

## Grammar Wizards

### **Researchers find that starlings can learn to recognize sentences.**

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Starlings recently proved to researchers that a complicated sentence structure doesn't belong exclusively to humans. Linguists, led by Noam Chomsky, have long argued that certain language patterns, particularly the capacity to recognize sentences with "recursive, center-embedded grammars," were a defining mark of what it meant to be a human. However, nine out of the 11 starlings tested by researchers from the University of California, San Diego and the University of Chicago, learned to distinguish these "sentence" structures.

Recursive grammar refers to the insertion of a clause or words into the middle of a sentence. For example, "Oedipus ruled Thebes," can become "Oedipus, who killed his father, ruled Thebes."

To test the birds, researchers composed 16 artificial songs that followed two separate patterns. One set allowed a sound to be inserted in the middle of an acoustic string, much like inserting a word or clause into a sentence. This is a simple form of recursive grammar. The second set followed the "finite-state rule," which allows sounds to be added to the end or beginning of a string. This type of communication is considered typical of non-humans.

After 10,000 to 50,000 trials throughout several months, the starlings could recognize the two patterns and utilize their knowledge to distinguish among longer grammatical strings.

"The more closely we understand what non-human animals are capable of, the richer our world becomes," said Timothy Q. Gentner, lead author of the study and assistant professor of psychology at the University of California, San Diego. "Fifty years ago, it was taboo to even talk about animal cognition. Now, there are NOVA specials on the subject and no one doubts that animals have complex and vibrant mental lives. This study is a powerful statement about what even birds can do. Look at what they're learning."

The study was published in the April 27, 2006, issue of Nature.