Got Culture?

by Craig Stanford

ON MY FIRST TRIP TO EAST AFRICA in the early 1990s, I stood by a dusty, dirt road hitchhiking. I had waited hours in rural Tanzania for an expected lift from a friend who had never shown up, leaving me with few options other than the kindness of strangers. I stood with my thumb out, but the cars and trucks roared by me, leaving me caked in paprika-red dust. I switched to a palm-down gesture I had seen local people using to get lifts. Voilà; on the first try a truck pulled over and I hopped in. A conversation in Kiswahili with the truck driver ensued and I learned my mistake. Hitchhiking with your thumb upturned may work in the United States, but in Africa the gesture can be translated in the way that Americans understand the meaning of an extended, declarative middle finger. Not exactly the best way to persuade a passing vehicle to stop. The universally recognized symbol for needing a lift is not so universal.

Much of culture is the accumulation of thousands of such small differences. Put a suite of traditions together—religion, language, ways of dress, cuisine and a thousand other features—and you have a culture. Of course cultures can be much simpler too. A group of toddlers in a day care center possesses its own culture, as does a multi-national corporation, suburban gardeners, inner-city gang members. Many elements of a culture are functional and hinged to individual survival: thatched roof homes from the tropics would work poorly in Canada, nor would harpoons made for catching seals be very useful in the Sahara. But other features are purely symbolic. Brides in Western culture wear white to symbolize sexual purity. Brides in Hindu weddings wear crimson, to symbolize sexual purity. Whether white or red is more pure is nothing more than a product of the long-term memory and mindset of the two cultures. And the most symbolic of cultural traditions, the one that has always been considered the bailiwick of humanity only, is language. The words "white" and "red" have an entirely arbitrary relationship to the colors themselves. They are simply code names.

Arguing about how to define culture has long been a growth industry among anthropologists. We argue about culture the way the Joint Chiefs of Staff argue about national security: as though our lives depended on it. But given that culture requires symbolism and some linguistic features, can we even talk about culture in other animals?

In 1996 I was attending a conference near Rio de Janeiro when the topic turned to culture.[1] As a biological anthropologist with a decade of field research on African great apes, I offered my perspective on the concept of culture. Chimpanzees, I said with confidence, display a rich cultural diversity. Recent years have shown that each wild chimpanzee population is more than just a gene pool. It is also a distinct culture, comprising a unique assortment of learned traditions in tool use, styles of grooming and hunting, and other features of the sort that can only be seen in the most socially sophisticated primates. Go from one forest to another and you will run into a new culture, just as walking between two human villages may introduce you to tribes who have different ways of building boats or celebrating marriages.

At least that's what I meant to say. But I had barely gotten the word "culture" past my lips when I was made to feel the full weight of my blissful ignorance. The cultural anthropologists practically leaped across the seminar table to berate me for using the words "culture" and "chimpanzee" in the same sentence. I had apparently set off a silent security alarm, and the culture-theory guards came running. How dare you, they said, use a human term like "cultural diversity" to describe what chimpanzees do? Say "behavioral variation," they demanded. "Apes are mere animals, and culture is something that only the human animal can claim. Furthermore, not only can humans alone claim culture, culture alone can explain humanity." It became clear to me that culture, as understood by most anthropologists, is a human concept, and many passionately want it to stay that way. When I asked if this was not just a semantic difference—what are cultural traditions if not learned behavioral variations?—they replied that culture is symbolic, and what animals do lacks symbolism.

When Jane Goodall first watched chimpanzees make simple stick tools to probe into termite mounds, it became clear that tool cultures are not unique to human societies. Of course many animals use tools. Sea otters on the California coast forage for abalones, which they place on their chests and hammer open with stones. Egyptian vultures use stones to break the eggs of ostriches. But these are simple, relatively inflexible lone behaviors. Only among chimpanzees do we

see elaborate forms of tools made and used in variable ways, and also see distinct chimp tool cultures across Africa. In Gombe National Park in Tanzania, termite mounds of red earth rise 2 meters high and shelter millions of the almond-colored insects. Chimpanzees pore over the mounds, scratching at plugged tunnels until they find portals into the mound's interior. They will gently insert a twig or blade of grass into a tunnel until the soldier termites latch onto the tools with their powerful mandibles, then they'll withdraw the probe from the mound. With dozens of soldier and worker termites clinging ferociously to the twig, the chimpanzee draws the stick between her lips and reaps a nutritious bounty.

