

Fast mapping in human and non-human great apes: a touchscreen study in Basel Zoo

Main question: can non-human great apes use fast mapping to rapidly learn new associations, like humans do?

Humans and other great apes are very closely related phylogenetically, and by extension, genetically. Because of this, studying an ability (its presence and its properties) in non-human apes and comparing it with its human counterpart can shed light on how this ability evolved from our common ancestor to modern humans. In this project, we thus take a comparative perspective to the evolution of human language, and in particular the evolution of fast mapping.

Fast mapping is a learning ability that is essential during human language acquisition (Carey, 1978; Behrend et al., 2001). It is defined as the ability of an individual to form hypotheses about the meaning of a new sound after as few as one exposure to it. In human infants, it is thought to be key to first language development, as it is one of the processes that enable them to learn a great number of words in just a few months (the ‘vocabulary spurt’ phase, see for example Hoff, 2013).

Although this phenomenon has been proven to exist in humans (children, but also adults), to our knowledge, nothing is available from other great apes. In one relevant study (Kaminski et al., 2004), a trained border collie has demonstrated fast mapping when acquiring toy names, but to this date, this has remained an isolated case.

In this project, we will use a touch-screen paradigm to test whether chimpanzees (*Pan troglodytes*) and gorillas (*Gorilla gorilla*) have the ability to fast-map a novel sound onto a novel object. In a comparative perspective, human adults and human infants will also be tested using the same method and design. For the non-human great apes, testing will happen at Basel Zoo, whereas the testing place for the humans can be discussed (the easiest possibility would be at the University of Neuchâtel).

The motivated student will participate in the creation of stimuli (visual: short videos of animals, and auditory: pseudo-words), work with gorillas and chimps in Basel Zoo, recruit and test human participants and analyse the resulting data from all species. The experimental design, based on a previous eye-tracking study, is mostly already defined, but can still be discussed.

By directly comparing great apes with human infants and adults, we aim to gain a deeper understanding of the evolution of fast mapping, which is key to human language. By using this comparative approach, results will help us gain insight into the evolutionary history of communication at large. If fast mapping can be demonstrated in great apes, then this will have far-reaching consequences for its evolution, by indicating that this ability has evolved before humans and before language.

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