

Essay Review

Trying to Make Chimpanzees Into Humans

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FRANS B.M. de WAAL (ed.), *Tree of Origin: What Primate Behavior Can Tell Us About Human Social Evolution*, Cambridge, MA: Harvard University Press, 2001, 311 pp., illus., \$29.95.

Although this edited volume resulted from a conference held years ago now, in 1997, it is not out of date. Indeed, many of the contributors have continued to promote the same stories and assumptions that have unfortunately become commonplace in primatology and paleoanthropology: chimpanzees or bonobos are our closest living relatives, natural or other kinds of selection can make anything happen, and even an organism's desires can engender change through use and disuse. The subtitle is therefore misleading. For, with the exception of Strier's contribution on behavior in some New World monkeys, the primates whose behavior is used as the backdrop to boundless speculation on the evolution of human social behavior are chimpanzees. Why? Not because chimpanzees or bonobos are behaviorally most similar to humans – in fact, some of the contributors are forced to admit, as is well known, that the orangutan is most human-like in problem solving, copying, cultural behavioral attributes – but because of the assumption that, because humans and chimpanzees are similar in various (although not all) stretches of DNA, they are the most closely related of the large-bodied hominoids (apes + humans).

I will not here review the history of assumption that underlies this overly simplistic interpretation of similarity. I explore this in depth elsewhere (e.g. Schwartz 1987; 2005; in press), where I also demonstrate that while chimpanzees share with humans virtually no unique morphologies (but they do share many with gorillas), the

orangutan is the most human-like ape in features of soft- and hard-tissue anatomy, development, and reproductive behavior and physiology (including lack of estrus or 'concealed' ovulation) that have long been taken as being unique to humans alone. The irony of the primatological and paleoanthropological communities taking as 'truth' what some molecular anthropologists admit is only an assumed process of molecular 'evolution' and turning a blind eye to the human-like attributes of orangutans (or the orangutan-like attributes of humans), is that much effort is expended in explaining away the contradictions that come from using chimpanzees or bonobos as models of how early hominids (extinct human relatives) may have behaved socially or otherwise. Indeed, the edited volume under review represents an excellent example of the mental contortions that some primatologists go through in order to keep the myth alive.

Take, for instance, the first contribution, by Pusey, on chimpanzee community structure. More than once Pusey makes the point that the fission-fusion, male philopatry, and female dispersal aspects of chimpanzee societies are unique among mammals (not primitive as one might expect). Female chimpanzees also engage in infanticide. The well-known promiscuity of chimpanzees is couched in terms of females pursuing multiple mates in order to select higher ranking males, among which a scenario of rank and sperm competition is inferred and then imbued with reality. Selection is invoked as shaping female genital morphology because 'a female often mates with many males [which means that] her reproductive tract is apt to house sperm from more than one male'. In turn, selection molded sperm to form a gelatinous plug that would interfere with subadults' ability to inseminate females. How this is selected and by whom is not addressed. Even though similarities are drawn between human (especially hunter-gatherers, representing the presumed 'primitive' human state) and chimpanzee social structure, Pusey gives four examples of the same in very distantly related primates.

In contrast to chimpanzees (and bonobos), humans form long-term pair bonds, copulate in private, mate at lower frequencies than receptive female chimpanzees (but each mating is more prolonged and mating occurs over more of the total life span), are far less promiscuous, and lack an estrous cycle and associated anogenital swelling. In light of these striking differences, Pusey, as virtually every contributor to this volume, finds himself in the dilemma of trying to explain how, when, and why early hominids departed from the chimpanzee mode of social behavior and became 'human'. Of course, if one used an orangutan model, none of these human attributes

would be problematic. In fact, all hominids would have been so characterized. But the quest for human-chimpanzee links is compelling. For example, in his chapter, Stanford points out that chimpanzees are less carnivorous than previously thought; they are primarily frugivorous, with meat constituting only about 3% of the total diet. However, like human hunter-gatherers, when chimps eat meat, they eat a lot of it at one time. (It would seem that the hunter-gatherer has replaced the 'bushman' or Hottentot of the Great Chain of Being.)

