

Contrasting inter-group behavior of our two closest evolutionary relatives, chimpanzees and bonobos, provides possible insights to human evolution

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Within-group cooperation (i.e., among closely related individuals), is to varying degrees observed among a significant number of animal species. However, peaceful encounters and cooperation between members of separate groups (i.e., individuals of the same species who are not closely related) without immediate reciprocity, have heretofore been viewed as an almost exclusively human behavior. Competition and aggression have been thought the normal non-human conditions. Indeed, human society is based on cooperation between individuals and groups that are not close relatives.

Two recently published studies based on field observations of chimpanzees and bonobos (a.k.a. “pigmy chimpanzees”) display some markedly contrasting behaviors regarding inter-group interaction, which may provide insight into the behavior of early human ancestors. Although closely related to each other, chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*) are separate species. Their genus, *Pan*, however, is the most closely related of the great apes (gorillas, orangutans) to the earliest members of the human lineage (collectively known as hominins).

Chimpanzees are known to exhibit a degree of within-group aggression related to competition in the group’s social dominance hierarchy. However, there is also cooperation, for example in communal hunting. Observed relations between separate groups are antagonistic, including some which have been likened to a kind of warfare in competition for territory and resources.

Recent observations of chimps in the wild, based on a

three-year study by the University of Cambridge and the Max Planck Institute for Evolutionary Anthropology at the Taï National Park in Côte d’Ivoire, reported in the journal PLOS Biology (Lemoine, Samuni, Crockford, and Wittig, 2023), have recorded the use of what may be described as “military” tactics to regulate potential confrontations with other groups of chimps. This involves knowledge of the strategic value of topography and a form of reconnaissance, employing high ground to observe rival groups, while remaining unobserved themselves, in order to adjust the potential for confrontations with other groups. The researchers found that “strength in number determined advances or retreat decisions, with advances being more likely (and so retreat less likely) when in situations of favorable imbalance of power.” Chimps were also observed to regularly patrol the borders of their territory, apparently to detect intruders.

The authors comment, “Taking coordinated decisions to adopt tactics that reduce risks involves demanding cognitive abilities and the ability to adjust one’s behavior based on available knowledge.” They conclude that, “Tactical decision-making during in-group/out-group contexts and territorial landscape usage may offer an important paradigm to gain insight into the evolution of complex socio-cognitive adaptations, particularly in relation to the evolution of hominoid and human cognition.”

While chimps and bonobos live in similar social groups, composed of several adult males and females and their offspring, bonobos stand in sharp contrast to the antagonistic inter-group and, indeed, intra-group

behavior of chimpanzees. A common expression that has been applied to bonobos is that “they make love, not war.” Indeed, bonobos are known to be highly promiscuous, in both same sex and cross-sex encounters, using sex as a social-bonding mechanism.

Based on research by Harvard University and the German Primate Center, in the Kokolopori Bonobo Reserve, Democratic Republic of the Congo, published in the journal *Science* (Samuni and Surbeck, 2023), investigators found that when different groups meet their interactions are peaceful and cooperative. Intra-group behavior tends also to be benign.

“Tracking and observing multiple groups of bonobos in Kokolopori, we’re struck by the remarkable levels of tolerance between members of different groups. This tolerance paves the way for pro-social cooperative behaviors such as forming alliances and sharing food across groups, a stark contrast to what we see in chimpanzees,” says Dr. Liran Samuni, of the German Primate Center in Göttingen and the lead author of this study. Furthermore, the observed interactions between individual members of the different groups were found not to be random, but rather preferentially oriented toward those other individuals who were likely to reciprocate, but with no immediate guarantee. Positive interactions observed between members of different groups include grooming, forming alliances, and sharing high-value food resources.

The researchers conclude, “cooperation between unrelated individuals across groups without immediate payoff is not exclusive to humans and suggest that such cooperation can emerge in the absence of social norms or strong cultural dispositions.” In other words, cooperative behavior beyond the immediate family group may be a trait that has its origin prior to the development of human behavior that is highly culturally regulated.

Samuni commented, “The ability to study how cooperation emerges in a species so closely related to humans challenges existing theory, or at least provides insights into the conditions that promote between-group cooperation over conflict.”

More extensive research has been conducted on chimpanzees as opposed to bonobos up until now. The aggressive behavior of the chimpanzees has frequently been cited as the evolutionary root of human aggression. At the very least, the sharply differing

behavior of bonobos paints a much more complicated picture. The fact that our two closest biological relatives exhibit such diametrically differing behavior raises the alternative interpretation that early humans had substantial behavioral flexibility.

The transition of early hominins from a forested to a more open, savannah environment during the Pliocene must have created extreme selective pressure to draw on all existing behavioral resources that were the legacy of their common ape ancestors. The evolution of a heavy reliance on technology from very rudimentary ancestral behaviors, such as stone tool manufacture, clearly demonstrates that flexibility.

Cooperation between separate groups would very likely have been advantageous in such a stressful environment. Resources in the open environment of the savannah tend to be scattered and available at different times of the year. Many hunter-gatherer groups are known to have practiced a seasonal fission-fusion settlement pattern, with groups aggregating when resources are locally abundant and dispersing when they are not. By contrast, resources in forested settings would tend to be more ubiquitous, if varying in abundance. Therefore, the defense of a limited territory in the open land with only some of the necessary resources would have been a losing strategy, with cooperation and freedom of movement, a more bonobo-like strategy, more selectively advantageous.

An important question, which is not explored in either study is why such a stark difference evolved between chimps and bonobos, such closely related species. What are the environmental or other factors which led to such a divergence? These are fruitful lines of future investigation.



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