

How similar are the gestures of apes and human infants? More than you might suspect

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Image: Wikipedia.

Psychologists who analyzed video of a female chimpanzee, a female bonobo and a female human infant in a study to compare different types of gestures at comparable stages of communicative development found remarkable similarities among the three species.

This is the first time such data have been used to compare the development of [gestures](#) across species. The chimpanzee and [bonobo](#), formerly called the "pygmy chimpanzee," are the two species most

closely related to humans in the [evolutionary tree](#).

"The similarity in the form and function of the gestures in a human infant, a baby chimpanzee and a baby bonobo was remarkable," said Patricia Greenfield, a distinguished professor of psychology at UCLA and co-author of the study.

Gestures made by all three species included reaching, pointing with fingers or the head, and raising the arms to ask to be picked up. The researchers called "striking" the finding that the gestures of all three species were "predominantly communicative," Greenfield said.

To be classified as communicative, a gesture had to include [eye contact](#) with the conversational partner, be accompanied by vocalization (non-[speech sounds](#)) or include a visible behavioral effort to elicit a response. The same standard was used for all three species. For all three, gestures were usually accompanied by one or more behavioral signs of an intention to communicate.

[Charles Darwin](#) showed in his 1872 book "The Expression of the Emotions in Man and Animals" that the same [facial expressions](#) and basic gestures occur in [human populations](#) worldwide, implying that these traits are innate. Greenfield and her colleagues have taken Darwin's conclusions a step further, providing new evidence that the origins of language can be found in gestures and new insights into the co-evolution of gestures and speech.

The findings are published today in the open-access journal *Frontiers in Psychology*.

The apes included in the study were named Panpanzee, a female chimpanzee (*Pan troglodytes*), and Panbanisha, a female bonobo (*Pan paniscus*). They were raised together at the Language Research Center in

Atlanta, which is co-directed by Sue Savage-Rumbaugh, a co-author of the study. There, the apes learned to communicate with caregivers using gestures, vocalizations and visual symbols (mainly geometric shapes) called lexigrams.

"Lexigrams were learned, as [human language](#) is, during meaningful social interactions, not from behavioral training," said the study's lead author, Kristen Gillespie-Lynch, an assistant professor of psychology at the City University of New York and a former UCLA graduate student in Greenfield's laboratory.

The human girl grew up in her parents' home, along with her older brother. Where the apes' symbols were visual, the girl's symbols took the form of spoken words. Video analysis for her began at 11 months of age and continued until she was 18 months old; video analysis for the two apes began at 12 months of age and continued until they were 26 months old. An hour of video was analyzed each month for the girl, the chimpanzee and the bonobo.

Overall, the findings support the "gestures first" theory of the evolution of language. During the first half of the study, communicating with gestures was dominant in all three species. During the second half, all three species increased their symbol production—words for the child and lexigrams for the apes.

"Gesture appeared to help all three species develop symbolic skills when they were raised in environments rich in language and communication," said Gillespie-Lynch, who conducted the research while she was at UCLA. This pattern, she said, suggests that gesture plays a role in the evolution, as well as the development, of language.

At the beginning stage of communication development, gesture was the primary mode of communication for human infant, baby chimpanzee

and baby bonobo. The child progressed much more rapidly in the development of symbols. Words began to dominate her communication in the second half of the study, while the two apes continued to rely predominantly on gesture.

"This was the first indication of a distinctive human pathway to language," Greenfield said.

All three species increased their use of symbols, as opposed to gestures, as they grew older, but this change was far more pronounced for the human child. The child's transition from gesture to symbol could be a developmental model of the evolutionary pathway to human language and thus evidence for the "gestural origins of human language," Greenfield said.

While gesture may be the first step in language evolution, the psychologists also found evidence that the evolutionary pathway from gesture to human language included the "co-evolution of gestural and vocal communication." Most of the child's gestures were accompanied by vocalization (non-language sounds); the apes' gestures rarely were.

"This finding suggests that the ability to combine gesture and [vocalization](#) may have been important for the evolution of language," Greenfield said.

The researchers conclude that humans inherited a language of gestures and a latent capacity for learning symbolic language from the last ancestor we share with our chimpanzee and bonobo relatives—an ancestor that lived approximately 6 million years ago.

The evolution of human language built on capacities that were already present in the common ancestor of the three species, the psychologists report.

"Our cross-species comparison provides insights into the communicative potential of our common ancestor," Gillespie-Lynch said.

The article is titled "A cross-species study of gesture and its role in symbolic development: implications for the gestural theory of language evolution." Other co-authors were Yunping Feng and Heidi Lyn.

More information: Paper: [www.frontiersin.org/Comparativ ...
.2013.00160/abstract](http://www.frontiersin.org/Comparative_2013.00160/abstract)

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