

## How Humans and Their Closest Relatives Use Social Glue to Build Bridges and Mend Fences

# The THREE Chimpanzees

by NINA G. JABLONSKI

**T**HOMAS HENRY Huxley is probably best known for his vocal support of Charles Darwin's theory of evolution by natural selection. He is less well-known for the rigorous comparative anatomical investigations he carried out in the mid-1800s on many species of mammals, including apes and humans. After carrying out extensive dissections, Huxley concluded that humans were, without a doubt, more closely related to chimpanzees (*Pan troglodytes*) than to any other mammal. While this came as no particular surprise to other zoologists at the time, the Victorian public was unnerved by the disclosure of our propinquity to what were seen as monstrous, hairy, and uncultured creatures. "If this is true, let it at least not become widely known," one indignant socialite is reported to have said at the time.

Well, true it is, and science in the last 50 years has not only reaffirmed Huxley's conclusions, but has shown through comparative DNA studies that humans and chimpanzees are more closely related to each other than either is to our next closest relative, the gorilla. And since Huxley's time, we have discovered the existence of yet another close relative, the bonobo or pygmy chimpanzee (*Pan paniscus*), which last shared an ancestor with the "common" chimpanzee about two million years ago.

To the delight of many, and the chagrin of our discomfited Victorian descendants, Jared Diamond's 1992 book *The Third Chimpanzee* introduced a large popular audience to the evidence of our close relatedness to chimpanzees and bonobos. Diamond not only reviewed the biological evidence that humans differ by only the smallest genetic margin from chimpanzees, but also intimated that other characteristics once thought to separate us, such as the manufacture and use of tools, were, in fact, traits that we all shared. The deeper we look into chimp and bonobo society, the more similarities we find with human behaviors. It's just that the expression of these behaviors in humans is a quantum leap ahead of the other two chimpanzees.

But perhaps the most important similarity among all three chimps is that many of their behaviors are

learned rather than instinctive, and are handed down faithfully from one generation to the next. Being a good mother, finding the right food to eat, and figuring out who to avoid

because they are in a bad mood, are all learned behaviors and so constitute elements of true culture in whatever species they occur.

I have been fascinated for years by the behavioral and cultural similarities between the three chimpanzees, and have sought to understand why certain behaviors have undergone subtle but important differentiations since we last shared common ancestors. One of the best ways to examine behavioral evolution is from a historical perspective, based on the evolutionary relationships among the African apes—the three chimpanzees and the gorilla.

Common sense indicates that behaviors shared by the gorilla and all three chimps likely evolved early on in ape evolution, whereas those shared only by humans and chimpanzees evolved more recently. The evolutionary lineages of chimpanzees and humans split apart before those of the common chimps and bonobos; so the behaviors that humans and common chimps share can be considered ancestral for bonobos. Bonobos can be seen as a natural laboratory for studying convergent evolution—many of the anatomical and behavioral traits that they do not share with common chimps must have evolved in parallel to the human lineage.

Conflict avoidance and reconciliation behaviors figure importantly in the lives of all apes and monkeys, and the evolution of these most complex of social interactions offers an insight into the origins of human nature.

**A**PES ARE REMARKABLE MAMMALS. THEY have relatively large brains for their body size, long lives, long periods of gestation and infant dependency, and get a late start on reproduction—often well into the teens. This combination appears to have evolved under the salubrious environmental conditions of the Miocene Epoch some 20 million years ago, a time when apes thrived and diversified throughout Africa, Europe, and Asia.

But ape populations increase slowly: under most circumstances, they reproduce just fast enough to maintain a steady population. So the survival of each individual is important. In order to propagate the



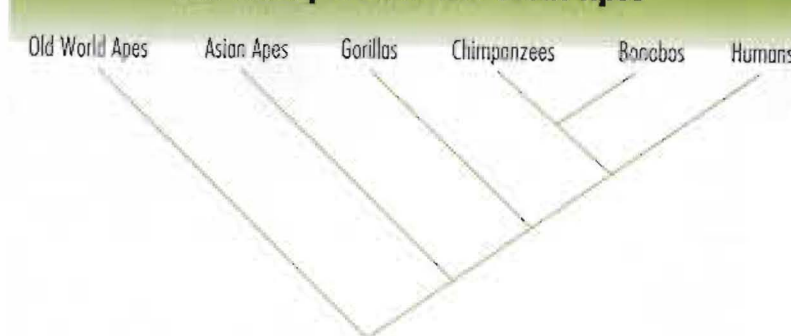
Armed with good intentions, these chimpanzees engage in a relaxing grooming session. Chimps and their close relatives, bonobos and humans, have each developed unique ways to ease social tensions and minimize conflicts.

species, apes can't risk being killed by predators or, especially, one another.

