

Reaching Into Thought: The Minds of the Great Apes

edited by Anne E. Russon, Kim A. Bard and Sue Taylor Parker, Cambridge University Press, 1996. £55.00/\$84.95 (xii + 464 pages) ISBN 0 521 47168 0

Reaching Into Thought is the latest edited volume examining the psychological abilities of the great apes. In the opening chapter, Anne Russon and Kim Bard (two of the book's editors) assure us that the minds of these species are 'very much like our own', that 'researchers are regularly finding heretofore unexpected realms and degrees of similarity', and that these similarities are 'particularly useful for evolutionary reconstructions' (p. 14). There are caveats, to be sure, but the authors are careful to protect the intellectual abilities of these animals: 'although great ape abilities fall well short of those achieved by humans, evidence that all the great apes can handle such tasks as rudimentary language, insightful or tool-assisted problem-solving, and abstract learning is seriously challenging traditional views that their reach is bounded by symbolic level processing' (p. 8). Indeed, as many as 16 of the 19 chapters stress similarities and play down differences. By the end of the volume, Parker (the third editor) and Russon digest the evidence and offer what they see as the accepted view: 'the various contributors to this volume concur with other primatologists that, barring inappropriate rearing conditions, great apes display symbolic cognitive skills similar to those children achieve between 2 and 3 years of age' (p. 430).

On the surface, this sounds impressive, and the uninitiated might be convinced that the only thing left to quibble about is exactly how similar great ape minds are to our own. Indeed, the visual rhetoric of National Geographic and BBC documentaries on chimpanzee social organization, tool-use and cooperative hunting have already smoothed the way, preparing the reader to be persuaded that the remarkable behavioral similarity between humans and apes is a sure guide to a comparable degree of psychological similarity. But from where does this persuasion derive exactly? Over two-and-a-half centuries ago, David Hume identified its source as the argument by analogy, one that he deemed unassailable: 'this doctrine [that similarity in behavior guarantees similarity in mental processes], he wrote, "is as useful as it is obvious... 'tis from the resemblance of the external actions of animals to those we ourselves perform, that we judge their internal [actions] likewise to resemble ours..." (p. 176). He continued: 'when...we see other creatures, in millions of instances, perform like actions, and direct them to like ends, all our principles of reason and probability carry us with an in-

vincible force to believe the existence of a like cause...The resemblance betwixt the actions of animals and those of men is so entire in this respect, the very first action of the first animal we shall please to pitch on, will afford us an incontestable argument for the present doctrine' (p. 176).

Hume was at least right in one respect – the argument was persuasive. One hundred and fifty years later, Charles Darwin and George John Romanes resurrected the argument by analogy as the foundation for the new field of comparative psychology²⁻⁴. And, 120 years after that, *Reaching Into Thought* confirms that researchers still find the argument thoroughly persuasive.

Unfortunately, the argument by analogy is as flawed as it is persuasive. We propose that general behavioral similarities between humans and great apes are silent with respect to the level of psychological similarity addressed by most of the contributors to this volume⁵⁻⁹. In order to understand why, consider the following example: imagine that you observe two automobiles traveling along a highway. From the similarity in their appearance and motion you conclude that their operation must be based on very similar principles. And indeed, you could be reasonably certain from your knowledge of the history of automobiles that you could verify this assumption by opening up their hoods. But what about other dimensions of similarity, such as those related to the automobile's representations of itself? For example, from their spontaneous behavior alone, could you tell if one contained a speedometer and the other did not? Obviously not, because in this case the representational system (the speedometer) does not endow the automobile with any novel behaviors *per se*. Likewise, we suspect that the evolution of high-order mental representations, seemingly so characteristic of human cognition, might not have been associated with the evolution of bundles of new behavioral units.

