggered by a misleading cue in the environment, such as folic acid painted on a pebble. In addition to focusing our attention on more fruitful questions, the functional approach has the added benefit of reminding us that when we think about cognition, and when we wonder about the nature of animal cognition, we are often not interested in the question abstractly. There are certain aspects of cognition that we find more interesting than others. By focusing on more specific questions, we highlight those questions that are really driving our concerns. And by asking the questions in a more focused way, we ensure that we remember that research into the nature of animal cognition is comparative research. In answering our questions it helps to look at the evidence displayed by members of different species.

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### Animal Minds, Human Minds

I want to ask about the role that representations play in rats' behavior. If rats do indeed have the

ability to find alternative routes to a goal when a preferred route is blocked, that is, if they have the ability to remain directed toward a goal while relinquishing various means to achieving that goal, then it seems likely that representations are causally responsible for their behavior to at least some extent. Contrast this with the robot Herbert's behavior. Herbert is unable to overcome obstacles; he merely moves about his environment, retrieving cans. Having a representation of his environment would not change the way he sweeps the environment for cans.

What might these questions and answers reveal about the nature of the internal psychological states of rats (and of Herbert)? At least this: We learn that the evidence suggests that some of the rats' behavior is guided by representations, rather than being merely a response to the world. That suggests that the rats have internal psychological states. If their behavior were directed by the nature of the world rather than by their representations of the world, no inner cognitive interpretation of the world would be implicated. That means there would be no evidence for inner psychological states. That is the case for Herbert.

However, when we wonder about the nature of an organism's internal psychological states, we are seldom wondering about something as minimal as the presence of a representational layer. Instead we are often wondering about the nature of that layer—the richness of the representations, the degree to which those representations are causally responsible for the organism's behavior, and the structure of those representations. These worries, I suggest, are comparative worries. That is, we may consider the ways in which representations are causally responsible for human behavior and ask if they are causally implicated in rat behavior in the same way. For example, do rats represent pictorially or do their representations have a combinatorial, language-like structure? Or we might compare the behavior of rats with the behavior of another organism that we have reason to believe uses representations and ask how their use of representations is

similar and how it differs. Doing so will help us learn about the minds of both organisms, and it will help us learn about the nature of mind in general.

My interest is more specific; I am curious about the nature of human minds. The answers we find when exploring the role that representations play in the behavior of rats (and other organisms) help us learn in several different ways about human minds: (1) We learn something about the nature of the evidence that representations are active in causing human behavior. This can help us learn when human behavior is properly explained by reference to representational states and when reference to such states goes beyond the evidence. (2) This helps us recognize other ways of achieving behavioral goals (the results toward which behavior is aimed, either by the agent or by evolution) than by using representations, some of which may be part of the human behavioral repertoire. (3) We can also use what we learn about the minds of rats to determine what the structure of human minds might be and why, evolutionarily, human minds might have that structure. Understanding this can help us understand better how human minds work.

This is an example of a more general strategy. By asking specific questions about the specific abilities of other organisms, we are able to learn about the different means that organisms use to achieve similar goals. This sheds light on the means that human beings<sup>3</sup> use to achieve those goals, and it helps us understand the evolutionary history of that particular human cognitive ability. That in turn helps us understand how the human mind is structured and why it is structured that way. And that in turn helps us understand the nature of the human mind.

This, for me, is the grail, but chasing this grail has side benefits as well. Learning about the varied nature of animal minds shows us that a mind is not a simple organ, but is instead a complex mosaic of traits (Allen and Sidel 1998). There are other ways of being a mind than the

way that human minds are organized. Recognizing this helps us down from our self-imposed pedestal and lets us see that other animals not only have minds that are different from ours but also that they have mental abilities that human beings lack. And, as is the case with art, recognizing that the world of minds is far greater than we previously supposed can be a wonderful, stimulating revelation.

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### Notes

1. It would be a mistake to say that only things that do what minds do are minds, for that would mean that malfunctioning minds are not minds. That something has a particular function is a fact about the properties and abilities of that thing, or things of the same type, not a fact about how we may decide to think of that thing. For example, I cannot simply decide by fiat that my toaster oven has the function of warning me when telemarketers are phoning. Thus some object is a mind if it reasonably has as (one of) its function(s) a mental function.
2. One of these questions is about the mental abilities of a nonhuman animal, the other is about the mental abilities of a machine. Some might want to think of these as different areas of research, but I do not see the fruitfulness of such an arbitrary (I think) boundary. In the case of both the nonhuman animal and the machine we ask the same key questions: Does this behavior provide evidence that this thing is using representations? What would such evidence look like?
3. Or other organisms; the comparative strategy I am outlining can be used to learn about the mind of any organism.

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### References

- Allen, C. (forthcoming). Real traits, real functions? In *Functions and Functional Analysis in the Philosophy of Biology and Psychology*, A. Ariew, M. Perlman, and R. Cummins, eds., Oxford: Oxford University Press.
- Allen, C. and Sidel, E. (1998). The evolution of reference. In *The Evolution of Mind*, D. Cummins and C. Allen, eds., pp. 183–203. Oxford: Oxford University Press.
- Clark, A. (1997). *Being There*. Cambridge, Mass.: MIT Press.
- Connell, J. (1989). A Colony Architecture for an Artificial Creature. Technical Report II 5 1, Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Cambridge, Mass.
- Descartes, R. (1641/1984) Meditations on first philosophy. In *The Philosophical Writings of Descartes*. Vol. II. (J. Cottingham, R. Stoothoff, and D. Murdoch, trans.) Cambridge: Cambridge University Press.
- Gallistel, C. R. (1980). *Organization of Action: A New Synthesis*. Hillsdale, N.J.: Lawrence Erlbaum Associates.
- Godfrey-Smith, P. (1996). *Complexity and the Function of Mind in Nature*. Cambridge: Cambridge University Press.
- Sidel, E. (1998). Beliefs, desires, and the ability to learn. *American Philosophical Quarterly* 35: 21–37.
- Sidel, E. (1999). Critical notice of Andy Clark's *Being There*. *Canadian Journal of Philosophy* 29: 299–318.
- Uexküll, J. von (1909/1985). Environment (*Umwelt*) and the inner world of animals (C. J. Mellor and D. Gove, trans.). In *The Foundations of Comparative Ethology*, G. M. Burghardt, ed., pp. 222–245. New York: Van Nostrand Reinhold. (Reprinted from J. von Uexküll, 1909, *Umwelt and Innenwelt der Tiere*. Berlin: Jena.)

