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Talking elephants and problem-solving birds: what cognitive biology teaches us about animals and people

Speaking at the International Convention of Psychological Science (ICPS) held at the Austria Center Vienna, Prof. Tecumseh Fitch explained the similarities in cognition and linguistic function between animals and humans.

- **Neural pathways** that **control** the **vocal tract** decisive for imitation of sounds
- Seals, elephants, parrots and bats all have the ability to learn to produce sounds, just like humans
- While **primates cannot imitate sounds** because they lack the necessary neural circuitry, they do have a highly developed capacity for thought.

An internationally respected, 70-strong team of researchers headed by Tecumseh Fitch, Thomas Bugnyar and Leonida Fusani at the Department of Cognitive Biology at the University of Vienna is focusing on cognitive capacities and communication capabilities in humans and animals. **“To understand people you have to learn more about animals,”** explained Tecumseh Fitch, who highlighted the importance of interdisciplinary cooperation between psychology, biology and neuroscience in his keynote speech at the ICPS at the Austria Center Vienna. “Different disciplines have to work together to research the evolution of the language faculty and cognition in animals and humans,” Fitch added.

Power of speech depends on neural pathways

Prof. Fitch refutes the theory that anatomical factors such as the descended larynx and position of the jaw gave rise to the ability to speak. In a study he demonstrated that the **precursor mechanism for intentional vocal control** – the idea of producing a sound – has its origin in **intracortical** connections. For this to be possible there has to be a pathway between the cerebral cortex and specific neurons.

This connection has been demonstrated in songbirds and parrots, as well as humans. Seals, elephants and bats also have the ability to **imitate vocalisations**. “In addition to well-documented cases involving parrots, there is an elephant at a Korean zoo that is capable of saying several words,” Fitch revealed. “In this respect they are very similar to small children. Unlike responses such as laughing or crying, children have to actually learn to say words.” Contrary to the majority of animals, children are able to attribute meanings to different sounds.

Speech and cognitive function are not necessarily linked, Fitch continued: “Animals have the ability to learn and imitate new sounds if they are in frequent contact with humans. But speaking a language in the way that we do requires more than just the biological ability to

imitate sounds – it also calls for an ability to infer meaning from words in relation to each other. This **capacity for creating syntax** is uniquely human.”

No correlation between speech and cognition

Even though speech is always indicative of a higher stage of evolution, cognition – in other words, networking information in the brain – can happen without learning to vocalize sounds. While primates do not have a direct pathway between the regions of the brain responsible for hearing and the centres that control the muscles in the larynx and tongue, they are still able to communicate. “It is hard to say why this pathway is missing. But we do know that it is not just **highly evolved vertebrates** like primates, blackbirds and dolphins that have their **own communication systems**, and their **capacity for thought** and social behaviour resembles our own very closely. Which is why moral dimensions must be taken into account in cognitive biology,” Fitch said.

ICPS at the Austria Center Vienna

From 23-25 March 2017, around 1,500 researchers from more than 75 countries worldwide will meet at the Austria Center Vienna. The International Convention of Psychological Science (ICPS) is organised by the Association for Psychological Science and an international network of psychologists and cognitive biologists. The aim of the event is to foster global partnerships and promote interdisciplinary exchange.

Fun tip: [Korean speaking elephant on Youtube](#)

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