So it is not surprising that apes spend much of their lives avoiding conflict and making peace. Primatologist Frans de Waal, from the Living Links Center of Emory University, has studied captive primates for more than 20 years. He and his many students and colleagues have found that chimps and bonobos take two entirely different approaches to reducing tension and resolving conflicts. While chimps accomplish this through a repertoire of behaviors ranging from grooming to threat displays, bonobos resort almost exclusively to sex.

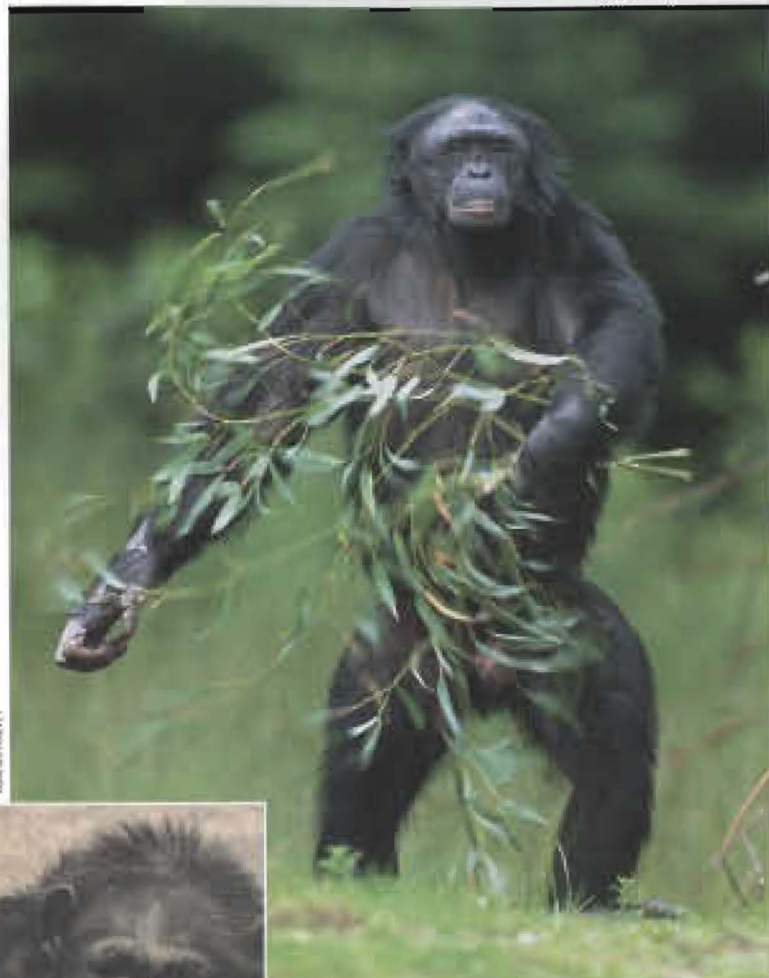
Common chimpanzees are highly social animals and, when not looking for food, spend a lot of time resting together, often grooming each other. This activity not only rids the animals of external parasites,

### The Family Tree of the Great Apes



The family tree of the great apes. The fossil record can also help scientists date the emergence of social behaviors. Chimpanzees are more closely related to bonobos than humans. So behaviors humans share with bonobos, but not chimps, may be examples of convergent evolution.





*The message comes through loud and clear when you stand up and make a threat display. Chimpanzees often get up on two feet, grimace, and charge about beating foliage to intimidate opponents and avoid a physical fight.*

but relaxes both the groomer and the groomed by lowering stress hormone levels. Social grooming, especially among males, builds critically important friendships and alliances. However, conflicts will inevitably arise over, for example, who will have access to food or mates. And when they do, the animals make their feelings known through flashy and often boisterous threat displays.

