

Chimpanzees: Alien Minds or Kindred Spirits?

Wild Cultures: A Comparison Between Chimpanzee and Human Cultures. By Christophe Boesch (2012) Cambridge: Cambridge University Press. 288 pp. \$95.00 (hardback). ISBN: 978-1107025370.

Chimpanzees of the Lakeshore: Natural History and Culture at Mahale. By Toshisada Nishida (2012) New York: Cambridge University Press. 340 pp. \$125.00 (hardback). ISBN: 978-1107015784

World Without Weight: Perspectives on an Alien Mind. By Daniel J. Povinelli (2012) Oxford: Oxford University Press. 374 pp. \$68.50 (paperback). ISBN: 978-0198570967.

Do human minds differ from those of other animals mainly in degree rather than kind, as part of a smoothly varying continuity of minds? Or do our minds differ qualitatively, the result of evolutionary changes so profound that a sharp discontinuity exists between human and other minds? Chimpanzees, our evolutionary cousins, have figured prominently in this debate. In these three books, Daniel Povinelli argues for discontinuity, Christophe Boesch argues for continuity, and Toshisada Nishida emphasizes both similarities and differences between chimpanzees and humans.

Psychologists first began systematically exploring the minds of chimpanzees in the 1920s and 1930s, with work by Wolfgang Köhler and Robert Yerkes. Povinelli's *World Without Weight* follows in this tradition of systematic experiments on captive chimpanzees. The book encompasses a rather quirky mix of formats, starting with four pages of epigraphs

about weight and a fictionalized account of a conversation, and ending with a fictionalized account of a dinner conversation and a series of aphorisms about the various ways people tend to overinterpret chimpanzee behavior. In between are detailed accounts of 32 previously unpublished studies of chimpanzees and human children. In contrast to the other two books, which mainly summarize and synthesize previously published work, *World Without Weight* presents these studies for the first time, written in the dense style of journal articles that may prove off-putting for the general reader. Leavening these detailed descriptions of experiments are short essays by colleagues.

Taken at face value, the title *World Without Weight* suggests a ludicrous claim. How could chimpanzees possibly survive life in the trees without a rich understanding of the effects of gravity? But Povinelli doesn't really mean that. A more accurate, though less catchy title would be *World Without f(WEIGHT)*, Povinelli's notation for "a theory of weight." He argues that the bodies and minds of animals, including humans and chimpanzees, represent weight in different ways, from the muscles that hold up their bodies against gravity to cognitive mechanisms that keep track of the force needed to lift different objects. Humans also have higher-level representations of weight, including linguistic and metaphorical representations, and a theory of weight in which we "represent weight as an unobservable causal mechanism." Povinelli argues that while chimpanzees share with humans a cognitive understanding of weight, they don't have a theory of weight. In these studies, he is taking aim at a larger question: "Are humans alone in trying to make sense of the world by postulating theoretical entities — such as weight — to explain how the world works?"

In Povinelli's experiments, chimpanzees demonstrate an understanding of many aspects of weight. When presented with cunningly designed boxes of different sizes made of the same

material but identical in weight, chimpanzees lifted larger boxes higher than smaller boxes, as if they expect the larger boxes to weigh more, just as humans would do. Also like humans, chimpanzees can learn to sort heavy from light objects. Unlike human children, who at three years of age can correctly choose the heavier object in a single trial, it took Povinelli's chimpanzees hundreds of trials to sort by weight reliably, and one of the seven subjects never learned to do so. When required to sort objects of reliably different weight without first picking them up, chimpanzees failed miserably. They appeared to be sorting based on the sensory experience of weight, rather than an abstract representation of weight. In general, these experiments provide persuasive evidence that while adult chimpanzees exhibit a rich understanding of many aspects of weight, they are nonetheless missing some important cognitive equipment that humans develop in early childhood.

