

Chimp Talk Debate: Is It Really Language?

PANBANISHA, A BONOBO CHIMPANZEE WHO has become something of a star among animal language researchers, was strolling through the Georgia woods with a group of her fellow primates—scientists at the Language Research Center at Georgia State University in Atlanta. Suddenly, the chimp pulled one of them aside. Grabbing a special keyboard of the kind used to teach severely retarded children to communicate, she repeatedly pressed three symbols—“Fight,” “Mad,” “Austin”—in various combinations.

Austin is the name of another chimpanzee at the center. Dr. Sue Savage-Rumbaugh, one of Panbanisha's trainers, asked, “Was there a fight at Austin's house?”

“Waa, waa, waa” said the chimpanzee, in what Dr. Savage-Rumbaugh took as a sign of affirmation. She rushed to the building where Austin lives and learned that earlier in the day two of the chimps there, a mother and her son, had fought over which got to play with a computer and joystick used as part of the training program. The son had bitten his mother, causing a ruckus that, Dr. Savage-Rumbaugh surmised, had been overheard by Panbanisha, who lived in another building about 200 feet away. As Dr. Savage-Rumbaugh saw it, Panbanisha had a secret she urgently wanted to tell.

A decade and a half after the claims of animal language researchers were discredited as exaggerated self-delusions, Dr. Savage-Rumbaugh is reporting that her chimpanzees can demonstrate the rudimentary comprehension skills of two-and-a-half-year-old children. According to a series of papers, the bonobo, or pygmy, chimps, which some scientists believe are more humanlike and intelligent than the common chimpanzees studied in the earlier, flawed experiments, have learned to understand complex sen-

tences and use symbolic language to communicate spontaneously with the outside world.

“She had never put those three lexigrams together,” Dr. Savage-Rumbaugh said, referring to the keyboard symbols with which the animals are trained. She found the incident particularly gratifying because the chimp seemed to be using the symbols not to demand food, which is usually the case in these experiments, but to gossip.

In a book published by Routledge, *Apes, Language and the Human Mind: Philosophical Primatology*, Dr. Savage-Rumbaugh and her coauthors, Dr. Stuart G. Shanker, a philosopher at York University in Toronto, and Dr. Talbot J. Taylor, a linguist at the College of William and Mary in Virginia, argue that the feats of the chimps at the Language Research Center are so impressive that scientists must now reevaluate some of their most basic ideas about the nature of language.

Most language experts dismiss experiments like the ones with Panbanisha as exercises in wishful thinking. “In my mind this kind of research is more analogous to the bears in the Moscow circus who are trained to ride unicycles,” said Dr. Steven Pinker, a cognitive scientist at the Massachusetts Institute of Technology who studies language acquisition in children. “You can train animals to do all kinds of amazing things.” He is not convinced that the chimps have learned anything more sophisticated than how to press the right buttons in order to get the hairless apes on the other side of the console to cough up M&M's, bananas and other tidbits of food.

Dr. Noam Chomsky, the MIT linguist whose theory that language is innate and unique to people forms the infrastructure of the field, says that attempting to teach linguistic skills to animals is irrational—like trying to teach people to flap their arms and fly.

“Humans can fly about thirty feet—that's what they do in the Olympics,” he said in an interview. “Is that flying? The question is totally meaningless. In fact the analogy to flying is misleading because when humans fly thirty feet, the organs they're using are kind of homologous to the ones that chickens and eagles use.” Arms and wings, in other words, arise from the same branch of the evolutionary tree. “Whatever the chimps are doing is not even homologous as far as we know,” he said. There is no evidence that the chimpanzee utterances emerge from anything like the “language organ” Dr. Chomsky believes resides only in human brains. This

neural wiring is said to be the source of the universal grammar that unites all languages.

But some philosophers, like Dr. Shanker, complain that the linguists are applying a double standard: they dismiss skills—like putting together a noun and a verb to form a two-word sentence—that they consider nascent linguistic abilities in a very young child.

“The linguists kept upping their demands and Sue kept meeting the demands,” said Dr. Shanker. “But the linguists keep moving the goal post.”

