

Chimpanzee intelligence determined by genes

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Image: Wikipedia.

A chimpanzee's intelligence is largely determined by its genes, while environmental factors may be less important than scientists previously thought, according to a Georgia State University research study.

The study found that some, but not all, cognitive, or mental, abilities, in chimpanzees depend significantly on the [genes](#) they inherit. The findings are reported in the latest issue of *Current Biology*.

"Intelligence runs in families," said Dr. William Hopkins, professor in

the Center for Behavioral Neuroscience at Georgia State and research scientist in the Yerkes National Primate Research Center at Emory University. "The suggestion here is that genes play a really important role in their performance on tasks while non-genetic factors didn't seem to explain a lot. So that's new."

The role of genes in human intelligence or IQ has been studied for years, but Hopkins' study is among the first to address heritability in [cognitive abilities](#) in nonhuman primates. Studies have shown that human intelligence is inherited through genes, but social and [environmental factors](#), such as formal education and socioeconomic status, also play a role and are somewhat confounded with genetic factors. Chimpanzees, which are highly intelligent and genetically similar to humans, do not have these additional socio-cultural influences.

"Chimps offer a really simple way of thinking about how genes might influence intelligence without, in essence, the baggage of these other mechanisms that are confounded with genes in research on human intelligence," Hopkins said.

The study involved 99 chimpanzees, ranging in age from 9 to 54, who completed 13 [cognitive tasks](#) designed to test a variety of abilities. Hopkins used quantitative genetics analysis to link the degree of relatedness between the chimpanzees to their similarities or differences in performance on the various cognitive measures to determine whether cognitive performance is inherited in chimpanzees.

Genes were found to play a role in overall cognitive abilities, as well as the performance on tasks in several categories.

Traditionally, researchers studying animal intelligence or animal learning have shared the view that environment and how previous behavior is reinforced affect how animals perform on a particular task.

"In our case, at least, it suggests that purely environmental explanations don't really seem to tell the whole story," Hopkins said. "Genes matter as well."

Hopkins also studied the structure of chimpanzee intelligence to determine whether there were any similarities to the structure of human intelligence.

"We wanted to see if we gave a sample of [chimpanzees](#) a large array of tasks," he said, "would we find essentially some organization in their abilities that made sense. The bottom line is that chimp intelligence looks somewhat like the structure of [human intelligence](#)."

In the future, Hopkins wants to continue the study with an expanded sample size. He would also like to pursue studies to determine which genes are involved in intelligence and various cognitive abilities as well as how genes are linked to variation in the organization of the brain.

Hopkins also would like to determine which genes changed in human evolution that allowed humans to have such advanced intelligence.

More information: *Current Biology*, Hopkins et al.: "Chimpanzee (Pan troglodytes) Intelligence is Heritable." [www.cell.com/current-biology/abstract/S0960-9822\(14\)00677-0](http://www.cell.com/current-biology/abstract/S0960-9822(14)00677-0)

Provided by Georgia State University

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