

The Mentality of Apes Revisited

Daniel J. Povinelli¹ and Jesse M. Bering

Cognitive Evolution Group, University of Louisiana, Lafayette, Louisiana (D.J.P.), and Department of Psychology, Florida Atlantic University, Boca Raton, Florida (J.M.B.)

Abstract

Although early comparative psychology was seriously marred by claims of our species' supremacy, the residual backlash against these archaic evolutionary views is still being felt, even though our understanding of evolutionary biology is now sufficiently advanced to grapple with possible cognitive specializations that our species does not share with closely related species. The overzealous efforts to dismantle arguments of human uniqueness have only served to show that most comparative psychologists working with apes have yet to set aside the antiquated evolutionary "ladder." Instead, they have only attempted to pull chimpanzees up to the ladder's highest imaginary rung—or perhaps, to pull humans down to an equally imaginary rung at the height of the apes. A true comparative science of animal minds, however, will recognize the complex diversity of the animal kingdom, and will thus view *Homo sapiens* as one more species with a unique set of adaptive skills crying out to be identified and understood.

Keywords

chimpanzees; cognitive evolution; theory of mind; comparative psychology

Five to seven million years ago, a small lineage of anthropoid apes

came down from the trees. Within a couple of million years, descendants of this lineage had evolved a new form of locomotion (striding bipedalism), and had resculpted their pelvic girdle, head, hands, and feet. They tripled the size of their brain, and even appeared to have reorganized some of the most fundamental systems within that brain (see Preuss & Coleman, in press). In a world already teeming with biological diversity, the human lineage made its debut.

With the appearance of our species came the ability to ponder those origins, and to pose such questions as, what does it mean to be human? and, more central to this essay, what psychological characteristics appear to be uniquely human? Such questions have challenged generations of inquisitive minds, all the while fueling controversy and divisiveness. Typically, the answers to such questions depended on the profession of the individuals being asked: To the theologian, the uniquely human endowment was the possession of a soul; to the psychologist, it was language; to the anthropologist, it was culture.

DEMOLISHING HUMAN UNIQUENESS

Alas, enter the first comparative psychologist, Darwin, who, running against centuries of religious and philosophical dogma, strategically announced that there is no characteristic truly unique to humans. "There can be no doubt,"

wrote Darwin in 1871, "that the difference between the mind of the lowest man and that of the highest animal is immense. Nevertheless the difference, great as it is, certainly is one of degree and not of kind" (Darwin, 1871/1982, p. 445). How could Darwin be so sure? To him and his followers, the answer was simple: Just observe other species' natural, spontaneous behaviors, and then use introspection to infer the underlying causes of these behaviors. Although this may seem like a sensible enough approach, consider the full implications of this method: It makes the human mind the standard against which all other minds are judged, installing our mental processes—and only ours—into the minds of other species. Even now, as data calling for a radical departure from this canonical view continue to mount, this most anthropomorphic (and ultimately un-evolutionary) of assumptions continues to live on in the field of comparative psychology.

In no case is this truer than in research into the mental abilities of chimpanzees and other great apes. Here, the classic argument by analogy enjoys the protection of the suspect notion of "evolutionary plausibility." Researchers regularly assert that the parsimonious explanation of behavioral similarity between humans and chimpanzees is the operation of equally similar psychological systems. Against this theoretical backdrop, Savage-Rumbaugh, mentor of the bonobo chimpanzee Kanzi, writes a book whose subtitle proclaims that her chimpanzee is "the ape at the brink of the human mind" (Savage-Rumbaugh & Lewin, 1994). In a recent article, Suddendorf and Whiten (2001) conclude that "the gap between human and animal mind has been narrowed" (p. 644). And de Waal's (1999) take on the same trend is that the chimpanzee is "inching closer to humanity" (p. 635).

For some researchers, continuity extends to identity. Savage-Rumbaugh, for example, declares that she has met the mind of another species and discovered that it is human: "I found out that it was the same as ours," she concludes. "I found out that 'it' was me!" (as quoted by Dreifus, 1999, p. 54). More typically, though, chimpanzees are caricatured as watered-down human beings. Echoing Darwin, Fouts (1997) sees any attempt to demonstrate differences between closely related species as symptomatic of "Cartesian delusions," and proclaims, "The cognitive and emotional lives of animals differ only by degree, from the fishes to the birds to monkeys to humans" (p. 372). Likewise, Goodall (1990) writes of a "succession of experiments that, taken together, clearly prove that many intellectual abilities that had been thought unique to humans were actually present, though in a less highly developed form, in other, non-human beings" (p. 18).