Wrangham takes the food scenario further. Beginning with the claim that the as yet undiscovered ancestral hominid was essentially a chimpanzee (dubbed *Pan prior*), Wrangham suggests that descendent hominids (australopiths) no longer needed teeth adapted for shearing and chewing foliage, so they evolved teeth for crushing (as in the orangutan). Somehow, they also became bipedal. But australopiths lacked traits of 'humanity': large brains, small jaws, guts, and teeth, full-time terrestrial locomotion, and male-female pair bonds. These traits came with *Homo habilis* [which, from my own study of the human fossil record, is a taxon without basis (Schwartz and Tattersall 2003)]. Nevertheless, *H. habilis* conveniently evolved into *H. erectus* in a transition that supposedly lasted only a few tens of thousands of years, resulting, among other things, in the latter species' guts becoming even smaller! (Mind you, guts are soft tissue, which doesn't fossilize.)

Overlain on this story is the claim that hominids began cooking food at about 1.9 mya (million years ago), and that they controlled fire at about 1.6-1.7 mya. Cooking thus had an effect on calorie intake, which led to increased female body size (also at about 1.9 mya). There is, of course, nothing in the human fossil record to suggest any of this. Nevertheless, Wrangham continues: 'Because cooking caused the diet to be softer and more easily digested, it can readily account for the reduction in tooth area and gut size, as well as the increased energy needed for fueling a larger brain.' (How the one could induce the other is a biological mystery – nevertheless). By controlling fire, hominids could scare away predators, which then led to the loss of climbing adaptations because 'individuals could sleep and eat more comfortably on the ground'. With greater security from predators, mortality rates could decrease, and individuals could live longer and take longer to grow and mature. In addition, at about 1.9 mya, 'a complete suite of mating adaptations evolved, including the concealment of ovulation, permanent female attractiveness, a high number of matings between births, and fairly equal distribution of mating opportunities among different males'.

There was thus the simultaneous emergence of cooking and a modern human mating system. How and why did hominids change from the chimp mode of social structure to that of our own? Well, supposedly, cooking means waiting, and waiting makes scrounging by others possible. As such, females bonded with males to protect themselves from scroungers, which led to female-female competition for male food guardians, and this, in turn, led to the emergence of the unusual human mating pattern. As for 'losing' the estrous cycle, selection 'favored' mothers who 'deceived' males into finding them attractive throughout the entire menstrual cycle.

So, why do female orangutans lack estrus and form short-term but renewed consortships with males? Who knows? But orangs don't cook and rarely eat meat.

After Wrangham we come to Byrne's contribution on primate intelligence, in which he tries to reconstruct the 'ancient mind' by assuming that if we knew the environmental challenge the ancestral 'aptitude' had met, we could know how it caused inclusive fitness in individuals with this trait who, of course, would leave more descendants: 'Are the challenges for which our intelligence is most crucial today the same as those ancient ones that led to its evolution, or has intelligence taken over new functions?' Who knows? But the pertinent issue is whether these are real or relevant questions. More importantly, perhaps, is the impossibility of testing any of them. But if one believes that traits exist because they were 'good for' or benefited their bearers, then one has license to imagine the 'forces' that 'created' the trait, whether one thinks it increases fitness in present-day species or, if not, that it must have increased fitness in a now-extinct ancestor. Of course, there also is the inescapable invocation of use-disuse arguments. For instance, the size and complexity of social groups is correlated with a major selection pressure promoting brain enlargement in primates, which, in turn, resulted in monkey and ape brains that are on average twice as large as other mammals of similar size. But there's more: larger brains evolved in response to a need for increased social skills, which then permitted a more rapid pace of learning.

Dunbar's chapter, the 'brain on two legs', continues the theme: social complexity and group size are correlated and the former has driven the evolution of intelligence. From some evidence that primates that live in large groups tend to have relatively larger brains than other primates, Dunbar concludes that 'it has been the need to evolve larger groups that has driven brain size evolution in primates', leading, eventually, to the emergence of language. Ironically, the primate group sizes on which

Dunbar's theory relies on groups larger than the largest social groups in living humans. But Dunbar goes forth, developing a model that can 'predict where a species can and cannot occur on the basis of its maximum ecologically tolerable group size', with the intention of exploring where populations of extinct primates, including hominids, could have lived. Even though predicting that chimpanzees could not have inhabited the same areas as early hominids (australopiths), Dunbar doggedly holds on to the notion that 'we know' that the australopiths were essentially chimpanzee-like hominids that evolved into more wide-ranging and carnivorous species of the genus *Homo*.

