

Grounding cognition is the evolutionary past

Book review

Heyes, C & Huber, L (eds) (2000) **The evolution of cognition**. Cambridge, Ma.: The MIT Press. ISBN 0-262-08286-1. Pages xi + 386.

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At its heart, human evolutionary psychology is an analysis of decision-making in the service of broad reproductive goals. Following the axioms of natural selection, each of us should be designed in ways that promote not only the production of offspring but also the likelihood that these will survive to become parents themselves. Some of these proposed design features are obvious. The shape of the human female pelvis, for example, differs significantly from that of our nearest living relative, the chimpanzee, in a way that seems geared to help the birth of a very large-headed infant while still making bipedal walking possible. The importance of childbirth, historically, as a time of mortality for women stands as witness to the evolutionary trade-off between these two conflicting demands on the pelvis and provides an intuitively acceptable basis for the evolutionary claim.

Other proposed design features, however, seem perfectly suited to broad debate. Is human beauty only a universal proxy for health and fecundity? Did language evolve to help us detect cheaters? Are we really selfish by nature? Is culture under genetic control? While some of the engendered arguments remain primarily ideological or political at heart, perhaps because they strike at the heart of our fundamental self-conceptions, the new evolutionary psychology has been taken much more seriously than it had been in the 1970s, during its previous incarnation as "sociobiology". Some of the reason for this is a shift in the zeitgeist - we are all conservatives now - but a lot is due to the fact that serious evolutionary psychology is a determinedly empirical and more sophisticated discipline. It must, in other words, be encountered on its own terrain. Since its central argument is that selection pressures have produced a human psychology predisposed to view the world in particular ways, this will require, sooner or later, an appreciation of the evolutionary underpinnings of animal and human cognition.

The question is whether **The evolution of cognition** will help you acquire this? Edited by two well-known cognitive scientists, whose ambit extends much further than a mere concern with humans, this volume contains 19 chapters by 30 authors. Its goal is to provide the materials for a debate about the ways in - and extent to - which evolution has structured cognitive processes. In doing so it covers a lot of ground, from broad overviews of the field (modularity; constraints on cognitive evolution), through

categorisation and representation, to causality, consciousness and culture. As with very nearly all edited books, chapters differ in style and density and, in the end, it's unlikely that you'll take away any sense of a single, coherent line of argument. While, at one level, this is a pity, there is a counter-argument: what you get in place of uniformity is immediacy. Most of the authors are in the frontline of their respective areas of research and, in the main, they provide good general reviews of the issues that concern them.

Robin Dunbar goes over the comparative data that make up his proposal that primate - and therefore - human cognition has been driven by the problems that individuals face as a consequence of being "forced" to live in groups by external predation pressure. Since specific ecological circumstances select for groups of different sizes, with an associated increase in cognitive demand, we find that there is a strong correlation between the average group size of a species and relative neocortex size. The outcome of this is that the great apes, but not the monkeys, have the computing power necessary for causal reasoning (or at least intuitive appreciation of causality) and, so, for the rudiments of an understanding of other minds; this being the cognitive ability that exemplifies human social cognition.

Discussions of Theory of Mind (or TOM as it's known) lead quickly to considerations of consciousness. Nick Humphrey, who really started the whole consideration of intelligence as "social", provides an intriguing chapter in which he argues that subjective experience, long considered to be a problem for approaches based on natural selection and biological survival, can be explained as the "privatisation" of sensory responses initially made to external stimulation. Euan MacPhail follows this by proposing, instead, that since language is necessary for the experience of feelings, only humans are capable of such experience.

In an excellent review of the evolution of complex cognition, Peter Richerson and Robert Boyd suggest that complex cognition was driven, historically, by the need to deal adaptively with the stochastic, "noisy" environments of the Pleistocene. The best way of tracking relatively rapid climatic changes selected for cognitive abilities able to "acquire and manage cumulative cultural traditions". This was aided by the pre-adaptations of primate cognition to social life and dramatically aided by the acquisition of TOM and the imitation that this made possible. Here, in a nutshell, is the broad scope of evolutionary cognition. Whether Richerson and Boyd's argument turns out to be robust or not, any attempt to understand the emergence of human cognition will need to link together simple mechanisms like association, abstraction and generalisation that enable learning by individuals, within an evolutionary framework that explains why and how brains become capable of more complex or directed processing, to provide a non-reductive appreciation of phenomena like culture.

There is a need for a good single-authored book on cognitive evolution. Until it appears, this is a reasonably approachable introduction to the issues. I don't think it will provide many answers but it will undoubtedly alert the general reader to relevant concerns within the field, such as the continuity/discontinuity of mental experience between humans and other animals, as well as highlight the range of conceptual approaches to the study of comparative cognition.