Yes, We Can Communicate with Animals

In his short and very entertaining video, Cole summarizes decades of research aimed at teaching apes human language, all of which, we are to understand, came to naught. But what the video actually shows us is how little the average person (and many scientists) understands about language. At one point, Cole tells his dog to sit, and the dog sits. This, he tells us, is not evidence that the dog knows English.

But actually it is.

The dog's behavior shows us that he is capable of understanding the simple concept of sitting, that he is capable of distinguishing the verbal signal "sit" from other verbal signals and that he is capable of connecting the two. This isn't rocket science, it isn't magic and it isn't anthropomorphizing. It is just the way word learning works.

In studies conducted at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, a border collie named Rico was taught the meanings of 200 words. He could even use the process of elimination to figure out unfamiliar words: if he already knew the word "ball," and his trainer showed him a ball and a stick and told

him to get the “stick,” he would bring the stick. He could remember new words even after a month of not hearing them.
More recently, another border collie named Chaser learned a whopping 1,022 words, as reported in February 2011 in the peer-reviewed science journal *Behavioural Processes*. Kanzi, the bonobo trained by psychologist Sue Savage-Rumbaugh, has amply and repeatedly demonstrated his knowledge of more than 3,000 lexigrams (word symbols). In a long-term study of chimpanzee gestural communication in the wild in Uganda, researchers at the University of St. Andrews in Scotland discovered that the apes communicated with one another through a repertoire of about 66 different gestures. Many of these gestures had been documented from other chimpanzee sites both in captivity and in the wild.

But I assure you, no dog (or ape) will ever learn words, lexigrams or gestures for “bacteria,” “economy” or “atom.” They may be able to hear or see the differences among them, but the concepts they represent are beyond their conceptual capacity. You can’t learn words for things you can’t understand.

WHERE THE RUBBER HITS THE ROAD

But what Cole has in mind is having a conversation with an ape in the way humans converse with one another—with sentences. He points out that the longest “sentence” signed by a chimpanzee named Nim Chimpsky was *“Give orange me give eat orange me orange me eat give me you.”*

What Nim’s sentence lacks is not just conceptual complexity but grammatical orderliness. And this is what sets human languages apart from communicative systems of other species. Our languages consist of word categories such as nouns, verbs, adjectives, adverbs, prepositions, and so on. We modify word order and word endings to create different tenses so that we can describe events from the past or imaginary ones from the future. This grammatical complexity emerges quite early in child development, beginning in the second year of life and exploding with full force in the third year of life. No nonhuman animal to date has demonstrated the ability to construct sentences with the level of grammatical complexity typical of a three-year-old human child.

There are two reasons why humans are capable of understanding complex concepts and generating grammatically complex utterances. The first is our extraordinarily large brain. To appreciate just how large the human brain is, consider how our so-called encephalization quotient (EQ) compares with that of other species. Cephalization is the tendency for neural tissue to be located in the front (head) of an organism. It usually corresponds to brain size. EQ is an estimate of the possible intelligence of an animal.

An EQ of 1.0, for example, means that the species has (on average) the brain size that would be expected given its body size: we would expect a whale's brain to be bigger than a mouse's simply because a whale's body is so much more massive. An EQ of 2.0 means that the species has a brain twice as large as would be expected in an animal that size. Dogs have an EQ of about 1.0—their brain is about as big as you would expect it to be. Chimpanzees have an EQ of 2.5; dolphins have an EQ of 5.3. And humans? We have an EQ of about 7.5. Our brain is seven times larger than it should be given our body size. That is a very large brain.

It isn't just intelligence that matters. Even individuals with low IQ, such as those with Down syndrome or Williams syndrome, can master the complexity of human language just fine. The key is the way the human brain is genetically wired for communication.
The *FOXP2* gene is present in most species, from reptiles to humans. Its primary function appears to be directing neural wiring that impacts communication. Mice that are genetically altered to have only one functional copy of the *FOXP2* gene have significantly reduced vocalizations as pups. Altering the *FOXP2* genes of songbirds impairs their ability to learn and imitate songs.

About 200,000 years ago a mutation of the *FOXP2* gene appeared in hominins. This genetic mutation entirely replaced more primitive versions of the gene within 500 to 1,000 human generations—a mere 10,000 to 20,000 years, which is an eyeblink in evolutionary time. This is also the period when anatomically modern humans appeared. The consensus among scientists is that the *FOXP2* gene has been the target of heavy selection during recent human evolution because it changed the way our brain was wired for communication.

It is not reasonable to expect other species that have the more ancient form of this gene to master the grammatical complexity of human language. And it is not reasonable to expect other species with a smaller EQ to grasp the abstract concepts that humans readily grasp. But you can expect to communicate with them about concepts that are well within their mental capacity, using simple language.

What would that be for apes? In a 2007 paper primatologist Joan Silk put it this way:

Primates are endowed with cognitive abilities that are especially well suited to tracking social information. For example, primates are able to recognize individuals; identify kin; compute the value of resources and services; keep track of past interactions with group members; make transitive inferences; discriminate between cooperators and defectors; and assess the qualities of prospective rivals, mates and allies.

If you want to communicate with an ape, try communicating about these topics. Just remember to keep it simple. You may be surprised. Boyce Rensberger, a former science writer for the *Washington Post,* learned American Sign Language (ASL) from his parents, who could neither speak nor hear, although he could do both. When interacting with a chimp who had mastered a bit of ASL, he said, “Suddenly, I realized I was conversing with a member of another species in my native tongue.”