But if speedometers fail to endow automobiles with behaviors that are impossible without them, why are they installed in the first place? The answer is that although the automobile's basic set of behaviors is not enlarged by the addition of the speedometer, many of those behaviors become easier to perform (e.g. maintaining a constant speed, estimating times of arrival), and still others become practical for the first time. Likewise, the work of Annette Karmiloff-Smith and other developmen-



tal psychologists has shown that, even in the case of human development, profound age-related differences in cognitive abilities are not necessarily linked to profound differences in spontaneous behavior¹⁰. On the other hand, if someone were to insist on being shown some behavior that an automobile with a speedometer could perform, and that one without a speedometer could not, it would be very difficult to do so if we only had recourse to their spontaneous behaviors. This demand, however, is based on the illogical assumption that the emergence of novel representational systems must lead to definable behaviors that are not only novel, but also otherwise impossible. Yet this is specifically the demand of those who are particularly convinced by the argument by analogy.

Thus, although the evolution of new, functionally useful psychological systems might generate new representations that causally interact with behaviors, these new psychological structures might not be responsible for the emergence of those behaviors, or be the direct cause of subsequent occurrences of those behaviors. More importantly, it shows how the addition of these new representations need not be associated with an expansion in the existing set of basic behaviors, nor with an expansion in the set of possible behaviors. Does this mean that we cannot tell the difference between systems with such representations and those without them? No; it just means that the behaviors used to make the inference could not be of a spontaneous, ordinary sort. So what behaviors could be used? To return to our automotive example, imagine that we ask both drivers to accelerate to 60 km per hr. One driver will do so easily by consulting his speedometer. But the driver of the automobile without the speedometer will have a difficult time indeed. And yet even this driver has driven his automobile at precisely 60 km per hr many times before and, with enough external feedback, could learn to do what we ask of him.

Elsewhere, we have outlined a theory that accounts both for the striking behavioral similarities between humans and apes, and for the striking dissimilarities in high-level psychological

function⁵⁻⁹. In short, we have argued that the complex social behaviors so eloquently described in several of the chapters of this volume might have evolved independently of (and perhaps long before) the ability to interpret them. On this view, the three-fold increase in human brain size during the past 2 million years or so might have been associated with the addition of numerous cognitive specializations in areas related to the representation of mental states, causal understanding and language (in short, a specialization in 'explanation'). Such specializations could have placed us in the position of having to explain why we and others do what we do, and why the world operates the way it does. These psychological faculties might truly be cognitive specializations of the human species - abilities not found in other primates. If this is true, it means that the superficial level of similarity between them and us can comfortably reside alongside profound differences in high-level cognition. This does not mean that we cannot train apes to count, imitate, or use tools, nor does it mean that they will not display rudiments of these skills on their own. To the contrary, our theory assumes that such behavioral similarity is widespread, and furthermore that superficial similarity can be dramatically increased by training. However, the conceptual weakness in the argument by analogy means that 'demonstrations' that apes can count, use language, or imitate can never supplant the need for careful and rigorous research to determine whether they interpret what they are doing in a manner similar to us. Indeed, although we do not pretend that they are uncontroversial, results from our laboratory¹¹⁻¹³ as well from that of Michael Tomasello^{14,15} raise the empirical question of whether great apes 'interpret' (in this sense) at all.

Although the view just described remains empirically undetermined, it certainly contrasts sharply with the views of a number of the contributors to the present volume who, on *a priori* grounds, see chimpanzees as 'the ultimate challenge to traditional definitions of human uniqueness', and who see their own role as 'human tutors' (Boysen, p. 177), or are unembarrassed at describing their research as 'a process of negotiation within the transaction' between the human and the ape. 'Not only does Chantek [an orangutan] move closer to the target behavior,' explains Lyn Miles (p. 295), 'but the caregivers will sometimes adjust the target behavior toward Chantek's last action.' Determined to demonstrate similarity, they train on and on, without directly confronting the sobering possibility that the very effort required to train them initially to perform the simplest 'symbolic level' tasks (whatever that means), might in and of itself suggest that their 'success' could have been arrived at via ancient psychological

abilities, largely unrelated to those that allow human infants and children achieve the same performance. Indeed, only four of the chapters (those by Anderson, Visalberghi and Limongelli, Gomez, and Call and Tomasello) escape this trap by: (1) recognizing the distinctions between performance and comprehension, and (2) to varying degrees, making serious experimental attempts to sort them out. Most of the remaining contributions, no matter how interesting their behavioral descriptions, simply do not utilize the methods and experimental designs that could produce information capable of distinguishing among the multitude of mental processes that might underwrite great ape behavior.

