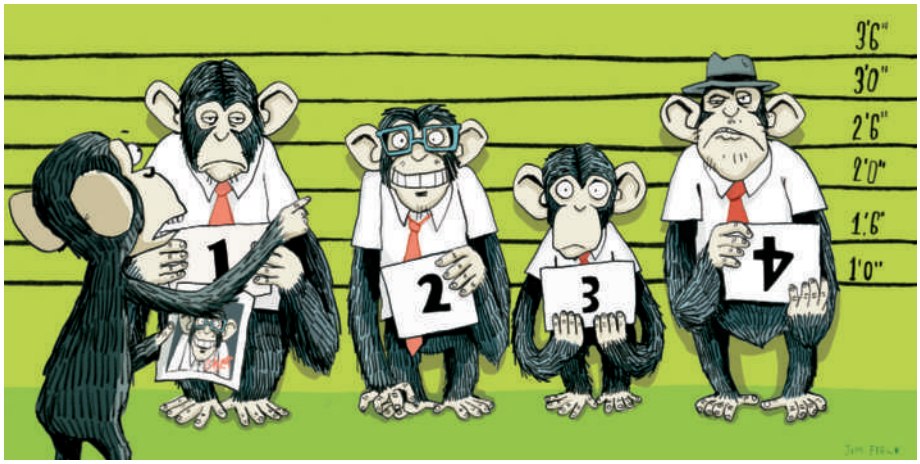
ESSAY

Darwin's last laugh

We must look for mental commonalities between humans and other animals to understand the minds of either, says **Frans B. M. de Waal**, rebutting a recent claim to the contrary.



JIM FIELD

In 1739, the Scottish philosopher David Hume wrote: "When any hypothesis … is advanc'd to explain a mental operation, which is common to men and beasts, we must apply the same hypothesis to both." A century later, Darwin showed that all forms of life have a common origin. Yet, to this day, the idea that humans and animals share characteristics and abilities, including mental ones, as a result of shared evolutionary history, still seems hard to swallow for some.

For example, in a recent critique of evolutionary approaches to cognition[1], Johan Bolhuis and Clive Wynne label the anthropomorphism of Charles Darwin "farfetched". They question those who, like Darwin, believe that there is "no fundamental difference between man and the higher mammals in their mental faculties". Attempts to identify human-like cognition in other animals has invariably led to over-interpretation, they argue.

I disagree. The opposite approach of anthropodenial — the *a priori* rejection of continuity between humans and other animals — has led people to systematically underestimate animals[2]. Well into the last century, comparative psychologists had animals perform arbitrary laboratory tasks unrelated to the problems they face in their natural environments. This theory-free 'behaviourism' never advanced our understanding of cognition to the degree that Darwinism has.

> **"Efforts to single out behaviours as distinctly human have rarely held up to scrutiny."**

Evolutionary theory predicts cognitive similarities based on the relations between species and their habitats. It also tells us that if closely related species, be they octopus and squid or human and chimpanzee, show similar responses under similar circumstances, the most parsimonious interpretation is that the cognition involved is similar too. Humans and their closest relatives diverged so recently, in evolutionary terms, that it is hardly anthropomorphic to assume that shared ancestry suggests shared cognition.

A wealth of recent evidence supports this assertion, most of it discovered precisely because investigators have taken human capacities as their starting point. Only humans were thought capable of recognizing faces from the arrangement of the nose, eyes, mouth and so on. But other primates have this ability, and the same neural substrate seems to be involved[3]. Similarly, bonobos, golden monkeys and a variety of social mammals kiss, embrace, groom or mount their opponents after a fight. Calling this 'reconciliation', a term derived from human interaction, has proven appropriate given that these reunions alleviate stress and repair social ties[4]. In contrast, efforts to single out distinctly human capacities have rarely held up to scientific scrutiny for more than a decade, such as claims about culture, imitation, planning and the ability to adopt another's point of view.

Other behaviours may have an even longer evolutionary history. For example, a nasal spray of oxytocin, a hormone and neurotransmitter common to all mammals, can enhance a person's tendency to share money with another. A related hormone, vasopressin, is known to strengthen pair bonds in rodents, and the effect of oxytocin on non-human primates is being tested.

Even distantly related species, such as elephants, dolphins, primates and birds, share an evolutionary history that may explain cognitive similarities, much as deep homologies in genetic instruction underlie the eyes and limbs of both flies and rodents. For example, neuroscientists first discovered mirror neurons in macaques, but have since found them in swamp sparrows, suggesting that they occurred in the common ancestor of birds and mammals. These neurons fire both when an animal performs an action and when it sees or hears another perform that action, and are thought to facilitate human imitation and empathy.

Some behavioural similarities will be the result of convergent evolution, in which species evolve similar cognitive capacities independently, because they have been exposed to similar selection pressures. For example, birds that store their food, such as scrub jays, need to know when competitors can see them. They use deceptive tactics akin to those of chimpanzees and other primates that live in large groups[5]. Likewise, capuchin monkeys and Caledonian crows, with similar foraging needs, have both ended up using tools. Yet even here, we cannot rule out the potential role of shared ancestry, given that bird and mammal brains are not nearly as different as once thought.

In sum, there is no good scientific reason to give evolutionary approaches short shrift, or to deride Darwin's speculations about continuity between humans and other animals, including a "sense of humour" — even the playful panting sounds of apes have recently been shown to be homologous to human laughter. Anyone who has watched primates, elephants or ravens at play realizes that here, too, Darwin may well have the last laugh. ■

Frans B. M. de Waal is director of the Living Links Center, part of the Yerkes National Primate Research Center, Emory University, 954 N. Gatewood Road, Atlanta, Georgia 30322, USA, and is author of the forthcoming *The Age of Empathy* (Harmony, 2009).
e-mail: dewaal@emory.edu

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