



Book Review

Baboon Metaphysics: The Evolution of a Social Mind. By DOROTHY L. CHENEY & ROBERT M. SEYFARTH. Chicago: University of Chicago Press (2007). Pp. x+348. Price \$27.50 paperback.

Nearly 20 years ago, [Cheney & Seyfarth \(1990\)](#) published *How Monkeys See the World*, the culmination of their pioneering research using field experiments. Perhaps no single book on primate psychology, maybe aside from *Chimpanzee Politics* ([de Waal 1982](#)) or *Machiavellian Intelligence* ([Byrne & Whiten 1988](#)), has had a greater effect on the study of primate psychology. *How Monkeys See the World* set the agenda for a generation and argued why cognitive ethology is the way forward, meeting [Quine's \(1960\)](#) challenge head-on by demonstrating that clever field experimentation can reveal with close approximation how animals view the world in which they evolved. *Baboon Metaphysics* is the thrilling sequel, this time focusing on the chacma baboon, *Papio ursinus*, but the same questions as from their first work tease us here: How might the social group help a primate to survive, and why do some individuals live to reproduce into old age and others do not? What is the glue that holds a seemingly fractious primate group together? What about being a primate might make social life so complicated? To what degree do primates predict and manipulate each other's behaviour through communication or by modeling the psychological states of others? What can we learn about our own species from understanding other primates? Inheriting Bill Hamilton's former field site in the Okavango Delta in 1992, the authors have observed for 15 years how this species has adapted to one of its environmental extremes. The only predictable thing about this unique delta environment is its radical seasonal changes. For part of the year, baboons live in open grassland, while at other times they must swim between a tapestry of islands created by Angolan floodwaters that bring a bounty of food, but also predators (e.g. crocodiles). Where else would one study a primate species, if the goal was to see their most sophisticated problem-solving skills and answer some of the most challenging questions above?

Of the book's many strengths, two take center stage: (1) the importance of understanding the context in which primate psychology evolved and is deployed and (2) the balanced presentation of ingenious experiments and the review of difficult topics for which these authors are famous. First, throughout the book the authors showcase the power of field work to come to grips with animal psychology. If researchers were to stick solely to studying flexible problem-solving behaviour in captivity, they would not learn about the full range of ways in which

a species' cognition might be expressed. Could anyone have guessed that a baboon worked as a switch operator for a railway crossing, or that baboons make extraordinary goat herders? The authors convincingly discuss how such anecdotal reports uncover important evidence about the social lens of the baboon (e.g. baboons cannot help but categorize their social world, as evidenced by the need of the goat-herding baboons to return separated kids to their mothers). Such powerful and odd anecdotes, encountered only in the field, can be extraordinarily revealing. Moreover, the lives of most primates are dominated not just by social interactions with conspecifics but by interactions with predators as well. Only in their natural habitat can one observe how a baboon keeps from becoming prey. This book vividly shows how primates can and cannot avoid, predict and defend themselves against predators. Even more stunning is how they respond to the loss of a group mate to such predation. The authors report that close kin of individuals lost to predation showed significant increases in cortisol levels (measured via fecal samples) for up to a month after the death. Moreover, in response to such stress, close kin worked hard to expand their social network of support through grooming individuals with whom they had not previously groomed preferentially. In both cases, those unrelated to the deceased did not show such physiological or behavioural patterns. The authors propose that such a pattern, which could only be detected in the wild, may suggest that baboons undergo a period of bereavement.. Finally, what makes this book so powerful is not just their observations of otherwise unobservable phenomena, but also the absence of behaviours that one might expect to be present if baboon psychology is similar to our own. For example, the authors describe how baboons often get separated from the group, particularly during flood season, when many islands are created that are separated by crocodile-infested waters. When predators abound, it would seem disadvantageous to be separated from the group. Indeed, when separated while crossing from island to island, a lone individual will grunt repeatedly as if to re-establish the location of the group with their reply. However, the authors report that in such cases the group seldom calls out to a lost individual to help them find their way back to the group; this is even the case for mother and infant pairs! The baboons seems either not to care or not to understand the distress of their group mate and thus are uninterested or unable to help, even at such a relatively low cost. A similar example centres on the observation that females relax around new immigrant males well before the danger from these males to their infants has passed. Females seem to either habituate to the new males' presence or cannot monitor the males' intentions well

enough to know that they still might commit infanticide. Again, we cannot see such details of social life anywhere else but in the field.

