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Descartes's Language Test and Ape Language Research

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RESUMEN

Algunos filósofos (por ejemplo, Descartes) argumentan que hay una relación evidencial entre el lenguaje y el pensamiento, tal que esa presencia del lenguaje resulta indicativa de la de la mente. La investigación reciente sobre la adquisición del lenguaje en simios como los chimpancés o los bonobos trata de demostrar la capacidad de esos primates para adquirir una capacidad lingüística al menos rudimentaria. Este artículo presenta un caso de estudio de la investigación sobre el lenguaje de los simios y explora las consecuencias de la investigación respecto del argumento de que los animales carecen de mente puesto que no poseen capacidad lingüística.

PALABRAS CLAVE: *mentes animales; lenguaje; Descartes; Washoe; Kanzi.*

ABSTRACT

Some philosophers (e.g. Descartes) argue that there is an evidential relationship between language and thought, such that presence of language is indicative of mind. Recent language acquisition research with apes such as chimpanzees and bonobos attempts to demonstrate the capacity of these primates to acquire at least rudimentary linguistic capacity. This paper presents a case study of the ape language research and explores the consequences of the research with respect to the argument that animals lack mind because they fail to display linguistic capacity.

KEYWORDS: *Animal Minds; Language; Descartes; Washoe; Kanzi.*

I. INTRODUCTION

In this paper, I consider the topic of animal minds in light of the attempt by scientists to teach apes to communicate linguistically. Reflection on the ape language research gives rise to a dilemma which turns on the relation between language and thought. If scientists succeed in teaching an ape to communicate linguistically, does this mean that prior to language acquisition

the ape has a mind? Alternatively, does the ape acquire a mind as the result of learning the language?

There is widely held to be a close relationship between language and thought. In what follows, I pose a dilemma for those inclined to deny that animals have a mind on the basis of this relationship. By way of introduction, I offer some preliminary remarks about the evolutionary background of the topic of animal minds (section II). I then present Descartes's view that language possession may serve as a test for mind (section III). Descartes's language test is of immediate relevance to the ape language research. For if apes acquire language, they thereby satisfy the test for mind. But it is not clear that the research does yield genuine language acquisition. I illustrate this with a case study of the ape language research (section IV). But despite the equivocal outcome of the research, it remains worthwhile to explore a number of its implications (section V). I conclude by noting that if the outcome of the research is positive, one must either deny the connection between language and thought or allow that mind may be acquired as the result of learning a language.

II. HUMANS AND NON-HUMAN ANIMALS

On a traditional way of thinking about the relation between humans and non-human animals, there is a fundamental difference between humans and animals. Humans have a mind. They think, they reason, have hopes, wishes, desires, feelings, sense perception, and feel pain. Non-human animals do not have a mind. Perhaps they feel pain. But they don't think, reason, have hopes, wishes, desires, and so forth. Having a mind is what distinguishes humans from non-human animals.

A contrasting approach is associated with a modern evolutionary conception of humans. Humans are evolved creatures like non-human animals. We may be different from non-human animals in many ways. But we share a great deal with them. So we can expect to find that we have much in common with animals. In particular, we may expect to find similar, if not identical, mental phenomena in non-human animals. Given this, possession of mind is no longer what distinguishes humans from non-human animals. For animals, too, may have a mind, though perhaps not a mind in quite the same sense as the human mind.

Darwin himself argued that human mental powers gradually developed from the mental capacities of the animals from which humans evolved. He noted that the mental powers of humans are closer to those of apes than the mental powers of apes are to those of fish. In the *Descent of Man*, he describes a number of examples of animal behaviour which he takes to provide evidence of mental activity. Here is one case that Darwin describes:

[...] at the Cape of Good Hope an officer had often plagued a certain baboon, and the animal, seeing him approaching one Sunday for parade, poured water into a hole and hastily made some thick mud, which he skilfully dashed over the officer as he passed by, to the amusement of many bystanders. For long afterwards the baboon rejoiced and triumphed whenever he saw his victim [Darwin (1871/2001), pp. 214-5].

The point of this case is to show that the baboon has certain basic emotional states, apparent from rejoicing when he sees the officer. But Darwin's own description suggests more than this. The baboon harbors a grudge against the officer. It remembers what the officer did to it at some earlier point in time. It recognizes the officer. It knows how to make mud. It forms the intention of making mud to throw at the officer, and does so. Later it relishes the memory of having done so and rejoices whenever it sees the officer again.

