

## Knowing minds

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**The Thinking Ape: Evolutionary Origins of Intelligence.** By Richard Byrne. Oxford University Press: 1995. Pp. 266. £30 (hbk), £13.50 (pbk).

**Mindblindness: An Essay on Autism and Theory of Mind.** By Simon Baron-Cohen. MIT Press: 1995. Pp. 171. \$28.50, £17.95.

EVOLUTIONARY psychology uses evolutionary theory to weave cognitive, developmental, comparative and neuropsychology into accounts of the origins and nature of human thinking and behaviour. The resulting fabrics are, as these books illustrate, colourful and intriguing, but they are seldom alike, and often a little too luxuriant for their purpose. Richard Byrne and Simon Baron-Cohen disagree on important issues but they share an eagerness to go beyond current evidence in proposing models of cognitive development that will stimulate research.

Byrne outlines a three-stage model for the evolution of 'the thinking ape' — that is, human intelligence. Drawing on cladistics analysis and the behaviour of extant primates, he infers that interesting things began to happen in the primate lineage about 40 million years ago with the appearance of cebus-human ancestors (the now extinct common ancestors of cebus monkeys and modern humans). Their forerunners, lemur-human ancestors, were no brighter than other mammals. But, under selection pressure from their socially complex environments, the simian primates, starting with the cebus-human ancestors and including all monkeys and apes, evolved larger brains allowing more rapid and efficient associative learning, 'primed' by the actions of members of the same species.

These advances enabled cebus-human and macaque-human ancestors, like contemporary platyrrhine and catarrhine monkeys, to deceive and cooperate with one another. But they could not understand *why* their actions had certain effects on objects and other animals. This kind of 'insight' emerged about 16 million years ago with the orangutan-human ancestors and is confined, among today's primates, to the great apes. It represents a remarkable change in cognitive ability, including the capacity to mindread or attribute mental states to others, and allows forward-planning, tool-making, imitation and teaching. In Byrne's view, this second watershed in the origin of human intelligence evolved under selection pressure from the physical environment, and was a necessary precursor to the final stage, the evolution of language in hominids.

Byrne has provided both a readable

review of primatology, suitable for undergraduates, and an original and interesting thesis about the evolution of intelligence that will appeal to general readers as well as researchers in the field. The core of his theory is a now familiar claim: that there is a sharp discontinuity, "a Rubicon of cognitive capacity", between monkeys and apes. This view was elucidated, for a similar audience, by Dorothy Cheney and Robert Seyfarth in *How Monkeys See the World* (University of Chicago Press, 1990). But Byrne puts a new spin on the idea, not only through cladistics analysis, but also by suggesting that monkeys show primed associative learning and insisting that apes have more all-purpose intelligence than monkeys; they are not merely superior social schemers.

With his emphasis on the general nature of intelligence, one might expect Byrne to rely on laboratory data. But, mysteriously, he dwells on field studies and gives experiments short shrift. This will make the text engaging for the general reader. But specialists may find it less persuasive. After reading the book, they may still wonder why, if apes are so much more intelligent than monkeys, there is no evidence that they have larger brains or commonly engage in more complex behaviour in the wild. Byrne addresses these questions, but they strain his primary evidence of the "Rubicon in cognitive capacity" — anecdotal reports of intentional tactical deception, teaching and tool-use in chimpanzees.

In a sense, Baron-Cohen takes up the story where Byrne leaves off. Byrne leads us to a point in evolutionary history where most humans (and other apes) are born with the potential for mindreading, and Baron-Cohen discusses the ontogeny of mindreading, the way in which evolutionary potential is realized in human development and what happens if the process is blocked. He suggests that the process normally has four steps, involving the activation of four cognitive mechanisms — the intentionality detector, the eye-direction detector, the shared-attention mechanism and the theory-of-mind mechanism — and claims that autism is a result of an arrest between the second and third steps. According to Baron-Cohen, autistic people suffer from 'mindblindness'; they are largely unaware that other people have minds.

The first two mechanisms work from birth. In effect, the intentionality detector distinguishes animate from inanimate objects and attributes goals or desires to the former, whereas the eye-direction detector is sensitive to gaze direction and understands the relation 'sees'. In normal children, but not autistic ones, the two detectors are joined about 9 months after birth by the shared-attention mechanism. (The role of experience in this transition and others assumed by the model is not

clear.) This mechanism allows the infant to appreciate that he or she and another individual are attending to the same object; it forms 'triadic representations' and is necessary for the development at about 18 months of the theory-of-mind mechanism. This final step, the crowning theory-of-mind mechanism, establishes triadic representations involving the whole range of mental-state relations, including 'pretends' and 'believes'.

Although replete with acronyms, Baron-Cohen's prose is lucid and endearingly deferential. Leda Cosmides and John Tooby refer in their foreword to "Baron-Cohen's trailblazing research", but his own comments imply that he has done little more than pin together some ideas from Nicholas Humphrey, David Premack, Alan Leslie and others. Despite its sabre-rattling tone, the foreword is much closer to the truth. The theory is new and, as Baron-Cohen points out repeatedly, is consistent with the data. But it seems that he could have generated any number of developmental schemes consistent with the same data, and it is not always clear why he chose this one.

For example, why are the eye-direction detector and the shared-attention mechanism taken to represent the relation 'sees' when infants' sensitivity to gaze direction could be more modestly attributed to an understanding of the relation 'looks'? And why is there just one, massive step between the shared-attention and theory-of-mind mechanisms? Such questions hover over the first half of the book, but when Baron-Cohen begins to discuss autism, they disappear. Using his careful and ingenious experiments with autistic children and referring to a wealth of literature on the disorder, he argues persuasively that these children's core impairment is indeed mindblindness.

Baron-Cohen thinks that mindreading exists only in humans, that it is modular and that it co-evolved with language. Byrne finds mindreading in other great apes, takes it to be a manifestation of general intelligence and claims that it was a necessary precursor to the evolution of language. I hope these two evolutionary psychologists also disagree about the ethical implications of mindreading. Byrne apparently supports the proposal laid out in *The Great Ape Project* (eds Paola Cavalieri and Peter Singer, St Martin's Press/Fourth Estate, 1993) that 'human' rights should be extended to all great apes largely on the strength of the ability of these animals to mindread. But I trust that neither he nor Baron-Cohen would wish to deprive autistic people — sufferers from mindblindness — of the same rights. □

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