It is the collection of new experiments themselves that make the book a must-read. One of the most intriguing, conducted together with the authors' colleagues Roman Wittig and Cathy Crockford, demonstrated a new way that baboons use their vocalizations flexibly. Although most primates reconcile after fights with direct contact, such as by grooming, which eases tension and restores trust between individuals, baboons show unusually low rates of such physical contact after an altercation. However, using playbacks, the authors discovered that baboon grunts also seem to function as reconciliation, such that after hearing the playback of a grunt from a dominant who had recently threatened her, a subordinate will relax and more readily interact with the dominant. Even more dramatic is that close kin can also mediate such reconciliation indirectly by using their grunts to stand in for those of the aggressor. Hearing a playback of the grunt from a family member of the aggressor, subordinates were again more likely to interact with the aggressor or her family (but not more likely with family unrelated to the aggressor), as if the subordinate inferred that the family member's reconciliatory grunt must be directed at her. Based on such observations, the authors tested further whether baboons recognized the intent of a group members grunt calls. The authors note that baboons must somehow be able to distinguish between vocalizations such as grunts that are meant for them or their close kin and those from less relevant group members. It cannot be, the authors reasoned, that baboons, however egocentric, think that all vocalizations concern them. With their collaborator Anne Engh, they tested whether baboons could differentiate the intent of a threat grunt depending on recent social interactions. They found that after a fight with a dominant, baboons reacted to a playback of a threat grunt from that same attacker more strongly before they had reconciled than after they had recently reconciled (via grooming). Such a pattern is consistent with the interpretation that the subordinate only interpreted the threat grunt as directed at herself if she had not previously reconciled with the dominant, but she encoded the call as irrelevant to her if she had just made up with that same individual.

But there is more here than field data and elegant experiments. Another strength of the book is that throughout the authors propose testable alternative hypotheses to their own while flagging false dichotomies. For example, they address an experimental critique of the argument that the primate social field is more complex than that of other animals (pp. 113–116). Schusterman & Kastak (1993, 1998) found that a California sea lion, *Zalophus californianus*, was able to spontaneously categorize exemplars from two classes of arbitrary symbols when presented in dozens of novel dyadic combinations (i.e. the seal generalized her training with several initial pairings to 80 other novel pairings of the same initial symbols). From this finding, it is argued that such simple equivalency judgments represent a generalized learning process that may underlie much of animal sociality, including the

recognition of social relationships in primates. Cheney and Seyfarth counter that such a learning process cannot account for the thousands of triadic relationships that primates must monitor and update constantly as social relationships constantly shift. They even propose the experiment needed to falsify the hypothesis that primates have more complex social fields. As for false dichotomies, the authors are often careful to explain that many of the hypotheses that we frequently think of and even test against each other, as if they were mutually exclusive, do not necessarily have to be. They cite the possibility that learned behavioural contingencies may interact with one's ability to read another's intentions, even though such mechanisms are frequently tested as alternative explanations for behaviour. As another example, they argue against the characterization that nonhuman primate vocalizations are divergent from those of humans because they are inflexible, involuntary and emotional responses. Instead, the authors argue that nonhuman primates are in control when they vocalize and use such vocalizations craftily as they interact with conspecifics in a myriad of situations to manipulate behaviour in others. What primates seem unable to do is to control the detailed acoustic features of the calls that they choose to produce.

Primatologists, anthropologists, psychologists and biologists will enjoy this book. Besides being authoritative in its own right, the authors' collective voice shines through perhaps even more than in their first book. They clearly had fun writing this book and their passion for all aspects of baboon life is infectious. While you are enjoying the book, you will find the best that the behavioural sciences has to offer. You will learn about studies that are as creative as they are methodologically rigorous. Moreover, the scientists who describe this research are, simultaneously, open-minded to the potential complexity of the animal mind and dedicated to conservative interpretations of the problem-solving behaviours that they observe. The book leaves the reader with exciting challenges for future research: can we not only apply the playback techniques developed by Cheney and Seyfarth to other primate species, but also develop new experimental techniques that test primate problem-solving skills in other psychological domains in ways as meaningful as those reported in *Baboon Metaphysics*? If other researchers are able to extend the success of Cheney and Seyfarth in this way, we may not only continue to learn what makes us different from our living relatives, but also how we might have become that way.

I have only one regret regarding the book. From the acknowledgments, it is clear that the authors have told only half the story, and that there is at least one award-winning memoir to be made from the human side of this adventure (oh, the hippos!). I look forward to reading this book too one day.

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