

**Awareness, self-reflection, and mind-reading:  
Genesis and functions of cognitive meta-processes.**

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**【Outline of survey】**

In this project, we aim to unveil mechanisms of understanding others (mind-reading) by empirical studies of phylogeny and ontogeny of introspective cognition such as awareness and self-reflection (cognitive meta-processes). We hypothesize that understanding self underwrites understanding others. We plan to conduct behavioral observations and tests of a wide variety of animals including humans, nonhuman primates, carnivores, ungulates, rodents, and birds in evolutionary and developmental perspectives for their potential to show functions such as meta-memory (memory of memory) and information-seeking behavior, recognition of confidence and risk selection, episodic memory and future planning, recognition and control of affect, and empathy and understanding other's behavior. Recent studies have shown that several nonhuman species may possess some of the meta-processes and thus language is not necessary before possessing them. This project is the first systematic study toward general understanding of meta-processes that remain to be one of the most important aspects in knowing what humans are.

**【Expected results】**

We will be able to make a sketch of how cognitive meta-processes have evolved and develop in ontogeny and hope to identify what meta-processes are necessary before acquiring aspects of mind-reading. Establishing methodology to study meta-processes contributes to neuroscientific investigation of these higher functions. Demonstration of meta-processes in various organisms may drastically change current views of humans, infants, and nonhumans, which in turn may enhance respect to lives and consciousness to global symbiosis, and promotes suggestions for the globalized future. Identification of meta-processes necessary to understanding others will contribute to support people who have deficit in this function and might help developing mind-reading robots.

**【References by the principal investigator】**

- Fujita, K. (2007) *Doubutsu tachi no yutaka na kokoro* (The wealth of Nonhuman animal minds). Kyoto University Press. 181pp. (in Japanese)
- Fujita, K., & Itakura, S. (eds.) (2006) *Diversity of Cognition: Evolution, Development, Domestication, and Pathology*. Kyoto University Press. 414pp.

**【Term of project】** FY2008—2012

**【Budget allocation】**

**143,300,000 yen** (direct cost)

**【Homepage address】**

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