It is very tempting to describe the baboon's behaviour using mental vocabulary of the kind that we employ to describe human behaviour. However, to apply such mental vocabulary to the baboon is to invite the charge of anthropomorphism. Anthropomorphism is widely regarded as a fallacy because it is taken to be a mistake to attribute human mental states to non-human animals. But it is by no means clear that it is a fallacy. Of course, it would be a fallacy if animals had already been shown not to have minds. But until this has been shown, it is inappropriate to assume that animal mental state attribution is mistaken. To assume that anthropomorphism is a fallacy is to assume that animals do not have minds and for that reason that it is a mistake to attribute mental states to them. But the question of whether animals have minds is precisely what needs to be established before we can say that anthropomorphism is mistaken. Thus, while I do not assume that animals have minds, neither do I assume that attribution of mental states to animals is intrinsically mistaken, as the charge of anthropomorphism presumes.

As we have seen, a Darwinian perspective leads us to expect continuity between humans and non-human animals. But there is one factor that may seem to set humans apart from non-humans. Unlike non-human animals, humans are language users. Non-human animals communicate with each other. Some species of animals have systems of communication. But no species of non-human animal has language. No other species is able to use language as a means of articulating and communicating complex thoughts in the way that humans do. The way in which human thought and language are intertwined is a distinctive feature of humans that sets us apart from other animals.

In recent decades, researchers in a number of scientific fields have conducted a range of studies of the mental capacities of a variety of species of non-human animals. Of particular interest are a series of experiments on language acquisition that have been undertaken with non-human primates, such

as chimpanzees and bonobos. This language acquisition research suggests that members of some species of ape are able to acquire rudimentary language skills. Given the relationship that has been thought to obtain between language and thought, the ape language research raises intriguing questions about animal minds.

III. DESCARTES'S LANGUAGE TEST

Philosophers have long held that there is an intimate relationship between language and thought, which suggests that animals without language do not have minds. René Descartes was one influential advocate of this view.

In the *Discourse on Method*, Descartes considers the possibility of a human-like machine that is capable of producing speech-like sounds. Descartes claims that the capacity of such a talking machine to produce speech would be subject to limitations of a kind which would distinguish its speech-like output from genuine human speech. According to Descartes, a talking machine

[...] could never use words or other signs, composing them as we do to declare our thoughts to others. For one can well conceive that a machine may be so made as to emit words, and even that it may emit some in relation to bodily actions which cause a change in its organs, as, for example, if one were to touch it in a particular place, it may ask what one wishes to say to it; if it is touched in another place, it may cry out that it is being hurt, and so on; but not that it may arrange words in various ways to reply to the sense of everything that is said in its presence, in the way that the most unintelligent of men can do [Descartes (1637/1968), p. 74].

Thus, Descartes allows that it may be possible to construct an automaton able to respond verbally to a fixed set of linguistic and physical cues. But such a machine would be unable to respond to an endless variety of linguistic inputs in the flexible manner that is characteristic of a real human speaker.

Descartes remarks that the language test can also be used to distinguish men from beasts. He notes that while there is no man “so dull-witted and stupid” as to be incapable of such flexibility of speech, “there is no animal, however perfect and whatever excellent dispositions it has at birth, which can do the same” [Descartes (1637/1968), p. 74]. There are animals, such as magpies and parrots, which are able to “utter words”, but they “cannot speak as we do” [Descartes (1637/1968), pp. 74-5]. “This shows”, he says, “not only that animals have less reason than men, but that they have none at all” [Descartes (1637/1968), p. 75]. In the same way, therefore, that inability to

respond suitably to variable linguistic stimuli distinguishes a talking machine from a human speaker, so, too, does it distinguish animals from humans.

According to Descartes, evidence of linguistic capacity may serve as a test for the presence of thought. The point is not that language is necessary for thought. Rather, language is contingently associated with thought. Descartes's view is that the relationship between language and thought is an evidential rather than a constitutive relationship. We have no evidence that animals have minds because we have no evidence that they can talk. Such a language test may be unable to establish conclusively that animals fail to have minds. But the fact that animals do not have the capacity for speech means that we fail to have positive evidence that they do have a mind.