Threat displays are an ancient behavior that chimpanzees share with gorillas. They begin when an excited ape adopts a bipedal stance, its hair on its shoulders and back erect. It may then rush its adversary, first on two legs, followed by a faster quadrupedal charge. The charging animal will often slap, bite, and generally "rough up" the animal being charged, but usually avoids causing any serious injury.

Sometimes, though, instead of charging, an excited ape will make use of a convenient prop, wielding a large branch, for example, or shaking entire trees to magnify the dramatic movements of its arms. These displays are controlled and only rarely lead to physically violent confrontations involving injury. They stop the aggression from escalating by persuading one



individual to "stand down," to stop harassing an ally, or to stay away from a potential mate.

Sometimes sooner and sometimes later, and often aided by an intermediary, reconciliation follows. The former adversaries will engage in cautious touching, kissing, and embracing. In some groups, the first step toward reconciliation is the extension of a hand, as if to say, "It's okay now."

**B**ONOBOS HAVE EVOLVED A VERY DIFFERENT, and perhaps even more efficacious, way to avoid aggression—extensive sexual contact. Studies of their behavior in the 1980s and 1990s revealed that these apes have so much sex that they were often described as "the apes from Venus." Our Victorian socialite wouldn't have approved of this one little bit!

Like chimpanzees, bonobos use grooming for mutual relaxation and to foster social bonds between individuals. But if two groomers observe something that causes both of them to feel slightly anxious, then grooming is abandoned in favor of sex. Bonobos have a low threshold for tolerating tension and become sexually aroused remarkably easily. Most animal societies reserve sexual behavior for reproduction, but among bonobos it has become an intrinsic part of social relationships. Any



**Sex is used by bonobos to divert attention and to change the tone of an encounter between individuals.**



*Above: Bipedalism is a learned behavior.*

*Above left: The notorious libidos of bonobos may arise from their low tolerance for social tension. Instead of fighting, these pygmy chimpanzees kiss and make up by having sex.*

*Left: Generations of chimpanzees take a time-out for a grooming break that also serves to strengthen troop alliances.*



object that arouses the interest of more than one bonobo at a time, such as a source of food or another animal, leads to sexual contact.

Frans de Waal once wrote that it is the "possibility of conflict over possession" that leads to sexual interactions in bonobos, and that sex is used to divert attention and to change the tone of an encounter between individuals. And this isn't just sex between two consenting adults of opposite sexes. Sexual contact occurs

between bonobos of different ages and both sexes, and involves not only copulation, but genito-genital rubbing between females and scrotal rubbing between males. Actual threat displays in bonobos are rare. Field researchers have often commented that bonobos appear more peaceful and less aggressive than chimpanzees.

The bonobo method of conflict resolution may be related to their origin as a small isolated population that was cut off from other chimpanzees about two



million years ago. Their survival may have depended on a highly effective way of avoiding potentially violent interactions between individuals. Whatever the evolutionary course, bonobos achieve the same end as chimpanzees.

Bonobos also use sex to relieve tension between groups as they do within groups. Peaceful mingling of communities, involving mutual sex and grooming, is the rule. This is in stark contrast to the pattern seen in common chimpanzees. Male chimps are known to patrol the borders of their territory and occasionally raid a neighboring group, injuring or killing some of its members.

SO WHERE DO HUMANS FIT IN THIS PICTURE? Over the course of the last decade, my husband, George Chaplin, and I have published a series of papers on the origin of bipedalism in humans (see, for instance, *CALIFORNIA WILD*, Summer 1999). This

topic is one of the most important, and most contentious, in the history of human evolution. It is important because the transition from walking on four legs to two marked the true beginning of the human lineage; it is contentious because the behaviors which led to the adoption of habitual bipedalism are not recorded in the fossil record or elsewhere. So we must deduce the reason by examining all the possible evidence—comparative anatomy, current behaviors,

fossils, and ancient environments—to come up with the most consistent explanation.