Less than 100 kilometers away from Gombe's termite-fishing apes is another culture. Chimpanzees in Mahale National Park live in a forest that is home to most of the same species of termites, but they practically never use sticks to eat them. If Mahale chimpanzees forage for termites at all, they use their fingers to crumble apart soil and pick out their insect snacks. However, Mahale chimpanzees love to eat ants. They climb up the straight-sided trunks of great trees and poke Gombe-like probes into holes to obtain woodboring species. As adept as Gombe chimpanzees are at fishing for termites, they practically never fish for these ants, even though both the ants and termites occur in both Gombe and Mahale.[2]

Segue 2,000 kilometers westward, to a rainforest in Côte d'Ivoire. In a forest filled with twigs, chimpanzees do not use stick tools. Instead, chimpanzees in Taï National Park and other forests in western Africa use hammers made of rock and wood. Swiss primatologists Christophe and Hedwige Boesch and their colleagues first reported the use of stone tools by chimpanzees twenty years ago.[3] Their subsequent research showed that Taï chimpanzees collect hammers when certain species of nut-bearing trees are in fruit. These hammers are not modified in any way as the stone tools made by early humans were; they are hefted, however, and appraised for weight and smashing value before being carried back to the nut tree. A nut is carefully positioned in a depression in the tree's aboveground root buttresses (the anvil) and struck with precision by the tool-user. The researchers have seen mothers instructing their children on the art of tool use, by assisting them in placing the nut in the anvil in the proper way.

So chimpanzees in East Africa use termite- and ant-fishing tools, and West African counterparts use hammers, but not vice versa. These are subsistence tools; they were almost certainly invented for food-getting. Primatologist William McGrew of Miami University of Ohio has compared the tool technologies of wild chimpanzees with those of traditional human hunter-gatherer societies. He found that in at least some instances, the gap between chimpanzee technology and human technology is not wide. The now-extinct aboriginal Tasmanians, for example, possessed no complex tools or weapons of any kind. Though they are an extreme example, the Tasmanians illustrate that human culture need not be technologically complex.[4]

As McGrew first pointed out, there are three likeliest explanations for the differences we see among the chimpanzee tool industries across Africa.[5] The first is genetic: perhaps there are mutations that arise in one population but not others that govern tool making. This seems extremely unlikely, just as we would never argue that Hindu brides wear red while Western brides wear white due to a genetic difference between Indians and Westerners. The second explanation is ecological: maybe the environment in which the chimpanzee population lives dictates patterns of tool use. Maybe termite-fishing sticks will be invented in places where there are termites and sticks but not rocks and nuts, and hammers invented in the opposite situation. But a consideration of each habitat raises doubts. Gombe is a rugged, rock-strewn place where it is hard to find a spot to sit that is not within arm's reach of a few stones, but Gombe chimpanzees do not use stone tools. The West African chimpanzees who use stone tools live, by contrast, in lowland rainforests that are nearly devoid of rocks. Yet they purposely forage to find them. The tool-use pattern is exactly the opposite of what we would expect if environment and local availability accounted for differences among chimpanzee communities in tool use.

British psychologist Andrew Whiten and his colleagues recently conducted the first systematic survey of cultural differences in tool use among the seven longest-term field studies, representing more than a century and a half of total observation time. They found thirty-nine behaviors that could not be explained by environmental factors at the various sites.[6] Alone with humans in the richness of their behavior repertoire, chimpanzee cultures show variations that can only be ascribed to learned traditions. These traditions, passed from one generation to the next through observation and imitation, are a simple version of human culture.

But wait. I said earlier that human culture must have a symbolic element. Tools that differ in form and function, from sticks to hammers to sponges made of crushed leaves, are all utterly utilitarian. They tell us much about the environment in which they are useful but little about the learned traditions that led to their creation. Human artifacts, on the other hand, nearly always contain some purely symbolic element, be it the designs carved into a piece of ancient pottery or the "Stanley" logo on my new claw hammer. Is there anything truly symbolic in chimpanzee culture, in the human sense of an object or behavior that is completely detached from its use?

Male chimpanzees have various ways of indicating to a female that they would like to mate. At Gombe, one such courtship behavior involves rapidly shaking a small bush or branch several times, after which a female in proximity will usually approach the male and present her swelling to him. But in Mahale, males have learned to use leaves in their courtship gesture. A male plucks a leafy stem from a nearby plant and noisily uses his teeth and fingers to tear off its leaves. Leaf-clipping is done mainly in the context of wanting to mate with a particular female, and appears to function as a purely symbolic signal of sexual desire (it could also be a gesture of frustration). A second leafy symbol is leaf-grooming. Chimpanzees pick leaves and intently groom them with their fingers, as seriously as though they were grooming another chimpanzee. And this may be the func-

tion; leaf-grooming may signal a desire for real grooming from a social partner. Since the signal for grooming involves grooming, albeit of another object, this gesture is not symbolic in the sense that leaf-clipping is. But its distribution across Africa is equally spotty; leaf-grooming is commonly practiced in East African chimpanzee cultures but is largely absent in western Africa.[7]

