

Primate perceptions

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How Monkeys See the World. By Dorothy L. Cheney and Robert M. Seyfarth. University of Chicago Press: 1990. Pp.377. \$28.75, £19.95.

"MONKEYS seem to be experts at reading each others' behavior, as yet we have little evidence that they are equally expert at reading each others' minds". Thus say Dorothy Cheney and Robert Seyfarth, in as precise and concise a one-sentence summary of a set of findings as anyone could ask. How they got to these conclusions, after years of careful study, makes fascinating reading.

To place *How Monkeys See the World*, one must look at the rise of cognitive ethology in the late 1970s. The theoretical impetus for this school of thought came from the lucid but speculative theorizing of prominent animal behaviourists like Donald Griffin. The empirical testing began with laboratory workers like David Premack and Sue Savage-Rumbaugh extending their studies of captive chimpanzees far beyond questions of whether or not apes have language. What was missing were ways of assessing the intellectual performance of animals in nature, of going beyond observations of behaviour to inferences about the covert mental processes that underlie overt action. This meant grasping tricky issues such as intentionality in the uncontrolled setting of the field.

Seyfarth and Cheney tackled the challenge by turning to field experimentation. They devised ways of empirically testing hypotheses by intervening (as delicately and as minimally as possible) in the ongoing natural lives of their chosen subjects, vervet monkeys living in the Amboseli National Park of Kenya. Such methods have a long history of ethology, and primatologists like Hans Kummer had shown them to be feasible and productive in studies of baboons in Ethiopia. What was needed was a means of systematic interrogation, to elicit knowledge from a monkey going about its daily life, unaware that it was even a subject of testing. This Cheney and Seyfarth did by focusing on the medium of vocal communication, presented through playback of recorded natural calls.

In their simplest form, playback experiments entail recording the responses by free-ranging animals to carefully presented vocal stimuli, for example do resident monkeys approach or avoid the broadcast long calls of their neighbours, depending on whether or not the calls originate from within or without their home range? Seyfarth and Cheney have concentrated more on individual responses,

so that in their best-known, early study they showed the referential content of the vervets' alarm calls given to leopards, birds of prey, and snakes. Each call, given in the absence of its referent, evokes the appropriate anti-predator reaction.

But playback studies can yield much more, sometimes serendipitously: in a study of maternal recognition of offspring's call, they found that not only did a vervet mother attend more strongly to her infant's call, but that at the same time her companions attended to her, indicating their apparent



knowledge of the mother-infant relationship. Again and again, Cheney and Seyfarth devised ingenious ways of 'questioning' their subjects, with the most sophisticated paradigm being one borrowed from developmental psychology. Making use of habituation, one tests the equivalence of two calls by making repeated presentations of one type of call, then by comparing the subject's response on the next presentation, this time to a second type of call. In effect, the amplitude of response to the second type of call with reference to a pre-test control presentation tells whether the monkeys consider the calls to be the same or different.

It is one thing to be knowledgeable about the behaviour of others, both within and across species, and to be able to generalize about their relations. But it is another thing to be aware of one's own knowledge or to accord knowledge to others. It is one thing to use abstract concepts and to communicate them, or to have emotions and beliefs. But it is something else to recognize that others also have such states of mind and are driven by them. In short, monkeys are impressively

intelligent, but they seem to lack a 'theory of mind', to use Premack's phrase.

Had Seyfarth and Cheney stopped with a synthesis of their studies of vervet monkeys, they would have produced a useful research monograph. Instead, they have been more ambitious, in seeking to tie together existing knowledge of such nonhuman primate abilities as deception (widely shown), attribution (present at least in apes), and teaching (apparently absent altogether). Again and again, Cheney and Seyfarth find apes to be superior in intellect, which is not surprising, but they do so in ways that had previously been limited to anecdotal evidence.

In interpreting claims and counterclaims in a contentious area, Seyfarth and Cheney resist easy advocacy arguments and give both sides of the debate. This is especially admirable in a chapter on social and nonsocial intelligence. They are self-declared proponents of the 'social' school of Nicholas

Humphrey and Alison Jolly that sees the evolutionary origins of intelligence in the exacting selection pressures of social life. But they give due attention to the claims of the 'nonsocial' school of Katharine Milton, and Sue Parker and Kathleen Gibson that prefers the demands of subsistence as the prime roots of intelligence.

But the work has limitations. Through no fault of their own, Cheney and Seyfarth chose a catastrophically declining population to study, so that their work cannot now be extended or replicated at Amboseli. On another front, their generalizations about apes and monkeys really boil down to chimpanzees and certain terrestrial Old

World monkeys. This is more than a pedantic point, as some apes such as gibbons seem to be indistinguishable from monkeys on all measures of intelligence. Finally, as in all lively areas of science, present events have already overtaken even recent conclusions. Though Seyfarth and Cheney repeatedly assert the absence in nonhuman primates of intentional and active teaching (as opposed to passive, inadvertent modelling that allows observational learning), new evidence for both wild and captive chimpanzees suggests that this uniquely human bastion too has fallen, or is at least crumbling.

In conclusion, Cheney and Seyfarth have given us the best-yet exploration of the thinking of another species of primate in nature. As such it stands comparison with an obvious counterpart from the laboratory, Wolfgang Kohler's *The Mentality of Apes* (Kegan Paul, 1925). □

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