

Chimps: More Diverse Than a Barrel of Monkeys

Chimpanzee bands, once thought to be all alike, are very different in tool use, hunting, and social organization

MANY A PERSON ATTENDING A SCIENTIFIC meeting has sat through a session where the speaker doesn't speak the same language as the audience. But it's unlikely that many have attended a meeting where the invited speaker addressed attendees in one language, and they instantly responded in a whole variety of other languages. That's just what happened at a recent conclave in Chicago.* And to make things even stranger, none of the languages were anywhere within the normal range of human expression.

The speaker was renowned primatologist Jane Goodall, who pioneered chimpanzee studies in the wild at Gombe National Park in Tanzania. For the occasion, she began her address with a chimp cry in the Gombe dialect. Some of her audience of 300 answered her with a cacophony of chimp cries—presumably in the dialects of the chimps they study.

There was more than mere bravura in this display of primatological prowess. Indeed, Goodall and her audience were demonstrating a startling change in their field. It used to be that researchers had a fairly uniform picture of the genus *Pan*—after all, there were few observers, and all the observed lived in and around two sites 100 miles apart in Tanzania—Gombe and the Mahale Mountains, where Kyoto University zoologist Toshisada Nishida started studies in

1965. From that kind of narrow perspective, you could say that all chimps looked more or less alike.

But now there are so many researchers in the field that they can populate a self-sufficient community (as shown at this meeting, only the second devoted solely to chimpanzees). And inevitably, as these scores of researchers return from new, far-flung African sites and compare field notes, a novel picture has emerged, one that emphasizes diversity in almost every aspect of chimpanzee life—including hunting, fighting, tool use, social interactions, and even language. Says meeting attendee Frances White, an assistant professor of biological anthropology and anatomy at Duke University: "The variation is so great that there is no such thing anymore as species-typical behavior." Which, in turn, has driven primatologists to ask the next logical question in their inquiry: How did such diversity come about?

Part of the reason why the variation in chimp behavior is being noticed today is a change in technique. Only in recent years have video cameras been used by primatologists in the wild, with the result that researchers can examine behavior—and measure variation in behavior between different groups—without having to travel to each and every remote study site. That, along with a push to standardize methods for observing chimps and describing their habitats, has brought a new level of sophistication to the field. William McGrew, director

of the primate unit at the University of Sterling in Scotland and another Chicago meeting attendee, put it this way: "We're moving away from strictly descriptive work to compiling data from different sites so we can do proper analysis of regional variation."

His assessment was especially borne out in videotapes and presentations showing tool use by different subspecies and species of *Pan*. Indeed, diversity has been better documented in tool use than perhaps any other aspect of chimp behavior. When Goodall discovered chimps using tools in the wild at Gombe 30 years ago it was considered "revolutionary," recalls John Mitani, an anthropologist at the University of Michigan who has studied variation in vocal behavior between chimps, noting that "it wasn't so long ago that humans were defined as the primate that hunted and made tools." But Goodall's discovery was only the beginning. Researchers have now observed tool use by chimps in at least 32 populations in the wild in Africa, according to a new survey by McGrew.

Intriguingly, these studies have revealed a patchwork of variation and exception within the overall pattern of tool use. Chimpanzees in the far west of Africa use tools most extensively—from twigs (for fishing termites out of termite mounds, ants out of trees, and honey from a bee's hive) to picks (for digging marrow out of bones) to crude stone hammers and anvils for cracking nuts.

Chimpanzees in East Africa—with the exception of those at Mahale and Gombe, who use leaves to sponge up water and twigs to tickle themselves, initiate play, and fish for termites and ants—seem to use tools less frequently. The most extreme end of the East African range of tool users are those at Kibale in Uganda. "I'm embarrassed to say that the Kibale chimpanzees appear as the country bumpkins of the chimp world," says zoologist Richard Wrangham, a Harvard Univer-

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BEHAVIORAL DIVERSITY

Behavior	Kibale Site	Gombe Site	Mahale Site
Insect tools (tools used to fish for insects)	None	Termites and ants	Termites
Mother core areas (mothers form clusters)	Clusters of 3-5	No clusters	Some clusters
Male coalitions (pairs of males band together)	Rare	Common	Common
Drinking with tools	Stems as sponges	Leaves as sponges	Rare
Fear of red colobus monkeys	Often fearful	Sometimes fearful	Not available



RICHARD WRANGHAM

sity professor of anthropology who is director of the Kibale Chimpanzee Project in Uganda. "They use none of these [tools]."

Given the preponderance of tool use in the chimp world, why not at Kibale? Wrangham speculated at the meeting that one factor could be the environment: Perhaps food supplies at Kibale are so rich that chimps there don't need to fashion tools to catch ants or crack open nuts. Indeed, they appear to be in robust health, with fewer parasites than their tool-using cousins to the south in Gombe. Interesting as it may be, though, Wrangham's hypothesis cannot be confirmed or rejected without tedious legwork, measuring differences in food quality at different sites—just the kind of work now being undertaken by Wrangham and his postdoctoral researcher Colin Chapman, in collaboration with researchers at other sites.