It is important to emphasize that Descartes's point is an epistemological point. It is a point about a lack of evidence for animal minds. This epistemological point is to be distinguished from a stronger, ontological claim. The stronger claim is that animals do not possess a mind because they fail to possess language, where possession of language is a necessary condition for possession of a mind. But, for Descartes, the point is not that language is necessary for thought. It is simply that linguistic capacity may serve to indicate the presence of thought. In the absence of language, there is no evidence for thought.

IV. APE LANGUAGE RESEARCH

Recently, there has been considerable interest in the linguistic achievements of some non-human primates. Researchers have attempted to teach gorillas, chimpanzees, bonobos and orangutans to communicate in a linguistic, quasi-linguistic or symbolic fashion. I will now describe some of the language research undertaken with chimpanzees and bonobos. The point that I seek to make is that, while there may be ground for optimism, the attempt to impart language has not met with unequivocal success.

IV.1 *Washoe*

In the 1960's, a number of psychologists began to teach chimpanzees to communicate by means of American Sign Language (ASL), the sign language of the American deaf community. One of the most famous of these chimpanzees is Washoe. Washoe was born in the wild in Africa in the mid-1960's, and taken to the U.S.A. as part of the space program. She was later adopted by the psychologists, Allen and Beatrix Gardner, of the University of Nevada. Using an approach known as "cross-fostering", the Gardners raised Washoe at home, as if she were a deaf human child.

Washoe was about 42 years old when she died in October 2007. She lived in a community of other ASL-using chimpanzees at the Chimpanzee and Human Communication Institute, directed by Roger Fouts at Central Washington University. Fouts had worked with Washoe since the late 1960's, when he undertook doctoral research under the supervision of Allen Gardner. Fouts moved with Washoe when she was transferred from Nevada to the Institute for Primate Studies at the University of Oklahoma, before finally taking Washoe with him to Washington when he set up the Institute.

Washoe was taught to communicate by means of ASL. While Washoe was with the Gardners in Nevada, her teachers refrained from speaking in her presence. They communicated with her, as well as with each other when in her presence, using only ASL [Fouts (1997), p. 16]. Later, when Washoe was taken to Oklahoma she was placed among a group of chimpanzees accustomed to hearing spoken English. As a result, she came to understand a certain amount of spoken English as well as continuing to use ASL [see Fouts (1997), p.135].

Fouts and the Gardners were careful about what to count as the use of a sign. They considered Washoe's use of a sign to be reliable if she was observed to use the sign by three separate human observers on fifteen consecutive days [Fouts (1997), p. 98]. A system of double-blind tests was also employed. An object would be shown by one experimenter to Washoe who would sign the name of the object to a second experimenter who was unable to see the object [Fouts (1997), p. 99]. By the time Washoe was five years old, Fouts reports that she made reliable use of 132 signs [Fouts (1997), p. 101]. This was not just a matter of employing individual signs one at a time. Washoe used combinations of signs in a manner that Fouts claims reflects syntactic order [Fouts (1997), pp. 102-3].

There was concern that Washoe's acquisition of ASL might be a form of the Clever Hans phenomenon. To rule this out, Fouts conducted an experiment to determine whether use of sign language might be transmitted from adult to baby chimpanzees without human intervention. Washoe adopted a young male chimpanzee, named Loulis, to whom she taught the use of sign language. To ensure that Loulis did not acquire ASL from humans, humans restricted their use of ASL when in his presence [Fouts (1997), p. 242]. Washoe trained Loulis directly to use signs without human interaction, sometimes even moulding his hands to form the signs.

IV.2 *Project Nim*

Despite the positive reports by authors such as Fouts about chimpanzee language acquisition, an air of controversy and scepticism surrounds the chimpanzee language research. In part, the scepticism reflects a healthy resis-

tance to bold claims about animal minds. However, there are serious questions about the research itself.

Herbert Terrace undertook a research project with a chimpanzee named Nim Chimpsky at Columbia University between 1973 and 1977. Project Nim was in key respects similar to the Gardners' and Fouts' work with Washoe. Though domestic arrangements were different, Nim was also cross-fostered, living first with a human family in a New York City apartment before shifting to a mansion, where he lived with graduate research assistants. As with Washoe, Nim was taught to employ ASL as a means of communication. Nim acquired his first sign, the sign for "drink", at four months. By the end of the project he had mastered 125 signs, and was observed to employ multiple sign sequences on more than 20,000 times during one two year period [Wallman (1992), p. 23].