The stream of consciousness proceeds apace throughout the remaining contributions. Snowdon speculates on the 'evolution' of human language, with a nod to Darwin's thoughts on animal expression as a system of motivational rules applied to species. After making the obligatory comparison with chimpanzees – human can produce three vowel sounds chimpanzees cannot [i, a, and u] – and noting that visual cues may be more important than vocal signals in apes, Snowdon gets to his point:

Language evolution was driven by social forces. Those ancestors who could communicate most effectively about the location of food and shelter or about predators and how to avoid them would have had more reproductive success because of obtaining more mating and by leaving behind more surviving offspring.

The awkwardness of language aside, this sounds familiar. It's a version of what I've called the 'vacuum theory of evolution' (e.g. Schwartz 2005). The need or desire to adapt to a certain situation sucks organisms into it (there must be more than one), which change to 'fit' the need or demand placed on them. Then, somehow, what should have been the genetic basis for the change is subsequently induced by the initial provocation. Pretty amazing, especially since it's the antithesis even of the Morganian/Fisherian notion of mutation providing selection with the variability needed to produce change. Nevertheless, as we've seen, the scenario of process is so entrenched in the public and scientific consciousness that forays into such heights of speculation become elevated to the level of fact.

In his chapter, McGrew tries to tackle the nature of culture, addressing the prospects and pitfalls of what he calls cultural primatology. Defining aspects of culture as learned (not inherited), social (not individual), and collective (not solitary), McGrew argues: 'just because humans are primates, cultural processes need not be limited to primates, or even to mammals'. Two points of interest

emerge in this overview: orangutans are the most manipulative of apes [and as von Schaik *et al.* (2003) demonstrated, the ape with the most human cultural attributes], and, while 80% of the publications over the past 12 years on primate behavior have focused on lemurs, gorillas, macaques, orangutans, and chimpanzees, more than 50% of these have been on chimpanzees. Why? In large part because it's assumed that the chimpanzee is our closest living relative and, even more naively, that by studying this primate alone one will be able to 'learn' about ancestral hominid behavior. Odd, though, that in almost every case, if one searches the literature, it turns out that orangutans are more human-like than chimpanzees.

Although de Waal contributed the second chapter in this collection, I saved its discussion for last since he focuses not on the common chimpanzee, but on the bonobo, which he sees as being the more human-like of the two. Since bonobos tend to stand bipedally more frequently than the other chimpanzees, de Waal likens them to *Australopithecus* – which is actually an artist's impression of how *Australopithecus* would have looked. But this comparison, while capturing the extent to which primatologists and paleoanthropologists allow their imaginations to exceed the bounds of scientific inquiry, ignores the enormous anatomical differences between a bonobo (and a common chimpanzee) and an australopith. The myths of bonobos being the gentle ape and the most sexual (for which the phrase, make love not war has incorrectly been applied) are reiterated. In fact, while it is true that bonobos engage in sexual activity more frequently than any other ape, for the most part it is genital rubbing between same-sex pairs, with males standing rear-to-rear and females lying face-to-face. The latter position is often generalized to heterosexual pairs to bolster the claim that bonobos make the better early hominid model. Yet, after all is said and done, de Waal, as others who seek evidence of human social and reproductive behavior in chimpanzees, must admit: 'Our species has been adapted for millions of years to a social order revolving around reproductive units – the proverbial cornerstone of society – for which no parallel exists in either *Pan* [chimpanzee] species.'

One day, perhaps, primatologists and paleoanthropologists will shed their blinders and realize that the ape they often discover is more human-like than either chimpanzee – the orangutan – might provide them with more satisfactory hypotheses to test. Until then, however, the scientific and popular literature will continue to be mired in the twilight zone of wondering why the ape that is claimed to be our closest living relative is so unlike us.

References

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