While experiments on captive chimpanzees provide an enviable measure of control, a full appreciation of chimpanzees didn't emerge until scientists left the cages and began following chimpanzees in their own world, the forests and woodlands of Africa. Jane Goodall is famous worldwide for pioneering long-term field studies of chimpanzees at Gombe, Tanzania, in the 1960s. Japanese primatologist Toshisada Nishida (1941–2011) gained less global fame, but contributed enormously to the science and conservation of wild chimpanzees, studying chimpanzees at Mahale, 170 km south of Gombe, on the shore of the same great lake, Tanganyika, in the same decade. *Chimpanzees of the Lakeshore* is Nishida's *magnum opus*, providing fascinating details about the early days of research at Mahale and a comprehensive synthesis of research done over the ensuing decades. Nishida started in 1965, five years later than Goodall, but he was the first to publish key aspects of chimpanzee social organization: they live in groups with distinct social boundaries and hostile intergroup relations, and females

rather than males usually leave the group of their birth. Nishida documented chimpanzee natural history in impressive detail. While many primatologists occasionally taste the foods eaten by their study subjects, Nishida did so systematically, and in his book reports the taste of each major food item, scoring it for sweetness, saltiness, sourness, bitterness, or astringency.

As the subtitle indicates, Nishida is interested not only in natural history, but also culture. Evolutionary anthropologists generally view culture as a key human adaptation. Our ability to spread from Africa to the remotest parts of the world depended on our capacity for social learning, including material culture (tools for carrying, hunting, fighting, and cooking) and symbolic culture, especially language. As the second major chimpanzee study, Mahale provided the first indications that chimpanzees have something comparable to human culture: population-level variation in socially learned behaviors. Early scientific visitors from Gombe to Mahale were surprised to see behaviors never documented at Gombe, such as hand-clasp grooming, in which mutually grooming chimpanzees use one hand to groom and the other hand to hold their partner's hand high above their heads. In this book, Nishida describes in detail the many different behaviors that vary among chimpanzee populations.

Until the late 1970s, the two East African sites of Gombe and Mahale remained the only sources of detailed information about the lives of wild chimpanzees. Since 1979, Christophe Boesch has expanded our understanding of the range of chimpanzee behavior enormously with his studies of chimpanzees in the West African population of Taï Forest, Côte d'Ivoire. Boesch began his work at Taï by documenting the use of stone tools to crack nuts, and has continued to focus on cultural issues. In *Wild Cultures*, Boesch covers much of the same ground as Nishida, but instead of focusing on natural history, Boesch makes an impassioned argument for continuity between chimpanzee and human minds. Whereas Nishida expresses caution about the degree to which we can infer cognitive

mechanisms from behavioral observation alone, Boesch asserts that field observations provide stronger evidence for high-level cognition than do most captive experimental studies.

As both Nishida and Boesch make clear, five decades of field studies at multiple sites have demonstrated considerable diversity in chimpanzee material culture. Each population of chimpanzees has its own local traditions of making and using tools. Chimpanzees use these tools to gain access to otherwise inaccessible foods, such as termites, ants, honey, and the flesh of nuts, substantially increasing their intake of protein and energy. In addition to material culture, chimpanzees also clearly vary in the signals they employ. For example, chimpanzees at Mahale, Taï, and Bossou (in Guinea) all use "leaf-clipping" (noisily tearing off pieces of a leaf without consuming them) as a social signal, but differently. The main use of the signal varies arbitrarily among these sites: Mahale males leaf-clip when they are interested in mating with a female; Taï males leaf-clip as a precursor to giving a charge display; and in Bossou, chimpanzees leaf-clip as a play invitation.

Boesch describes this variation in signals as "symbolic culture." Unfortunately, by doing so he blurs a distinction made in the nineteenth century by philosopher Charles Sanders Peirce between different classes of signs: icon, index, and symbol.¹ An icon refers to a referent through direct similarity, such as a picture of a snake; an index refers to a referent through an arbitrary but statistically regular correlation, such as a vervet monkey's snake alarm call; a symbol refers to a referent through reference to other symbols, such as the word "snake." An index, like an alarm call, loses its utility if it is not regularly used in association with the referent (as in the boy who cried wolf), whereas a word like "snake" retains its meaning and utility, even when the referent is nowhere to be seen. The distinction is subtle but, as Terrence Deacon argues in *The Symbolic Species*, the unusual properties of symbols likely played a critically important role in the coevolution of brain and language.¹

More in line with Peirce's definition of symbolic communication is

the drumming behavior that Boesch describes, in which chimpanzees bang on the buttresses of trees. Boesch hypothesizes that they do so in order to indicate their intended direction and timing of travel. This is an intriguing claim, but simpler explanations have not yet been ruled out.