Whereas the Gardners tended to focus on demonstration of Washoe's mastery of individual signs, the primary focus of Terrace's work with Nim was the combined use of multiple signs. Grammatical structure is considered by linguists to be an essential feature of human language, if not language as such. The mere use of signs for objects, even multiple signs, does not show that a chimpanzee employs the signs in accord with grammatical structure. The purpose of Terrace's research on Nim was to determine whether chimpanzee use of ASL signs displays grammatical rules or structure.

Great care was taken to record the order and position of the signs employed by Nim. Observers kept a running record of Nim's sign use by whispering into a tape recorder during language training sessions, and preparing transcripts following each session [Wallman (1992), p. 23]. More than forty hours of videotape recordings were made of sessions in which Nim used signs in interaction with his trainers [Terrace (1979), p. 209].

Detailed analysis of the data did not take place until the end of the project after Nim's return to Oklahoma. When analysis was undertaken, a number of negative results soon emerged. Preliminary analysis suggested that Nim was able to form primitive sentences. But more careful analysis revealed otherwise. The increase in Nim's vocabulary was not matched by increase in the length of his utterances. The average length of his utterances varied from 1.1 to 1.6 signs [Terrace (1979), p. 210]. Some of Nim's utterances were longer, but highly repetitious. For example, the longest of his recorded utterances was: "give orange me give eat orange me eat orange give me eat orange give me you" [Terrace (1979), p. 210].

Computer analysis of a large number of Nim's sign sequences revealed that the frequency with which signs belonging to certain semantic categories occurred in a given order differed significantly from chance [Wallman (1992), p. 86]. But Terrace could not conclude that such positional regularities were indicative of semantic structure. For Nim only ever used a limited

number of signs in any given semantic role [Terrace, *et al* (1979), p. 896; Terrace (1979), p. 214]. The fact that Nim tended to use a given sign in a given position seemed to suggest a positional habit rather than the influence of a syntactic rule.

But if statistical analysis of Nim's sign use was disappointing, worse lay in store when it came to discourse analysis of the videotapes. When the videotapes of Nim using sign language were finally reviewed, it became clear that the great majority of Nim's sign use involved repetition of signs which had been used immediately beforehand by his teachers [Terrace (1979), pp. 214-21; Terrace, *et al* (1979), pp. 896-7]. Only about 10% of Nim's sign use was spontaneous. The remainder were so-called 'adjacent signs', in which Nim employed a sign in response to a sign used by a teacher. Almost 40% of Nim's adjacent signing was either full or partial imitation of the signs used immediately beforehand by his teacher. Apart from the highly imitative nature of Nim's sign use, discourse analysis also showed Nim to be a poor conversationalist. Roughly 50% of the time, Nim interrupted by starting to sign while his teachers were still signing.

Because so much of Nim's sign use was imitative, Terrace notes that the evidence of syntactic structure found in the raw data cannot be credited to any grammatical competence on Nim's part. The structured pattern of Nim's sign use could derive from patterns in the sign use of his teachers which he was imitating. The imitative nature of Nim's sign use, as well as his tendency to interrupt, suggests that his sign use was not due to any genuine linguistic ability, so much as an attempt by Nim to employ signs as a means of obtaining various items or activities.

In light of the negative outcome of Terrace's work with Nim, any claims as to the presence of grammatical structure in chimpanzee sign use were decisively thrown into doubt. The implications were not restricted to Project Nim. For while it might be thought that the problem lay with some error in the work with Nim, Terrace analyzed film footage of Washoe's sign use and argued that Washoe was as imitative in her sign use as was Nim.

IV. 3 *Kanzi*

Despite the negative outcome of Project Nim, considerable optimism surrounds current language research undertaken on another species of ape. This is the work on bonobos being pursued by Sue Savage-Rumbaugh, who has recently moved to the Great Ape Trust, in Des Moines, Iowa from the Language Research Center at Georgia State University. The language research on bonobos uses a keyboard with non-pictorial lexigrams, rather than ASL.

