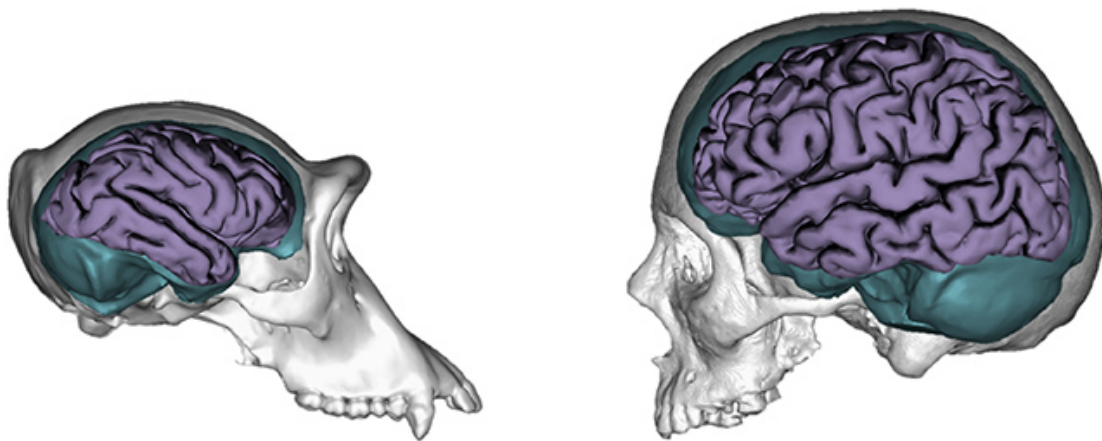


Nature and nurture: Human brains evolved to be more responsive to environmental influences

November 16 2015



Three-dimensional models of chimpanzee and human skulls showing their endocranial casts (teal) and brains (purple). Credit: Jose Manual de la Cuetara/Aida Gomez-Robles

Chimpanzees are our closest living relatives, but what is it about the human brain that makes us so different? Researchers at the George

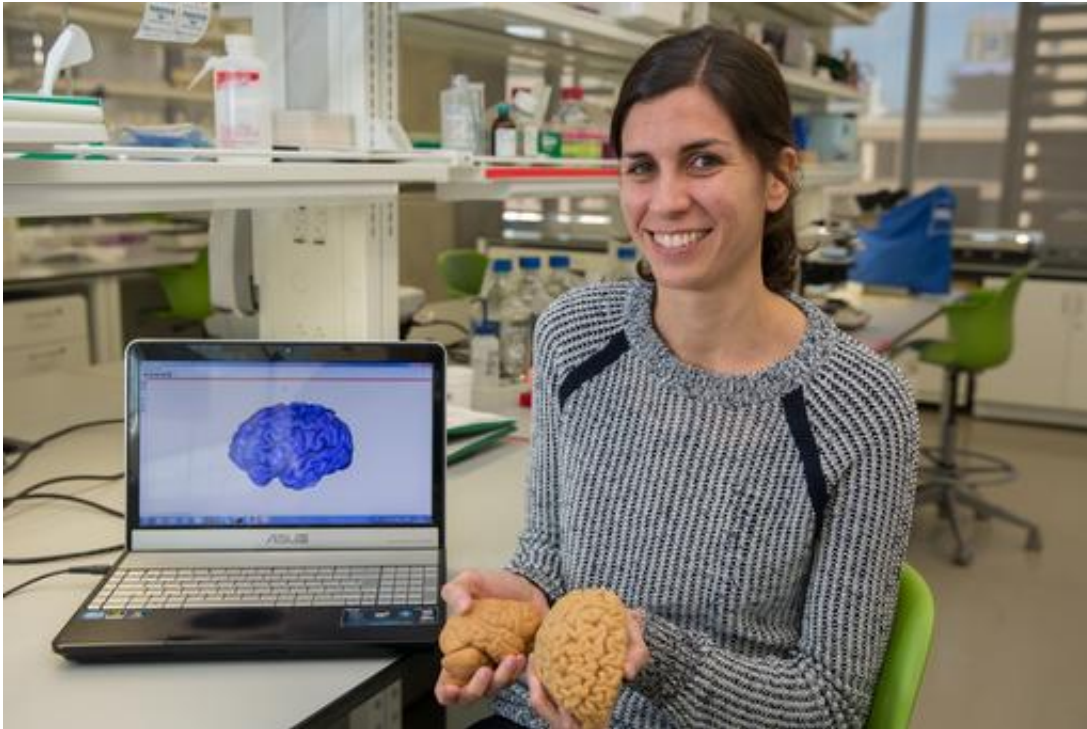
Washington University may have unearthed another piece of the puzzle. In a study published on Nov. 16, scientists discovered that human brains exhibit more plasticity, propensity to be modeled by the environment, than chimpanzee brains and that this may have accounted for part of human evolution.

This study, the first of its kind to examine the heritability of [brain organization](#) in [chimpanzees](#) compared to humans, provides a clue as to why humans are so capable of adapting to various environments and cultures.

The research team studied 218 human brains and 206 chimpanzee brains to compare two things: brain size and organization as related to [genetic similarity](#). The human brains were from twins (identical and fraternal) or siblings; the chimpanzee brains had a variety of kinship relationships, including mothers and offspring or half siblings. The study found that human and chimpanzee brain size were both greatly influenced by genetics. In contrast, the findings related to brain organization were different for chimpanzees and humans. In chimpanzees, brain organization is also highly heritable, but in humans this is not the case.

"We found that the anatomy of the chimpanzee brain is more strongly controlled by genes than that of human brains, suggesting that the human brain is extensively shaped by its environment no matter its genetics," said Aida Gómez-Robles, postdoctoral scientist at the GW Center for the Advanced Study of Human Paleobiology and lead author on the paper. "So while genetics determined human and chimpanzee brain size, it isn't as much of a factor for human cerebral organization as it is for chimpanzees."

The paper was published in the *Proceedings of the National Academy of Sciences*.



Aida Gómez-Robles, postdoctoral scientist at the GW Center for the Advanced Study of Human Paleobiology and lead author on the paper, studied brain organization and size to try to understand why humans are able to adapt to environments. Credit: William Atkins/George Washington University

"The [human](#) brain appears to be much more responsive to environmental influences," said Dr. Gómez-Robles. "It's something that facilitates the constant adaptation of the [human brain](#) and behavior to the changing environment, which includes our social and cultural context."

More information: Relaxed genetic control of cortical organization in human brains compared with chimpanzees, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1512646112

Provided by George Washington University

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