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1. The Problems of Animal Thought and Reason

Given what we know or can safely assume to be true of their behaviors and brains, can animals have thought and reason? The answer depend in large measure on what one takes thought and reason to be, as well as what animals one is considering. Philosophers have held various views about the nature and possession conditions of thought and reason and, as a result, have offered various arguments for and against thought and reason in animals. Below are the most influential of such arguments.

a. Hume's Argument for Animal Thought and Reason

David Hume (1711-1776) famously proclaimed that “no truth appears to be more evident, than that beast are endow'd with thought and reason as well as men” (1739/1978, p. 176). The type of thought that Hume had in mind here was belief, which he defined as a “lively idea” or “image” caused by (or associated with) a prior sensory experience (1739/1978, p. 94). Reason Hume defined as a mere

disposition or instinct to form associations among such ideas on the basis of past experience. In the section of *A Treatise of Human Nature* entitled, “Of the Reason of Animals,” Hume argued by analogy that since animals behave in ways that closely resemble the behaviors of human beings that we know to be caused by associations among ideas, animals also behave as a result of forming similar associations among ideas in their minds. Given Hume’s definitions of “thought” and “reason,” he took this analogical argument to give “incontestable” proof that animals have thought and reason.

A well-known problem with Hume’s argument is the fact that “belief” does not appear to be definable in terms of vivid ideas presented to consciousness. Beliefs have propositional content, whereas ideas, as Hume understood them, do not (or need not). To have a belief or thought about some object (for example, the color red) always involves representing some fact or proposition about it (for example, *that* red is the color of blood), but one can entertain an image of something (for example, the color red) without representing any fact or proposition about it. Also, beliefs aim at the truth, they represent states of affairs as being the case, whereas ideas, even vivid ideas, do not. Upon looking down a railway track, for instance, one could close one’s eyes and entertain a vivid idea of the tracks as they appeared a moment ago (that is, as converging in the distance) without thereby believing that the tracks actually converge. And it is further argued, insofar as “belief” fails to be definable in terms of vivid ideas presented to consciousness, “reason” fails to be definable in terms of a disposition to form associations among such ideas; for whatever else reason might be, so the argument goes, it is a surely a relation among beliefs. Finally, and independently of Hume’s definitions of “belief” and “reason,” there is a serious question about how incontestable his analogical proof is, since similar types of behaviors can often be caused by very different types of processes. Toy robotic dogs, computers, and even radios behave in ways that are similar to the ways that human beings behave when we have vivid ideas presented to our consciousness, but few would take this fact alone as incontestable proof that these objects act as a result of vivid ideas presented to their consciousness (Searle 1994).

b. Descartes’ Two Arguments Against Animal Thought and Reason

Equally as famous as Hume’s declaration that animals have thought and reason is René Descartes’ (1596-1650) declaration that they do not. “[A]fter the error of those who deny God, ” Descartes wrote, “there is none that leads weak minds further from the straight path of virtue than that of imagining that the souls of beasts are of the same nature as our own” (1637/1988, p. 46). Descartes gave two independent arguments for his denial of animal thought and reason, which have come to be called his *language-test argument* and his *action-test argument*, respectively (Radner & Radner 1989).

i. The Language-Test Argument

Not surprising, Descartes meant something different from Hume by “thought.” In the context of denying it of animals, Descartes appears to take the term to stand for *occurrent thought*—that is, thoughts that one entertains, brings to mind, or is suddenly struck by (Malcolm 1973). Normal adult human beings, of course, express their occurrent thoughts through their declarative speech; and declarative speech and occurrent thoughts share some important features. Both, for example, have propositional content, both are stimulus independent (that is, thoughts can occur to one, and declarative speech can be produced, quite independently of what is going on in one’s immediate perceptual environment), and both are action independent (that is, thoughts can occur to one, and declarative speech can be produced, that are quite irrelevant to one’s current actions or needs). In light of these commonalities, it is understandable why Descartes took declarative speech to be “the only certain sign of thought hidden in a body” (1649/1970, p. 244-245).