Following Dr. Chomsky, most linguists argue that special neural circuitry needed for language evolved after man’s ancestors split from those of the chimps millions of years ago. As evidence they note how quickly children, unlike chimpanzees, go from cobbling together two-word utterances to effortlessly spinning out complex sentences with phrases embedded within phrases like Russian dolls. But Dr. Shanker and his colleagues insist that Dr. Savage-Rumbaugh’s experiments suggest that there is not an unbridgeable divide between humans and the rest of the animal kingdom, as orthodox linguists believe, but rather a gradation of linguistic skills.

In the book *The Engine of Reason, the Seat of the Soul: A Philosophical Journey Into the Brain* (MIT Press), Dr. Paul Churchland, a philosopher and cognitive scientist at the University of California at San Diego, says linguists should take Dr. Savage-Rumbaugh’s experiments as a challenge. He argues that the jury is still out: the rules for constructing sentences might turn out to be not so much hardwired as a result of learning—by people and potentially by their chimpanzee relatives.

Animal language research fell into disrepute in the late 1970s when “talking” chimps like Washoe and the provocatively named Nim Chimpsky were exposed as unintentional frauds. Because chimpanzees lack the vocal apparatus to make a variety of modulated sounds, the animals were taught a vocabulary of hand signs—an approach first suggested in the 18th century by the French physician Julien Offray de La Mettrie. In appearances on television talk shows, trainers claimed the chimps could construct sentences of several words. But upon closer examination, scientists found strong evidence that the chimps had simply learned to please their teachers by contorting their hands into all kinds of configurations. And the trainers, straining to find examples of linguistic communication, thought

they saw words among the wiggling, like children seeing pictures in the clouds.

In a widely quoted paper in the journal *Science*, “Can an Ape Create a Sentence?” Nim Chimpsky’s trainer, Dr. Herbert Terrace, a Columbia University psychologist, reluctantly concluded that the answer was no.

A chimp might learn to connect a hand sign with an item of food, skeptics like Dr. Terrace argued, but this could be a matter of simple conditioning, like Pavlov’s dogs learning to salivate at the sound of a bell. Most important, there was no evidence that the chimps had acquired a generative grammar—the ability to string words together into sentences of arbitrary length and complexity.

As a young veteran of the original animal language experiments, Dr. Savage-Rumbaugh decided to try a different approach. To eliminate the ambiguity of hand signs, she used a keyboard with dozens of buttons marked with geometric symbols.

In elaborate exercises beginning in the mid-1970s, she and her colleagues taught common chimpanzees and bonobos to associate symbols with a variety of things, people and places in and around the laboratory. The smartest chimps even seemed to learn abstract categories, identifying pictures of objects as either tools or food. Dr. Savage-Rumbaugh reported that two of the chimps learned to use symbols to communicate with each other. Pecking away at the keyboard, one would tell a companion where to find a key that would liberate a banana for them both to share.

Most impressive of all was a bonobo named Kanzi. After futilely trying to train Kanzi’s adopted mother to use the keyboard, the researchers found that the two-and-a-half-year-old chimp, who apparently had been eavesdropping all along, had picked up an impressive vocabulary on his own. Kanzi was taught not in laboriously structured training sessions but on walks through the 50 acres of forest surrounding the language center. By the time he was six years old, Kanzi had acquired a vocabulary of 200 symbols and was constructing what might be taken as rudimentary sentences consisting of a word combined with a gesture or occasionally of two or three words. Dr. Savage-Rumbaugh became convinced that exposure to language must start early and that the lessons should be driven by the animal’s curiosity.

Compared with other chimps, Kanzi's utterances are striking, but they are still far from human abilities. Kanzi is much better at responding to vocal commands like "Take off Sue's shoe." In one particularly arresting feat, recorded on videotape, Kanzi was told, "Give the dog a shot." The chimpanzee picked up a hypodermic syringe lying on the ground in front of him, pulled off the cap and injected a toy stuffed dog.

Dr. Savage-Rumbaugh's critics say there is nothing surprising about chimpanzees or even dogs and parrots associating vocal sounds with objects. Kanzi has been trained to associate the sound "dog" with the furry thing in front of him and has been programmed to carry out a stylized routine when he hears "shot." But does the chimp really understand what he is doing?