When it comes to getting food, which is naturally the center of life in the wild for most species, chimps are equally creative. But if the clock had been stopped after early observations at Gombe and Mahale, primatologists would think today that chimps are solitary hunters and that they are unlikely to share their meat with other chimps. But Swiss primatologists Christophe Boesch and his wife, Hedwige Boesch-Achermann, found an amazing degree of cooperation among chimps hunting for colobus monkeys in the Tai National Forest in the Ivory Coast. In his presentation, Boesch showed a videotape in which at least four chimps worked together to capture a colobus infant. Working from different directions, two hunters pushed the colobus out on a tree limb, where another chimp could push it to the ground—and into the clutches of a female chimp.

No less remarkable, the ranking male in the group shared choice parts of the meat with the female who killed the monkey before other males had a turn at it—something not usually seen in chimp bands where sharing of food has been discovered, but generally among males until the choicest bits of the kill are gone (a means of solidifying special alliances, apparently).

Indeed, Tai females seem to be remarkably liberated in comparison with females at other locations. Between two and four females will form alliances, which share food. "They are friends," says Boesch, who thinks these females are not related to one another. But the

"friendship" has a high level of practical motivation: "The extent to which females bond with one another influences how much they are dominated by males," says University of Michigan psychology and anthropology professor Barbara Smuts. "It's one of the important ways for females, who are smaller than males, to balance the physical gap."

One other site where female bonding has been observed is among a species of chimp found only in Zaire—*Pan paniscus*, also known as the Bonobo or pygmy chimp. Bonobo females have been observed to dominate males in captivity, says Emory University primatologist Frans de Waal. And at one site in the wild, Kyoto University anthropologist Takayoshi Kano has also reported females occasionally attacking males. "Bonobos are less male bonded than the common chimp," says Harvard's Chapman. "Bonobo males kick other males out when a female comes in, whereas (common) chimpanzee males are more likely to kick the female out of the tree to let in their buddies."

The differences between the two species of chimp are particularly notable when it comes to sex. After the audience at the Chicago meeting had seen several videotapes of Bonobos, Meiji-Gakuin University zoologist Takeshi Furuichi summed up the species' most pervasive behavior: "You already have seen that Bonobos are extraordinarily sexual animals." Not only do females and males copulate frequently in all sorts of ways, but

females engage in genital rubbing with each other. Even infants as young as 4 months have been seen trying to copulate with their mothers. Those who study these amorous chimps think that all this sex is a way that the Bonobos help

form a social order—they use sex to release tension, to form bonds, and to vent excitement (especially when there's food around).

The more these primatologists uncover uniqueness among bands of chimps, the more they deflate one of the cardinal characterizations of humans: their uniqueness (called cultural diversity). Says Mitani, "When you see differences in tool-making, differences in dialect, differences in hunting [among chimps], it starts to break down the barriers we think of as human." Muses de Waal, is it possible that "primatology is moving into becoming a sort of cultural anthropology of primates?"

If these differences have pushed primatology in a new direction, they have also left researchers scratching their heads in puzzlement as they try to figure out the causes. At the meeting, environmental theories—like Wrangham's theory accounting for the embarrassing lack of tool use at Kibale—were examined. The chimps at Tai cooperate in hunting (they live in a dense rain forest where it may be more difficult to spot and kill prey) while those at Gombe do not (they live in more open savanna where it is easier to see prey).

And then there's yet another kind of explanation that sounds remarkably like the kind applied to human diversity: cultural causes. Applied most often to explain the distinct methods of tool use and grooming signals, cultural primatology sounds something like this: "Sometimes the variation is the chance discovery of one individual that has been passed on through learning," says Goodall.

A third possibility is that genetic variation among the chimps could account for some differences. That idea gains support from findings by Harvard anthropologist Maryellen Ruvolo, who reports in preliminary work that chimpanzees are at least four times as diverse genetically as humans.

Although this kind of genetic work has been done only on a small number of chimps, mostly in captivity, it has already produced intriguing conclusions. Molecular studies are starting to map the differences among the three traditionally defined subspecies of the common chimp, and the separate species Bonobo. Ruvolo and other molecular biologists are just starting collaborations with researchers to collect hairs and wadges—chewed vegetation from which DNA from cheek cells can be extracted—from chimps in the wild so they can use genetics to determine community, population and subspecies diversity, paternity and maternity, among other questions. The next likely step would be a gene bank.

Then again, primatologists may have to hurry or there won't be later steps in any of these approaches to chimp diversity. In spite of the meeting's antic beginning, and the excitement generated along the way, the conference ended on a somber note: a reminder that the subjects these primatologists are studying are disappearing due to the destruction of their habitats and to smugglers, who sell them on a booming international black market. "The tragedy is that during the past 5 years, while we've been learning more about the diversity of behavior in chimps, the habitats in Africa have been decreasing," says Goodall. "We'll never know the true flexibility of chimp behavior because the remaining habitats are gone."

■ ANN GIBBONS



Chimp tool kit. Gombe chimp uses twig to fish for termites.