All of this adds up to an agenda for psychological research with chimpanzees: "Just how human *are* chimpanzees?" We suggest, however, that the obsession with establishing psychological continuity between humans and other apes has cast this area of comparative psychology into a great freeze. It has contributed to marginalizing the discipline's mission by reducing it to a series of demonstrations in which one humanlike ability after another is revealed in nonhuman animals. It is an objective anchored to the mistaken idea that evolution proceeds linearly and that apes are thus playing catch-up to the human intellect. This objective, however, is fundamentally at odds with the central theme of modern biology: Evolution is real, and it produces diversity.

Indeed, differences are seen as somehow obscuring the true evolutionary relationships among living

species: "Researchers are regularly finding heretofore unexpected realms and degrees of similarity," noted Russon and Bard (1996), "and these similarities are particularly useful for evolutionary reconstructions" (p. 14). Not only is this point of view 180° out of phase with modern cladistic approaches to evolutionary reconstruction, but if the dramatic resculpting of the human body and brain that occurred over the past 4 million years or so involved the evolution of some qualitatively new cognitive systems, then this insistence on focusing on similarities will leave comparative psychologists unable to investigate hallmarks of their own species—or chimpanzees, for that matter. It is an agenda that does justice to no one.

AN ALTERNATIVE FRAMEWORK: THE REINTERPRETATION HYPOTHESIS

Perhaps the greatest obstacle to overcoming Darwin's a priori strait-jacket of unbroken psychological continuity has been the difficulty of imagining an alternative. After all, if there really were a viable alternative, surely whatever intuitive anthropomorphic biases researchers have could be overcome—much in the way that Newtonian mechanics overcame tenets of Aristotelian physics. But here the challenge may be more substantial, because in this case, the very system that comparative psychologists seek to investigate is the one producing the illusion, compelling these researchers to recreate the psychology of other species in their own image.

In recent publications, we have suggested an alternative to the continuity paradigm, an alternative that we initially applied to the evolution of a *theory of mind*—the ability to reason about mental states in the self and others (for an elabora-

tion of this model, see Povinelli, 2000, chap. 2). Our alternative posits that for dozens of millions of years, the primate order produced numerous social species, each one inheriting a core stock of mammalian social behaviors and then tweaking these behaviors to cope with the peculiar demands of its own circumstances. Although there is debate as to the key factors in this process, there can be no doubt that natural selection for social living was intense during the radiation of the primates, and with this drive to sociality came selection for social behavior to both exploit and cope with group living.

However, rather than positing sociality as the prime mover for the evolution of psychological systems for representing other minds, our alternative holds that the vast array of spontaneous behaviors that humans share with chimpanzees, including deception, gaze following, holding a grudge, tool use, reconciliation, and organized hunting, emerged and were in full operation long before additional systems evolved to interpret these behaviors in terms of underlying mental states. Instead, these behaviors were generated through existing psychological processes, motivated by physiological, attentional, perceptual, and affective mechanisms—mechanisms that continue to guide an enormously complicated assemblage of primate (including human) behavior.

The final part of our claim is that it was not until a particular lineage appeared—the human one—that a new representational system was stamped into the old, so that the observable world, and those things transpiring in it, were "reinterpreted" with hidden meaning, allowing humans to reflect on unobservable causes, such as mental states. Without discarding the ancestral mechanisms it built on, this novel causal explanatory system then generated its own subassem-

blage of behaviors (e.g., progressive cultural transmission, religious rituals, and explicit pedagogy), all of which hinge on the ability to represent a social and physical world governed by abstract causal forces. Because it envisions that a hallmark of human mental evolution was installing a system or series of systems that interprets ancestral behaviors in new ways, we have labeled our model the *reinterpretation hypothesis*.

The reinterpretation hypothesis calls into question the fairly common assertion that if similar behaviors “are the product of a common history, then it is likely that the underlying psychological processes responsible for the overt behavior are similar, too” (Suddendorf & Whiten, 2001, p. 643). To the contrary, the reinterpretation hypothesis makes clear that no a priori argument from similarities in spontaneous behavior will suffice. Although the recently shared ancestral heritage of chimpanzees and humans virtually guarantees behavioral homologies, the totality of the representational software that rides alongside (or in some cases causes) similar behaviors in the two species is not necessarily the same. With this alternative framework—a theoretical approach that embraces both similarity and difference—it is now possible to return to the investigation of human uniqueness in the way that a biologist would address an investigation of the specializations of any species—open to wherever the empirical facts seem to lead.

DIFFERENCES IN THE MENTALITIES OF APES AND HUMANS

Evidence that human evolution was marked by the emergence of novel mental abilities is beginning to accumulate. There is increasing

evidence that, at some point after hominids separated from the line leading to the modern African apes, humans developed a unique capacity to mentally represent a world of hidden causal forces, including mental states. Consider the following:

- Although chimpanzees respond to eye gaze by following the visual trajectory of other individuals, even around barriers, they do not appear to grasp the fact that others’ visual behaviors are

accompanied by the psychological experience of “seeing” (Fig. 1; see the review by Povinelli, 2000). Recent widely reported claims that chimpanzees may attribute the mental states of seeing and knowing to other chimpanzees (e.g., Hare, Call, Agnetta, & Tomasello, 2000) have not been supported by attempts at replication (Karin-D’Arcy & Povinelli, 2002).