The book jacket states that *Reaching Into Thought* is intended for 'researchers interested in current research and theoretical views of great ape cognition.' However, much of the 'theory' contained therein seems hopelessly contaminated by the argument by analogy. Instead of accepting both similarity and difference as equally probable outcomes of evolutionary experiments in cognition, the editors of this volume find great apes guilty of the charge of being like us, long before they are given a fair chance to prove their innocence. Thus: 'This book is dedicated to all those great apes who have tolerated and suffered human presence, as we struggle to overcome our preconceptions to see them more clearly as they are.' A number of the chapters in this volume are premised on (scientifically) irrelevant discussions concerning human uniqueness, animal welfare, and the dignity - and even rights - of other species. These are issues that are important, to be sure, and will be informed by and interact with science. But if studies of chimpanzee cognition are to ever reach a state of intellectual maturity, these issues must be divorced from the conduct and reporting of the research. This divorce will be painful and costly, but it is a clear case where separation is in the interests of all parties concerned.

But even if humans lack the will to follow through with this divorce right now, we need not give up all hope. After all, chimpanzees and other great apes will not tolerate this state of affairs indefinitely. Not because they have the capacity to care one way or the other, but because the methods and culture of experimental science will one day catch up with the unusual mixture of anecdote, ever-preliminary and partially reported experiments, and human politics that currently engulfs research into the mental states of our closest living relatives. Chimpanzees will be chimpanzees no matter how much we wish them to be otherwise.

Acknowledgement

Preparation of this review was supported by NSF Young Investigator Award SBR-8458111 to D.J.P.

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References

- Hume, D. (1739/1740) *A Treatise of Human Nature* (Vols 1 and 2) (reprinted 1978, Selby-Bigge, L.A., ed.), Clarendon Press
- Darwin, C. (1871) *The Descent of Man* (reprinted 1982), Modern Library, New York
- Romanes, G.J. (1882) *Animal Intelligence*, Kegan Paul
- Romanes, G.J. (1883) *Mental Evolution in Animals*, Appleton
- Povinelli, D.J. and Giambone, S. Inferring other minds: failure of the argument by analogy (invited article for special issue on Zoological Philosophy) *Philos. Topics* (in press)
- Povinelli, D.J. Social understanding in chimpanzees: new evidence from a longitudinal approach, in *Theories of Mind in Action: Development and Evolution of Social Understanding and Self-Control* (Zelazo, P., Astington, J. and Olson, D., eds), Erlbaum (in press)
- Povinelli, D.J. and Prince, C.G. (1998) When self met other, in *Self-Awareness: Its Nature and Development* (Ferrari, M. and Sternberg, R.J., eds), pp. 37-107, Guilford Press
- Povinelli, D.J. (1996) Growing up ape *Monogr. Soc. Res. Child Dev.* 61, Serial No. 247
- Povinelli, D.J. and Preuss, T.M. (1995) Theory of mind: evolutionary history of a cognitive specialization *Trends Neurosci.* 18, 418-424
- Karmiloff-Smith, A. (1992) *Beyond Modularity: A Developmental Perspective on Cognitive Science*, MIT Press
- Povinelli, D.J. and Eddy, T.J. (1996) Chimpanzees: joint visual attention *Psychol. Sci.* 7, 129-135
- Povinelli, D.J. et al. (1997) Exploitation of pointing as a referential gesture in young children, but not adolescent chimpanzees *Cognit. Dev.* 12, 327-365
- Povinelli, D.J. and Eddy, T.J. (1996) What young chimpanzees know about seeing *Monogr. Soc. Res. Child Dev.* 61, Serial No. 247
- Tomasello, M., Kruger, A.C. and Ratner, H.H. (1993) Cultural learning *Behav. Brain Sci.* 16, 495-552
- Tomasello, M., Call, J. and Gluckman, A. (1997) Comprehension of novel communicative signs by apes and human children *Child Dev.* 68, 991-1222

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