Dr. Savage-Rumbaugh insists that experiments using words in novel contexts show that the chimps are not just responding to sounds in a knee-jerk manner. It is true, she says, that Kanzi was initially aided by vocal inflections, hand gestures, facial expressions and other contextual clues. But once it had mastered a vocabulary, the bonobo could properly respond to 70 percent of unfamiliar sentences spoken by a trainer whose face was concealed.

None of this is very persuasive to linguists for whom the acid test of language is not comprehension but performance, the ability to use grammar to generate ever more complex sentences.

Dr. Terrace says Kanzi, like the disappointing Nim Chimpsky, is simply "going through a bag of tricks in order to get things." He is not impressed by comparisons to human children. "If a child did exactly what the best chimpanzee did, the child would be thought of as disturbed," Dr. Terrace said.

The scientists at the Language Research Center are "studying some very complicated cognitive processes in chimpanzees," Dr. Terrace said. "That says an awful lot about the evolution of intelligence. How do chimpanzees think without language, how do they remember without language? Those are much more important questions than trying to reproduce a few tidbits of language from a chimpanzee trying to get rewards."

Attempting to shift the fulcrum of the debate over performance versus comprehension, Dr. Savage-Rumbaugh argues that the linguists have

things backward: "Comprehension is the route into language," she says. In her view it is easier to take an idea already in one's mind and translate it into a grammatical string of words than to decipher a sentence spoken by another whose intentions are unknown.

Dr. Shanker, the York University philosopher, believes that the linguists' objections reveal a naive view of how language works. When Kanzi gives the dog a shot, he might well be relying on all kinds of contextual clues and subtle gestures from the speaker, but that, Dr. Shanker argues, is what people do all the time.

Following the ideas of the philosopher Ludwig Wittgenstein, he argues that language is not just a matter of encoding and decoding strings of arbitrary symbols. It is a social act that is always embedded in a situation.

But trotting out Wittgenstein and his often obscure philosophy is a way of sending many linguists bolting for the exits. "If higher apes were incapable of anything beyond the trivialities that have been shown in these experiments, they would have been extinct millions of years ago," Dr. Chomsky said. "If you want to find out about an organism you study what it's good at. If you want to study humans you study language. If you want to study pigeons you study their homing instinct. Every biologist knows this. This research is just some kind of fanaticism."

There is a suspicion among some linguists and cognitive scientists that animal language experiments are motivated as much by ideological as scientific concerns—by the conviction that intelligent behavior is not hardwired but learnable, by the desire to knock people off their self-appointed thrones and champion the rights of downtrodden animals.

"I know what it's like," Dr. Terrace said. "I was once stung by the same bug. I really wanted to communicate with a chimpanzee and find out what the world looks like from a chimpanzee's point of view."

—GEORGE JOHNSON, June 1995

She Talks to Apes and, According to Her, They Talk Back

DR. EMILY SUE SAVAGE-RUMBAUGH, 52, a researcher at Georgia State University in Decatur, Georgia, studies communication among primates and runs a 55-acre laboratory near Atlanta where she trains animals and humans to communicate with each other.

She is the author of *Kanzi: The Ape at the Brink of the Human Mind*, and, with Stuart G. Shanker and Talbot J. Taylor, is a coauthor of *Ape Language and the Human Mind*, published by Oxford University Press.

Q. Do your apes speak?

A. They don't speak. They point to printed symbols on a keyboard. Their vocal tract isn't like ours, and they don't make human noises. However, they do make all kinds of ape noises. And I believe they use them to communicate with one another. Now, the apes may not always elect to talk about the same things we do. They might not have a translation for every word in our vocabulary to theirs. But from what I've seen, I believe they are communicating very complex things.

Let me give you an example. A few weeks ago, one of our researchers, Mary Chiepele was out in the yard with Panbanisha. Mary thought she heard a squirrel and so she took the keyboard and said, "There's a squirrel." And Panbanisha said "DOG." Not very much later, three dogs appeared and headed in the direction of the building where Kanzi was.

Mary asked Panbanisha, "Does Kanzi see the dogs?" And Panbanisha looked at Mary and said, "A-frame." A-frame is a specific sector of the forest here that has an A-frame hut on it. Mary later went up to "A-frame" and found the fresh footprints of dogs everywhere at the site. Panbanisha knew where they were without seeing them.

And that seems to be the kind of information that apes transmit to each other: "There's a dangerous animal around. It's a dog and it's coming towards you."

