

Researcher reports on animals' reflective minds

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(PhysOrg.com) -- A principle area of investigation in the field of metacognition is the question of whether nonhuman animals can - like their human counterparts - monitor or self-regulate their own cognitive states and processes.

The state of research in this field was reported out on Feb. 20 at a European Science Foundation session at the annual meeting of the American Association for the Advancement of Science in Washington D.C.

The session speakers were J. David Smith, PhD, professor of psychology and cognitive science at the University at Buffalo; Josef Perner of the University of Salzburg, and Joalle Proust, Institut Jean-Nicod, a research center of the French National Center of Scientific Research, all of whom have investigated this area systematically.

To the question of whether non-human animals have metacognition, UB's Smith says the answer appears to be "yes."

"There is growing evidence that animals share functional parallels with humans' conscious metacognition, and possibly even experiential parallels, though the latter possibility has not been experimentally confirmed," he says.

At the conference, Smith and his colleagues reviewed this field of comparative inquiry, describing significant empirical milestones,

remaining theoretical millstones, and the prospects for continuing progress in a rapidly developing area.

"This research area has the potential to open a new window on reflective mind in animals," he says, "illuminating its evolutionary emergence and allowing researchers to trace the antecedents of human [consciousness](#)."

Smith says, "Metacognition is 'thinking about thinking,' or 'knowing about knowing' and can take many forms, including tip-of-the-tongue moments and knowing when you need to Google."

Human beings have feelings of doubt and confidence, and of certainty and uncertainty. We know, for instance, if we do or do not know or remember something. This ability to evaluate and predict one's own mental performance (metacognition) is one of our most sophisticated cognitive capacities and, until recently, it was thought to be uniquely human.

Smith, whose work is at the forefront of this rapidly developing field of study, says "Metacognition rivals language and tool use in its potential to reveal similarities and differences between human and animal minds.

"Newly devised experimental paradigms that test metacognition in nonhuman primates show that it is not a uniquely human talent," he says.

"Moreover, the same simple, nonverbal, and perceptual tasks used to study animal metacognition can also be used to explore young children's earliest metacognitive achievements. Children's metacognition often has been underestimated given the predominant verbal and introspective assessments," Smith says.

He adds that this innovative research is profoundly affecting philosophers involved in the current debate on the theory of mind.

Smith is the co-author of many studies in metacognition, most recently, "Beyond Stimulus Cues and Reinforcement Signals: A New Approach to Animal Metacognition," published in the most recent issue of the APA's *Journal of Comparative Psychology* (Vol. 124) and also "With His Memory Erased, a Monkey Knows He Is Uncertain," published in *Biology Letters* (Vol. 6, 2010).

The latter study showed that the researchers could safely and temporarily erase a monkey's visual working memory using trans-cranial magnetic stimulation, and by this technique create uncertainty in the monkey's mind that he responded to the uncertainty appropriately.

Smith reported at the ESF session because of his involvement in the EUROCORES (European Collaborative Research) collaborative research project "[Metacognition](#) as a Precursor to Self-Consciousness: Evolution, Development and Epistemology," which was also the name of the AAAS session. Perner and Proust are also associated with this project.

Provided by University at Buffalo

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