These two cases of potentially symbolic behavior may not seem very impressive. After all, the briefest consideration of human culture turns up a rich array of symbolism, from language to the arts. But are all human cultures highly symbolic? If we use language and other forms of symbolic expression as the criterion for culture, then how about a classroom full of two-year-old toddlers in a day care center? They communicate by a very simple combination of gestures and half-formed sentences. Toddlers have little symbolic communication or appreciation for art and are very little different from chimpanzees in their cultural output. We grant them human qualities because we know they will mature into symbol-using, linguistically expert adults, leaving chimpanzees in the dust. But this is no reason to consider them on a different plane from the apes when both are fifteen months old.

Chimpanzee societies are based on learned traditions passed from mother to child and from adult males to eager wannabe males. These traditions vary from place to place. This is culture. Culture is not limited, however, to those few apes that are genetically 99 percent human. Many primates show traditions. These are usually innovations by younger members of a group, which sweep rapidly through the society and leave it just slightly different than before. Japanese primatologists have long observed such traditions among the macaques native to their island nation. Researchers long ago noticed that a new behavior had arisen in one population of Japanese macaque monkeys living on Koshima Island just offshore the mainland. The monkeys were regularly tossed sweet potatoes, rice and other local treats by the locals. One day Imo, a young female in the group, took her potato and carried it to the sea, where she washed it with salty brine before eating it. This behavior rapidly spread throughout the group, a nice example of innovation happening in real time so that researchers could observe the diffusion. Later, other monkeys invented the practice of scooping up rice offered them with the beach sand it was scattered on, throwing both onto the surf and then scraping up the grains that floated while the sand sank.

At a supremely larger scale, such innovations are what human cultural differences are all about. Of course, only in human cultures do objects such as sweet potatoes take on the kind of symbolic meaning that permits them to stand for other objects and thus become a currency. Chimpanzees lack the top-drawer cognitive capacity needed to invent such a currency. Or do they? Wild chimpanzees hunt for a part of their living. All across equatorial Africa, meat-eating is a regular feature of chimpanzee life, but its style and technique vary from one forest to another. In Taï National Park in western Africa, hunters are highly cooperative; Christophe Boesch has reported specific roles such as ambushers and drivers as part of the apes' effort to corral colobus monkeys in the forest canopy.[8] At Gombe in East Africa, meanwhile, hunting is like a baseball game; a group sport performed on an individual basis. This difference may be environmentally influenced; perhaps the high canopy rain forest at Taï requires cooperation more than the broken, low canopy forest at Gombe. There is a culture of hunting in each forest as well, in which young and eager male wannabes copy the predatory skills of their elders. At Gombe, for instance, chimpanzees relish wild pigs and piglets in addition to monkeys and small antelope. At Taï, wild pigs are ignored even when they stroll in front of a hunting party.

There is also a culture of sharing the kill. Sharing of meat is highly nepotistic at Gombe; sons who make the kill share with their mothers and brothers but snub rival males. They also share preferentially with females who have sexual swellings, and with high-ranking females. At Taï, the captor shares with the other members of the hunting party whether or not they are allies or relatives; a system of reciprocity seems to be in place in which the golden rule works. I have argued that since the energy and time that chimpanzees spend hunting is rarely paid back by the calories, protein and fat gotten from a kill, we should consider hunting a social behavior done at least partly for its own sake.[9] When chimpanzees barter a limited commodity such as meat for other services—alliances, sex, grooming—they are engaging in a very simple and primitive form of a currency exchange. Such an exchange relies on the ability of the participants to remember the web of credits and debts owed one another and to act accordingly. It may be that the two chimpanzee cultures 2,000 kilometers apart have developed their distinct uses of meat as a social currency. In one place meat is used as a reward for cooperation, in the other as a manipulative tool of nepotism. Such systems are commonplace in all human societies, and their roots may be seen in chimpanzees' market economy, too.[10]

I have not yet considered one obvious question. If tool use and other cultural innovations can be so valuable to chimpanzees, why have they not arisen more widely among primates and other big-brained animals? Although chimpanzees are adept tool-users, their very close relatives the bonobos are not. Bonobos do a number of very clever things—dragging their hands beside them as they wade through streams to catch fish is one notable example—but they are not accomplished technicians. Gorillas don't use tools at all, and orangutans have only recently been observed to occasionally use sticks as probing tools in their rainforest canopy world.[11]

Other big-brained animals fare even worse. Wild elephants don't use their wonderfully dexterous trunks to manipulate tools in any major way, although when you're strong enough to uproot trees you may not have much use for a pokey little probe. Dolphins and whales, cognitively gifted though they may be, lack the essential anatomical ingredient for tool manufacture—a pair of nimble hands. Wild bottlenose dolphins have been observed to carry natural sponges about on their snouts to ferret food from the sea bottom, the only known form of cetacean tool use.[12] But that may be the limit of how much a creature that lacks any grasping appendages can manipulate its surroundings.

