

# The art of mindreading -- empathy or rational inference?

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The ability to infer what another person is thinking is an essential tool for social interaction and is known by neuroscientists as "Theory of Mind" (ToM), but how does the brain actually allow us to do this? We are able to rationally infer what someone knows, thinks, or intends, but we are also able to "slip into their shoes" and infer how they feel, and it seems that the brain processes these different types of information in different ways, as confirmed by a new report in the June 2010 issue of Elsevier's *Cortex*.

Prof. Elke Kalbe and colleagues from the Institute of [Neuroscience](#) and Medicine at the Research Centre Juelich and the Neurological University Clinic Cologne, Germany, studied a group of male volunteers as they performed a computerized task, which assessed their abilities in both emotional and rational inference. The researchers then applied repetitive [transcranial magnetic stimulation](#) (rTMS) to a part of the brain thought to be involved in rational inference - the right [dorsolateral prefrontal cortex](#) - in order to interfere temporarily with the activity in that part of the brain and test its effect on the ToM abilities of the volunteers.

The findings showed that the temporary interference in this particular area of the brain had an effect on the rational inference abilities (cognitive ToM) of the volunteers, but not on their abilities to infer emotions (affective ToM). "The study corroborates the notion that cognitive and affective ToM are functionally independent and that these subcomponents are mediated by at least partly different neural pathways", notes Prof. Kalbe. Although the distinction between these two aspects of "mindreading" had already been made, the brain pathways for rational inference processes had not been well understood previously.

Coauthor Prof. Matthias Brand, from the University of Duisburg-Essen, adds that this new study "specifically underlines the relevance of the dorsolateral prefrontal cortex for cognitive aspects

of ToM". He also points out that this suggests that certain skills and behaviours known as "executive functions", such as cognitive flexibility and set-shifting, may be important while the brain is working out what someone else is thinking.

**More information:** The article is "Dissociating cognitive from affective theory of mind: A TMS study" by Elke Kalbe, Marius Schlegel, Alexander T. Sack, Dennis A. Nowak, Manuel Dafotakis, Christopher Bangard, Matthias Brand, Simone Shamay-Tsoory, Oezguer A. Onur, and Josef Kessler, and appears in *Cortex*, Volume 46, Issue 6 (June 2010). <http://www.elsevier.com/locate/cortex>

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