In addition to taking speech to be thought’s only certain sign, Descartes argued that the absence of speech in animals could only be explained in terms of animals lacking thought. Descartes was well aware that animals produce calls, cries, songs, and various gestures that function to express their “passions,” but, he argued, they never produce anything like declarative speech in which they “use words, or put together other signs, as we do in order to declare our thoughts to others” (1637/1988, p. 45). This fact, Descartes reasoned, could not be explained in terms of animals lacking the necessary speech organs, since, he argued, speech organs are not required, as evidenced by the fact that humans born “deaf” or “dumb” typically invent signs to engage in declarative speech, and some animals (for example, magpies and parrots) who have the requisite speech organs never produce declarative speech; nor could it be explained as a result of speech requiring a great deal of intelligence, since even the most “stupid” and “insane” humans beings are capable of it; and neither could it be explained, as it is in the case of human infants who are incapable of speech but nevertheless possess thought, in terms of animals failing to develop far enough ontogenetically, since “animals never grow up enough for any certain sign of thought to be detected in them” (1649/1970, p. 251). Rather, Descartes concluded, the best explanation for the absence of speech in animals is the absence of what speech expresses—*thought*. There are various places in his writings where Descartes appears to go on from this conclusion to maintain that since all modes of thinking and consciousness depend upon the existence of thought, animals are devoid of all forms of thinking and consciousness and are nothing but mindless machines or automata. It should be noted, however, that not every commentator has accepted this interpretation (see Cottingham 1978).

Various responses have been given to Descartes’ language-test argument. Malcolm (1973), for example, argued that *dispositional* thinking is not dependent upon occurrent thought, as Descartes seemed to suppose, and is clearly possessed by many animals. The fact that Fido cannot entertain the thought, *the cat is in the tree*, Malcolm argued, is not a reason to doubt that he *thinks* that the cat is in the tree. Others (Hauser et al. 2002), following Noam Chomsky, have argued that the best explanation for the absence of speech in animals is the not the absence of occurrent thought but the absence of the capacity for recursion (that is, the ability to produce and understand a potentially in-

finite number of expressions from a finite array of expressions). And others (Pepperberg 1999; Savage-Rumbaugh et al. 1998; Tetzlaff & Rey 2009) have argued that, contrary to Descartes and Chomsky, some animals, such as grey parrots, chimpanzee, and honeybees, possess the capacity to put together various signs in order to express their thoughts. Finally, it has been argued that there are behaviors other than declarative speech, such as insight learning, that can reasonably be taken as evidence of occurrent thought in animals (see Köhler 1925; Heinrich 2000).

ii. The Action-Test Argument

Whereas Descartes' principal aim in his language-test argument was to prove that animals lack thought, his principal aim in his action-test argument is prove that animals lack reason. By "reason," Descartes meant "a universal instrument which can be used in all kinds of situations" (1637/1988, p. 44). For Descartes, to act *through* reason is to act on general principles that can be applied to an open-ended number of different circumstances. Descartes acknowledged that animals sometime act *in accordance with* such general rules of reason (for example, as when the kingfisher is said to act in accordance with Snell's Law when it dives into a pond to catch a fish (see Boden 1984)), but he argued that this does not show that they act *for* these reasons, since animals show no evidence of transferring this knowledge of the general principles under which their behaviors fall to an open-ended number of novel circumstances.

Some researchers and philosophers have accepted Descartes' definition of "reason" but have argued that some animals *do* show the capacity to transfer their general knowledge to a wide (or wide enough) range of novel situations. For example, honey bees that were trained to fly down a corridor that had the same (or different) color as the entry room into which they had initially flown automatically transferred this knowledge to the novel stimulus dimension of smell: those that were trained to choose the corridor with the same color, flew down the corridor with the same smell as in the entry room; and those that were trained to choose the corridor with a different color, flew down the corridor with a different smell as in the entry room. It is difficult to resist interpreting the bees' performance here, as the researchers do, in terms of their grasping and then transferring the general rule, "pick the same/different feature" (Giurfa et al. 2001). Other researchers and philosophers, however, have objected to Descartes' definition of "reason." They argue that reason is not, as Descartes conceived it, a universal instrument but is more like a Swiss army knife in which there is a collection of various specialized capacities dedicated to solving problems in particular domains (Hauser 2000; Carruthers 2006). On this view of intelligence, sometimes called the *massive modularity thesis*, subjects have various distinct mechanisms, or modules, in their brains for solving problems in different domains (for example, a module for solving navigation problems, a module for solving problems in the physical environment, a module for solving social problems within a group, and so on). It is not to be expected on this theory of intelligence that an animal capable of solving problems in one domain, such as exclusion problems for food, should be capable of solving similar problems in a variety of other domains, such as exclusion problems for predators, mates,