Kanzi is a 29 year old male bonobo born in captivity at the Yerkes Field Station outside Atlanta. He is one of a number of chimpanzees and

bonobos, with whom Savage-Rumbaugh works. The work with Kanzi came about by accident. Savage-Rumbaugh was attempting to teach Kanzi's adoptive mother, Matata, to use lexigrams on the keyboard to communicate. Matata was a poor learner. After 2 years, Matata had limited mastery of only six symbols on the keyboard.

As a baby, Kanzi accompanied Matata while she was being taught to use the keyboard. At one point, Matata was sent away to mate. In her absence, Kanzi began to use the keyboard spontaneously. Kanzi immediately demonstrated competence on the keyboard well in excess of that demonstrated by Matata. Kanzi had been watching attentively while Matata was being trained. He had learned by watching, while Matata failed to acquire competence. On the first morning on his own, Kanzi went to the keyboard, struck the *apple* key and the *chase* key. He then picked up an apple, looked at Savage-Rumbaugh, and ran off to prompt her to chase him [Savage-Rumbaugh and Lewin (1994), p. 135].

Project Nim was a disappointment because Nim imitated his trainers rather than displaying competence in sign language. By contrast, Kanzi's spontaneous use of the keyboard to communicate seems to show that Kanzi used the keyboard with the intention of communicating. Savage-Rumbaugh conducted a variety of tests to establish that Kanzi comprehended the meaning of the signs he was using [Savage-Rumbaugh and Lewin (1994), pp. 140-8]. Most telling appears to have been Kanzi's unprompted use of symbols to request items and activities which he wanted [Savage-Rumbaugh and Lewin (1994), pp. 144-5]. In addition, Kanzi displayed evidence of understanding spoken English. For example, he would turn off the lights when he heard someone mention turning the lights off. When he was still quite young, tests indicated comprehension of 150 spoken words [Savage-Rumbaugh and Lewin (1994), p. 148ff].

A principal aim of Project Nim was to establish whether chimpanzees are able to acquire syntactic structure. The negative outcome of project Nim threw this into doubt. However, Savage-Rumbaugh claims that Kanzi's use of lexigrams involves structural components. The most crucial evidence for this is Kanzi's use of multiple word utterances.

In an attempt to show that Kanzi's use of lexigrams was grammatical, Savage-Rumbaugh sought the assistance of Patricia Greenfield, a psychologist specializing in child language acquisition. Greenfield found evidence that Kanzi employed symbols which satisfied five criteria for presence of structure in his use of multiple symbolic sequences. In particular, symbols must have independent use, they must combine in a way that permits expression of a specific meaning, there must be a rule that applies to categories of symbols, categories are related by a formal device, and the rules must be productive [Savage-Rumbaugh and Lewin (1994), pp. 158-9]. According to

Savage-Rumbaugh, all five criteria are satisfied by Kanzi's use of the lexigrams. Hence, there is evidence of at least rudimentary syntactic structure in his use of multiple symbols. Greenfield and Savage-Rumbaugh refer to this rudimentary syntax as "protogrammar" because they recognize that the rules are rather simple [Greenfield and Savage-Rumbaugh (1990), p. 543].

V. BACK TO DESCARTES

I now wish to explore some of the implications of the ape language research with respect to Descartes's language test. Descartes takes evidence of the use of language as a test for possession of thought. Hence, he takes the fact that animals do not have the capacity for genuine language use as evidence that they do not have minds.

But what if it could be shown that chimpanzees or bonobos have acquired a rudimentary form of language? Would this show that such apes have the capacity for thought, and therefore that they do, or might, possess a mind?

Evidence that chimpanzees or bonobos have the capacity to acquire language would certainly appear to undermine Descartes's argument that animals do not have minds. Descartes's argument rests on a factual claim to the effect that animals do not possess language, and are therefore unable to display evidence of thought. If this factual claim is shown to be false by the ape language research, then Descartes's argument against animal minds would break down. By manifesting their linguistic capacity, the apes would pass Descartes's language test thereby providing evidence that they have a mind.

It is important to recognize this logical aspect of the evidential situation. If an ape were to acquire linguistic capacity, then it would pass the language test. By Descartes's lights, the evidence would show that it has a mind. But, while this may be true, it does not require us to commit oneself one way or the other with respect to the results of the ape language research. It is an empirical matter whether the chimpanzees or bonobos are able to acquire linguistic ability. If they have acquired the use of language, then Descartes's empirical claim that animals do not possess language fails, at least in the case of the chimpanzees or bonobos who have acquired the use of language. Given this, it may be concluded that the apes have a mind, since they possess a language. On the other hand, if in fact the apes have failed to acquire language, then, at least so far as Descartes's test is concerned, they may still be assumed not to have a mind.