Q. Your apes watch a great deal of TV—why?

A. Because their lives are so confined. They can expand their world by watching television.

Q. What do they watch?

A. This varies. They like the home videos we make about events happening to people they know from around the lab. They like suspenseful stories, with an interesting resolution. Of movies we buy, they really like films about human beings trying to relate to some kind of apelike creatures. So they like *Tarzan*, *Iceman*, *Quest for Fire*, the Clint Eastwood movies with the orangutan.

Q. You have a game with the apes, "Monster," where a lab staffer dresses up in a gorilla suit and feigns being frightful. Why?

A. It's a game started some years ago when we were working with two chimps, Sherman and Austin. We discovered that if someone dressed up in a gorilla suit and we drove this "monster" off with poundings of hammers and sticks, we upped our status with the chimps. In other words, "We're not the experimenters, in charge. We're your helpers." Sherman and Austin didn't know we were playing. For a while Kanzi and Panbanisha didn't either. But they caught on soon enough and now they love the game. . . .

. . . Another time, Panbanisha and I were walking around the building where Sherman and Mercury, this male chimpanzee with a big interest in Panbanisha, live. Mercury came outside and was being really bad, displaying, throwing bark, and spitting at Panbanisha. So Panbanisha opened her backpack, where there was a gorilla mask inside and she pointed to symbols on the keyboard and asked Mary to play "Monster." Mary did that, and Mercury flew indoors.

Panbanisha was able to use the game to stop him from displaying at her. She knew it was pretend. He didn't.

Q. How do you know when the chimps point to symbols on the keyboard that they are not just pointing to any old thing?

A. We test Kanzi and Panbanisha by either saying English words or showing them pictures. We know that they can find the symbol that corre-

sponds to the word or the picture. If we give similar tests to their siblings who haven't learned language, they fail.

Many times, we can verify through actions. For instance, if Kanzi says "Apple chase," which means he wants to play a game of keep away with an apple, we say, "Yes, let's do." And then, he picks up an apple and runs away and smiles at us.

Q. Some of your critics say that all your apes do is mimic you.

A. If they were mimicking me, they would repeat just what I'm saying, and they don't. They answer my questions. We also have data that shows that only about two percent of their utterances are immediate imitations of ours.

Q. Nonetheless, many in the scientific community accuse you of overinterpreting what your apes do.

A. There are some who say that. But none of them have been willing to come spend some time here. I've tried to invite critics down here. None have taken me up on it. I've invited Tom Sebeok (of Indiana University) personally and he never responded. I think his attitude was something to the effect that, "It's so clear that what is happening is either cued, or in some way overinterpreted, that a visit is not necessary." I would assume that many of the people associated with the Chomskyan perspective including Noam Chomsky himself have the same approach: that there's no point in observing something they're certain doesn't exist.

Their belief is that there is thing called human language and that unless Kanzi does everything a human can, he doesn't have it. They refuse to consider what Kanzi does, which is comprehend, as language. And it's not even a matter of disagreeing over what Kanzi does. It's a matter of disagreeing over what to call these facts. They are asking Kanzi to do everything that humans do, which is specious. He'll never do that. It still doesn't negate what he can do.

Q. Your husband, Dr. Duane M. Rumbaugh, is a distinguished comparative psychologist who is a pioneer in the study of ape language. Has your research been helped by the fact that your personal life is so fused with your professional life?

A. Without our being together, I don't think that one could ever be responsible for as many apes as we have here. Duane and I live right near the research center and we're willing to go there day and night, 365 days a

year. If an ape is sick, if one of the apes has gotten free, if Panbanisha is frightened because she's heard the river's about to flood, we go.

There have been lots of frictions, though. Duane was very, very upset when I began taking the apes out of their cages. And when I began to say that Lana (Duane's chimp) didn't understand some of the things she was saying and that comprehension of language was important, not just production—we almost broke up over that.

But we really love each other, and we're united in our core beliefs: that there is a huge capacity on the part of apes and probably all kinds of other animals that's being ignored. By ignoring it, humans are separating ourselves from the natural world we've evolved from. The bonobos are a real bridge to that world. At base, no matter how much Duane and I argue, we both know this is true.

—CLAUDIA DREIFUS, April 1998