Boesch presents an all-encompassing view that regards the enormous majority of behavioral differences among populations as cultural. But while many of his examples plausibly qualify as "culture" in the sense of learned behavioral traditions, others may be explicable through the effects of demography and ecology. Boesch downplays these alternative explanations and in doing so tends to ignore the extent to which other primatologists have disagreed with some of his interpretations of behaviors such as hunting, meat sharing, and teaching. For example, Boesch has long argued that when hunting in groups, Taï males take on distinct roles and are consequently awarded with shares of meat based on their role. Researchers at other sites have emphasized a more individualistic approach. For one, Nishida argues that "This distribution of hunters looks like a division of labour between the 'beater' and the 'captor', but it does not look like one hunter deliberately chases a colobus in the direction of another hunter. Instead, it appears that every chimpanzee wants to catch the monkey *himself*." Boesch argues that the "individualistic" hunting observed at other sites reflects a "cultural difference" due to differences in forest structure and demography. His idea has been neither proven nor disproven, so the issues at stake here would benefit from a more open-minded discussion.

Boesch often appears exasperated with those who emphasize discontinuities between human and chimpanzee minds. He associates the "hardcore psychologist" attitude towards animal minds with a view he attributes to Descartes, that animals are subhuman machines, without thoughts or feelings. Boesch argues that some psychologists hold this view because they have not studied chimpanzees in the wild. Instead, they work only with captive chimpanzees, who are deprived

of the social and ecological environment needed to develop fully their cognitive potential. Moreover, Boesch argues that hardcore psychologists' experiments are often designed inappropriately (testing how chimpanzees interact with humans, say, rather than with other chimpanzees) and that they frequently hold chimpanzees to a higher standard than humans.

These arguments have merit. Without field studies of chimpanzees, we would have a deeply impoverished understanding of their behavior. Surely a chimpanzee that has spent its life in a small labyrinth of concrete cages differs importantly from one that has grown up in the socially and ecologically rich world of wild chimpanzees. The abilities demonstrated by chimpanzees depend greatly on experimental design. For example, studies that take into account the relationships among test subjects, including their degree of social tolerance for one another, reveal stronger evidence of cooperative tendencies.

However, to an important degree, Boesch's characterization of the discontinuity argument is unfair. For example, in framing the argument for *Wild Cultures*, Boesch writes that "René Descartes' simplistic views about animals are wrong and it is time to incorporate this clearly into how we think about animals." Boesch does not cite any works of Descartes, so we cannot be sure which views he is critiquing here. It seems, though, that he is responding to a stereotype of Descartes' views in which "animals are mere machines, while humans are thinking beings with souls." However, as philosopher John Cottingham argued (1979), while Descartes is often blamed for having a "monstrous" view of animals, Descartes' actual

views were more nuanced.² Rather than advocating a particularly dismissive view of animal minds, Descartes pioneered a mechanistic, materialist view of biology, rejecting Aristotle's view that animate beings could only be explained by an *animus* (soul). Descartes explicitly included humans in this mechanistic view when he stated: "God made our body like a machine, and he wanted it to function like a universal instrument, which would always operate in the same way in accordance with its own laws."² Unless Boesch wishes to argue that chimpanzee minds are animated by souls rather than neurobiology, it seems unfair to state flatly, "Descartes got it wrong." Similarly, Boesch's arguments against "hardcore psychologists" often appear to miss the nuances of the opposing views.

Regardless of where one stands in the continuity debate, it is clear that chimpanzees profoundly differ from human beings. Despite being clever about making tools, chimpanzees can seem strikingly oblivious to important opportunities. For example, in fifty years of observing chimpanzees at Gombe, they have never been seen to crack oil palm nuts with stones, even though nuts and stones are abundant, and chimpanzees regularly eat the nuts' soft outer flesh.

More importantly, while chimpanzees have a rich and expressive ability to communicate and can learn aspects of symbolic communication in captivity, they do not have language. The symbolic communication underlying human language likely requires a profound transformation of the brain.¹ It is this symbolic mind that Povinelli points to as a key difference between the two species. It is not that chimpanzees cannot feel emotions, or plan, or

learn, or practice politics. Instead, chimpanzees appear not to engage in certain kinds of abstraction that may in fact be uniquely human.

Despite the framing of the debate as one between continuity and discontinuity, scientists agree that there must be evolutionary continuity: humans and chimpanzees share a common ancestor. If some of our ancestral species persisted today, this evolutionary continuity would be obvious. But with the extinction of other hominins, we are left with a gap. We shouldn't expect chimpanzee minds to be just like ours. Recognizing the differences in no way diminishes chimpanzees from being fascinating creatures, with much left to learn from continued study, and much in need of increased efforts to ensure their survival in the wild.

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