Though bipedal threat displays are shared by all the African apes in conflict resolution, our research indicates that they must have been used frequently to control disruptive behavior in the lineage leading to the earliest human ancestors, or hominids. Our earliest hominid ancestors lived in more open environments than our cousins, the chimpanzees, bonobos, and gorillas, do today. In such woodland fringe or woodland-grassland habitats, food would have been distributed in widely spaced patches, necessitating large home ranges and long daily foraging rounds. With food resources more unevenly distributed in the environment, individuals and groups would have come into more frequent contact—and potential conflict—with one another.

Bipedal displays also have the advantage of being highly visible from a distance, permitting individuals and groups to steer clear of one another in the first place. The increased use of bipedal displays would have helped prehomínids mitigate physical aggression and

reduce chances of injury and death. Those individuals who could avoid such a fate would have been more likely to reproduce. Evolution by natural selection is all about reproductive success—which individuals will in turn be able to successfully reproduce. The routine use of bipedal threat displays may have been what jump-started the transition from quadrupedalism to bipedalism. Once initiated, a host of other behaviors, such as bipedal feeding, carrying, throwing, playing, gesturing, and tool-making, would have strongly propelled the evolution of habitual bipedal posture and locomotion. The rest, as they say, is history.

Bipedal displays abound in our own behavior and culture today. Children chase each other. They shout demands to elicit submissive behaviors or to settle disputes over favored toys or who is going to play with whom. The displays and shouts usually work, but not always. Kids do occasionally bite one another like angry chimpanzees, but are then often ostracized by their playmates and scolded by observing adults.

The preschool years are critically important for developing human social skills, especially in conflict avoidance and resolution. Our knowledge of the development of social interaction in children has been greatly advanced by research carried out over the last two decades by F. F. Strayer of the Laboratoire d'Ethologie Humaine of the Université du Québec à Montréal. Strayer has shown that the use of threat displays and other antagonistic body and facial gestures in children between one and five years of age leads to submission and the development of dominance hierarchies. Significantly, the most popular kids are generally not those at the top of the hierarchy, but those who attract the friendliest attention through their affiliative gestures and attitudes.

Mechanisms for conflict avoidance and resolution in humans become increasingly sophisticated as we get older. Rewards such as popularity, friendships, and social approval accrue to those individuals who learn avoidance and resolution skills well. Conversely, much societal opprobrium is heaped upon those who don't. Appropriate use of aggression and the



control of aggression are among the most important and highly valued of human qualities.

A good—if rather extreme—example of this can be seen in the stylized combat of the boxing ring, where highly trained fighters use a specific set of techniques to battle one another under the watchful eye of a referee. Everything is fine as long as the rules of the fight are followed, but some of society's biggest social and financial penalties befall those who break the rules. One need only to remember the infamous ear-biting incident that marred the 1997 heavyweight title fight between Mike Tyson and Evander Holyfield to realize the extent of disapproval heaped upon someone who uses an inappropriate form of aggression.

Our interpretation of body language also contains holdovers from our behavioral evolution. Imagine a confident person. Almost certainly you have conjured up the image of someone standing tall with shoulders back, head erect, and eyes looking straight forward. Almost every expression of body language and posture that denotes confidence or the winning of a contest involves standing tall or at least standing up. Tall stature is associated with leadership, success, and the qualities of a good mate. This also explains why so many military men, from the ancient Trojans to the Japanese samurai to British and Danish guardsmen,

Our tendency to associate height and power harkens back to the time when we first stood on two feet. From the war room to the drawing room, hat height remains an important clue for deciphering another's social rank.



have worn headdresses or helmets that dramatically increase their stature.

Unlike our Victorian socialite, many people today can accept our close relatedness to chimpanzees and bonobos with equanimity. The similarities of conflict avoidance and resolution shown by the three chimpanzees bear remarkable witness to the importance of reducing tension and mitigating aggression in ape and human societies.

Over an estimated six million years, humans have evolved from bipedal apes to become the most potent manipulators of the environment that our planet has ever seen. As we reflect on this, we should also realize that the ability to empathize is one of our most highly developed behaviors—and who is more deserving of this precious human quality than our closest relatives? As we shrink their habitats through logging, and kill them for meat, chimpanzees and bonobos, with whom we share so much DNA and culture, are disappearing rapidly. A world without our two nearest relatives would be a lonely place, devoid of our evolutionary companions, the animals that shed light on our own beginnings. Let us work toward keeping them, and our ties to our ancient past, alive.

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