As illustrated by the case of Nim Chimpsky, the claims of ape language acquisition have been the subject of considerable controversy. Until the dust settles, therefore, it is best to remain agnostic about whether the apes in-

volved in these projects have acquired a language. Nevertheless, the ape language research does raise a number of challenging questions in relation to Descartes's language test that are worth consideration.

V.1 *Flexible Language Use*

One question relates to the fact that the claims about ape language competence are of a limited nature. Washoe has acquired *at most* several hundred signs of ASL. Kanzi's lexigram use manifests *at most* rudimentary syntactic structure. The question is whether evidence of such restricted language capacity suffices for Descartes's test for language possession. Does restricted language capacity permit the flexible use of language that Descartes takes to be the hallmark of language possession?

To answer this question, recall that Descartes sought to distinguish between the capacity of a bird or a machine to utter words in response to fixed stimuli, and the capacity to use words in a flexible manner in a variety of contexts which is the mark of genuine linguistic capacity. While it is true that a limited language capacity may place limits on expressive capacity, limited language capacity need not restrict use of words or signs to fixed stimuli. Both Washoe and Kanzi are reported to employ signs in novel circumstances, as well as to combine them in ways which they had not previously encountered. Thus, despite limitations of expressive capacity, their use of signs is not restricted to being a set response to a fixed stimulus. Given that their purported language use is not restricted to fixed stimuli, Washoe and Kanzi might therefore be deemed to pass Descartes's test for language possession.

V.2 *Is Language Necessary for Thought?*

A second question has to do with the relation between the onset of language and having a mind. Let us suppose that Washoe or Kanzi have acquired linguistic capacity and thereby pass the language test. Did they already possess a mind? Or have they acquired a mind as a result of learning a language?

On the one hand, if Washoe or Kanzi already possess a mind, then the acquisition of language does not lead to the acquisition of mind. Rather, with the acquisition of language they acquire a capacity to communicate their thoughts linguistically which previously they did not possess. The possibility that Washoe or Kanzi already possess a mind prior to language acquisition is entirely consistent with Descartes's language test. For if language is merely a contingent sign of thought, rather than a necessary condition for it, mind may predate the onset of language. In this case, it is not mind but the capacity to communicate mental content linguistically that is brought about by the onset of language.

On the other hand, if language is necessary for thought, then it seems to follow that the apes only come to have a mind once they acquire language. A number of philosophers have argued that language is necessary for thought. This is primarily due to the fact that the identification and individuation of a mental state such as a belief proceeds by way of linguistic specification of the content of the belief. We specify which belief a belief is by means of a sentence that expresses the content of the belief. This suggests that the identity of the belief depends upon its linguistic form. As such, the belief does not exist independently of the linguistic medium. But if language is necessary for thought as this suggests, then animals without language do not have thoughts. Thus, if having a mind requires mental states that are expressed in linguistic form, then in the absence of language animals do not have minds.

The view that language is necessary for thought, and therefore for mind, has an interesting consequence in the context of the ape language research that we have considered in this paper. If language is necessary for thought, then the chimpanzees and bonobos did not possess a mind prior to their acquisition of language. After their acquisition of language, they possess a mind. Thus, the apes acquire a mind as a result of acquiring a language. Whether or not one finds this suggestion plausible, it seems to me to be the fundamental question raised by research on ape language acquisition. Either one must deny that mind depends on language or one must bite the bullet. In this context, to bite the bullet is to say that the apes acquire a mind when they acquire a language.

Of course, those who are wed to a linguistic conception of the mind will be prepared to bite the bullet. But the bullet may prove hard to swallow. The linguistic conception of mind is not our only, or even our primary, grasp on the notion of mind. We also think of the mind in broadly functional terms, as that which plays a certain role in the life of an organism. In social interaction, rearing young, pursuit of food and predator avoidance, among other activities, animals display a variety of capacities which are indicative of the possession of mind in this broad sense. By denying animal mentality, the view that language is required for thought runs counter to a functional characterization of mind. Any attraction one might feel for the linguistic view of mind is surely outweighed by the tension that its denial of animal minds creates with the functional conception of mind.

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