

Gorilla makes language link with us

When Koko the gorilla gets a silly grin or a gully look on her face you don't have to wonder why. Just ask her.

Koko, a 7-year-old lowland gorilla, has become the first of her species to master sign language. After six years of intensive training from Francine "Penny" Patterson, a Stanford University doctoral candidate, Koko's working vocabulary consists of 375 signs, including such diverse terms as airplane, belly button, lollipop, friend, and stethoscope.

Koko responds to and asks questions, tells Ms. Patterson when she feels "happy" or "sad," refers to past and future events, and has begun to give definitions for words. She also shows an impish sense of humor, imitates human companions, talks in rhymes, and even lies on occasion to avoid blame.

IN THE PAST decade, researchers have successfully taught several chimpanzees sign language, but Koko is a trailblazer among gorillas. . . . When Koko uses language to make a point, to joke, to express her displeasure, or to lie her way out of a jam, then she is exploiting language the way we do as human beings," Ms. Patterson writes in the October issue of National Geographic. "Certainly that is linguistic, though perhaps not moral progress."

Koko converses in Armeslan, short for American Sign Language, the method of communication for about 200,000 deaf Americans. The language consists of gestures, each signifying a word or idea.

Teaching a gorilla to talk was not easy. At first, Koko attempted to bite Ms. Patterson when she tried to get the gorilla to make signs by "molding" the primate. In this technique the experimenter takes the hands of the subject and forms the sign representing an activity or object while in its presence.

The animal comes to associate the hand movement with its meaning until it eventually is making the sign by itself.

Koko did catch on and her vocabulary developed at a remarkable pace. After three years of training, Koko was reliably using 184 signs—that is, she used each spontaneously at least once a day, 15 days out of a month. By age six and a half, she had used 645 different signs at least once. Her regular working vocabulary is estimated at 375 signs.

KOKO EVENTUALLY added abstractions to her repertoire—"imagine," "understand," "gentle," "stupid," "boring," and "damn." She also built up an expressive lexicon of insults—"rotten stink" and "dirty toilet" in addition to "bird" and "nut" for people who are unmanly. In a fit of anger, she has referred to Ms. Patterson as "Penny toilet dirty devil."

Many instances of evasive behavior have convinced her that the gorilla deliberately lies. Once, while Ms. Patterson was writing, Koko snatched up a red crayon and began chewing on it. A moment later Ms. Patterson noticed and said, "You're not eating that crayon, are you?" Koko signed "lip," and began moving the crayon across her lips as if applying lipstick.

Gradually Koko acquired signs that refer to past and future. One bright morning that followed weeks of rain, Ms. Patterson told Koko that if it was sunny in the afternoon, they would go outside. When Ms. Patterson returned at 3 o'clock, Koko looked out at the still bright weather and collected her gear to go out.

In recent months, Koko has begun rhyming, a complex mental translation that requires her to produce in sign language a word that rhymes with what she has heard. "For instance, we say 'long,' she says 'wrong,' we say 'blue,' she says 'do,' we say 'squash,'



Koko, a 7-year-old gorilla, takes a picture of her image in a mirror. She has learned 375 gestures of sign language as well.

she says 'wash.' Ms. Patterson relates.

"WHAT MAKES all this awesome—even for me, after six years of witnessing such incidents—is that Koko, by all accepted concepts of animal and human nature, should not be able to do any of this," Ms. Patterson, 31, writes.

Now Koko has a new challenge—a keyboard computer linkup designed by Stanford Professor Patrick Suppes and colleagues that permits her to express herself through a speech synthesizer by pressing buttons.

Koko also has a new companion, a male gorilla named Michael who joined her at her mobile home on the

Stanford campus in 1976. Michael is now learning sign language, and although his vocabulary is only about 45 signs, he is able to converse.

"Gorillas are tragically misunderstood animals," writes Ms. Patterson. "In fact exceedingly shy, placid, and unaggressive, they are conceived to be ferocious, slaving man-killers."

Indeed, her colleagues initially had doubts about the gorilla's capacity to learn sign language. But they need not have worried about Koko's mind: The Stanford-Binet test has shown her IQ to range from 85 to 95, only slightly below average for a human.



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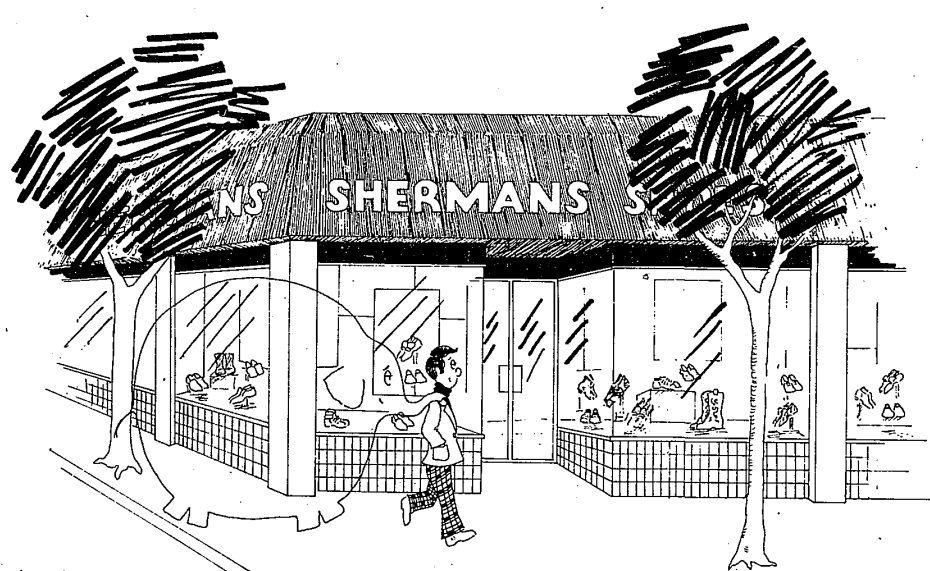
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