

Scientist postulates 4 aspects of 'humaniqueness' differentiating human and animal cognition

Shedding new light on the great cognitive rift between humans and animals, a Harvard University scientist has synthesized four key differences in human and animal cognition into a hypothesis on what exactly differentiates human and animal thought.

In new work presented for the first time at the annual meeting of the American Association for the Advancement of Science, Marc Hauser, professor of psychology, biological anthropology, and organismic and evolutionary biology in Harvard's Faculty of Arts and Sciences, presents his theory of "humaniqueness," the factors that make human cognition special. He presents four evolved mechanisms of human thought that give us access to a wide range of information and the ability to find creative solutions to new problems based on access to this information.

"Animals share many of the building blocks that comprise human thought, but paradoxically, there is a great cognitive gap between humans and animals," Hauser says. "By looking at key differences in cognitive abilities, we find the elements of human cognition that are uniquely human. The challenge is to identify which systems animals and human share, which are unique, and how these systems interact and interface with one another."

Recently, scientists have found that some animals think in ways that were once considered unique to humans: For example, some animals have episodic memory, or non-linguistic mathematical ability, or the capacity to navigate using landmarks. However, despite these apparent similarities, a cognitive gulf remains between humans and animals.

Hauser presents four distinguishing ingredients of human cognition, and shows how these capacities make human thought unique. These four novel components of human thought are the ability to combine and recombine different types of information and knowledge in order to gain new understanding; to apply the same "rule" or solution to one problem to a different and new situation; to create and easily understand symbolic representations of computation and sensory input; and to detach modes of thought from raw sensory and perceptual input.

Earlier scientists viewed the ability to use tools as a unique capacity of humans, but it has since been shown that many animals, such as chimpanzees, also use simple tools. Differences do arise, however, in how humans use tools as compared to other animals. While animal tools have one function, no other animals combine materials to create a tool with multiple functions. In fact, Hauser says, this ability to combine materials and thought processes is one of the key computations that distinguish human thought.

According to Hauser, animals have "laser beam" intelligence, in which a specific solution is used to solve a specific problem. But these solutions cannot be applied to new situations or to solve different kinds of problem. In contrast, humans have "floodlight" cognition, allowing us to use thought processes in new ways and to apply the solution of one problem to another situation. While animals can transfer across systems, this is only done in a limited way.

"For human beings, these key cognitive abilities may have opened up other avenues of evolution that other animals have not exploited, and this evolution of the brain is the foundation upon which cultural evolution has been built," says Hauser.

Source: Harvard University

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