So to be a cultural animal, it is not enough to be big-brained. You must have the anatomical prerequisites for tool cultures to develop. Even if these are in place, there is no guarantee that a species will generate a subsistence culture in the form of tools. Perhaps environmental necessity dictates which ape species use tools and which don't, except it is hard to imagine that bonobos have much less use for tools than chimpanzees do. There is probably a strong element of chance involved. The chance that a cultural tradition—tool use, hunting style or grooming technique—will develop may be very small in any given century or millennium. Once innovated, the chance that the cultural trait will disappear—perhaps due to the death of the main practitioners from whom everyone learned the behavior—may conversely be great. Instead of a close fit between the environment and the cultural traditions that evolve in it—which many scholars believe explains cultural diversity in human societies—the roots of cultural variation may be much more random. A single influential individual who figures out how to make a better mousetrap, so to speak, can through imitation spread his mousetrap through the group and slowly into other groups.

We tend to think of cultural traditions as highly plastic and unstable compared to biological innovation. It takes hundreds of generations for natural selection to bring about biological change, whereas cultural change can happen in one lifetime, even in a few minutes. Because we live in a culture in which we buy the newest cell phone and the niftiest handheld computer—we fail to appreciate how conservative traditions like tool use can be. *Homo erectus*, with a brain nearly the size of our own, invented a teardrop-shaped stone tool called a hand axe 1.5 million years ago. It was presumably used for butchering carcasses, though some archaeologists think it may have also been a weapon. Whatever its purpose, more than a million years later those same stone axes were still being manufactured and used. Fifty thousand generations passed without a significant change in the major piece of material culture in a very big-brained and intelligent human species. *That's* conservatism and it offers us two lessons. First, if it ain't broke don't fix it: when a traditional way of making a tool works and the environment is not throwing any curves your way, there may be no pressure for a change. Second, we see a human species vastly more intelligent than an ape (*Homo erectus*' neocortical brain volume was a third smaller than a modern human's, but two and a half times larger than a chimpanzee's) whose technology didn't change at all. This tells us that innovations, once made, may last a very long time without being either extinguished or improved upon. It suggests that chimpanzee tool cultures may have been in place for all of the 5 million years since their divergence from our shared ancestor.

The very word *culture*, as William McGrew has pointed out, was invented for humans, and this has long blinded cultural theorists to a more expansive appreciation of the concept. Whether apes have culture or not is not really the issue. The heart of the debate is whether scholars who study culture and consider it their intellectual territory will accept a more expansive definition. In purely academic arguments like this one, the power lies with the party who owns the key concepts of the discipline. They define concepts however they choose, and the choice is usually aimed at fencing off their intellectual turf from all others.

Primatologists are latecomers to the table of culture, and they have had to wait their turn before being allowed to sit. We should be most interested in what the continuum of intelligence tells us about the roots of human behavior, not whether what apes do or don't do fits any particular, rigid definition of culture. When it comes to human practices, from building boats to weddings to choosing mates, we should look at the intersections of our biology and our culture for clues about what has made us who we are.

NOTES

1. *Changing Views of Primate Societies: The Role of Gender and Nationality*, June 1996, sponsored by the Wenner-Gren Foundation for Anthropological Research.
2. For an enlightening discussion of cross-cultural differences in chimpanzee tool use, see almost anything William McGrew has written, but especially McGrew (1992).
3. See Boesch and Boesch (1989).
4. Again, see McGrew (1992).
5. McGrew (1979)
6. Whiten *et al.* (1999) combined data from seven long-term chimpanzees studies to produce the most systematic examination of cultural variation in these apes.
7. For further discussion of chimpanzee symbolic behavior in the wild, see Goodall (1986), Wrangham *et al.* (1994) and McGrew et al. (1996).
8. See Boesch and Boesch (1989).
9. See Stanford (1999, 2001).
10. See de Waal (1996) and Stanford (2001).
11. For the first report of systematic tool use by wild orangutans, see van Schaik *et al.* (1996).
12. See Smolker *et al.* (1997).