- In carefully controlled studies, great apes have failed to appreci-



Fig. 1. Gaze following in a 6-year-old chimpanzee. The chimpanzee makes eye contact with a human caretaker (top left), who turns and looks above the chimpanzee (top right); the chimpanzee then follows the caretaker’s gaze (bottom). Although it is tempting to assume in such circumstances that the chimpanzee’s interpretation of the situation is similar to our own (i.e., that the animal can infer that the person has “seen” something), the reinterpretation hypothesis (see the text for details) makes clear that in this and many other cases, high-level human cognitive systems may have been grafted into a suite of ancient systems that modulate quite ancient behavioral patterns. Only programmatic experimental approaches will suffice to determine the presence or absence of such systems in other species.

ate the underlying referential nature of intentional communication (e.g., Povinelli, Reaux, Bierschwale, Allain, & Simon, 1997). Whether the communicative attempt comes in the form of an extended index finger (i.e., pointing) or an iconic device (e.g., a replica of a box containing a food reward), chimpanzees do not seem to understand that the communicative behaviors of other individuals are driven by a desire to share information.

- A number of nonverbal methodological attempts to parallel research on children's understanding of the mental state of belief have shown that chimpanzees do not distinguish between individuals who are ignorant versus knowledgeable. For example, they respond to observers who have witnessed the hiding of food no differently than they do to those who are oblivious to its actual location—choosing at random who they would like to retrieve the reward for them (Call & Tomasello, 1999).
- "Expert" chimpanzees that have been previously trained on how to perform a cooperative task (e.g., jointly pulling a heavy box by two separate ropes) with a human partner do not spontaneously guide naive chimpanzee partners on relevant dimensions of the task; these experts essentially ignore the fact that their new partners lack the requisite knowledge for success, and fail to instruct them through teaching behaviors (e.g., showing, touching, pointing; see Povinelli & O'Neill, 2000).

Interestingly, this pattern may translate to the nonsocial domain as well. Recently, we completed a project that was designed to map our chimpanzees' understanding of unobservable forces in the physical world (see Povinelli, 2000). The initial round of nearly 30 studies,

conducted over a 5-year period, was centered on the widely celebrated ability of chimpanzees to make and use simple tools. However, we were interested not in the level of complexity that such tool use and construction might achieve, but rather whether chimpanzees reason about the hidden properties and functions of tools. In particular, we asked whether chimpanzees' understanding of the physical world is mediated by concepts robustly in place by about 3 years of age in human children—things such as gravity, force, shape, physical connection, and mass.

The results converged upon a finding strikingly analogous to what we have described about chimpanzees' understanding of the social world: Although they are very good at understanding and learning about the observable properties of objects, they appear to have little or no understanding that these observable regularities can be accounted for, or explained, in terms of unobservable causal forces. In short, we have speculated that for every unobservable causal concept that humans may form, the chimpanzee will rely exclusively upon an analogue concept, constructed from the perceptual invariants that are readily detectable by the sensory systems.

CONCLUDING REMARKS

If there is one thing that our species is obviously not very good at, it is imagining ways of understanding the world that differ markedly from our own. The popular press overflows with stories of empathic gorillas rescuing young children, cats scaling burning buildings to bring their kittens to safety, and dogs who think they are human. Whatever the behavioral facts of these cases, one thing is certain: We humans will auto-

matically interpret the psychological facts from the perspective of our evolved, but peculiarly distorted, ways of understanding the world.

Research with chimpanzees and other great apes remains marginalized within the cognitive and biological sciences largely because the field has failed to come to grips with the most important tenet of modern biology: Evolution is real, and it produces diversity. Comparative psychology was founded upon the notion that organisms could be arranged into an evolutionary scale or ladder in which the mental operations of living species were said to differ in degree, not kind. Most psychologists who work with chimpanzees continue to espouse this view. Because of the importance of comparing and contrasting the psychological systems of our own species with those of our nearest living relatives, there is an overwhelming need to train the next generation of these psychologists in the intricacies of the evolutionary biology of the organisms they study. Organismal biology can provide the theoretical motivation to look for, and thus celebrate, the marvelous psychological differences that exist among species.

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Acknowledgments—This work was supported by a Centennial Fellowship Award to D.J.P. from the James S. McDonnell Foundation.

Note

1. Address correspondence to Daniel Povinelli, Cognitive Evolution Group, University of Louisiana, 4401 W. Admiral Doyle Dr., New Iberia, LA 70560; e-mail: ceg@louisiana.edu.

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