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Lost In Thought: Brain Research

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Can one literally "lose oneself" in an experience? Many theoretical models of the mind reject this notion, proposing that awareness is dependent on the mediation of areas involved in self representation – a vigilant, self-aware "observer" network – in the human brain.

Prof. Rafael Malach, Ilan Golberg and Michal Harel of the Weizmann Institute's Neurobiology Department found a scientific means of addressing this question – by scanning the brains of volunteers performing various mental tasks.

The results of their study, which were published recently in the journal *Neuron*, were unanticipated: When subjects were given outwardly-focused tasks that demanded their full attention, areas of the brain that

relate to the self were not only inactive – they appeared to be vigorously suppressed.

The functional brain scans were done with an MRI (Magnetic Resonance Imaging) system, which maps brain activity by measuring changes in blood flow and oxygenation. Volunteers either viewed photos or listened to short music segments. For each stimulus, however, participants were asked to perform two different tasks. In one, "introspective" assignment, they were asked to think about themselves and how the image or musical selection made them feel.

In the second, "sensory-motor" task, they performed quick recognition exercises – such as identifying pieces that included a trumpet's sound. The scientists were particularly interested in certain regions in the prefrontal cortex, a part of the brain known to be involved in personality and self-knowledge, among other things. Indeed, the fMRI confirmed that these regions were active during introspection but, when subjects were absorbed in the recognition task, activity in these areas was silenced. (fMRI readings in these areas fell below those measured when subjects were resting.)

"It is tempting," says Malach, "to put these findings in a broader perspective, one that veers away from traditional western thought, with its emphasis on self-control and for which 'someone is always minding the store,' and toward more eastern perspectives, in which the 'self must be abandoned in order to fully engage with the outside world.'" On a more scientific level, their study suggests that the brain's self-awareness centers do not function as a critical element that allows perceptual awareness of the outside world. Rather, the self-related areas of the prefrontal cortex appear to be engaged specifically when we are aware both of the sensory experience and of ourselves as the observers of this experience. When we are so occupied with the outside world as to "forget ourselves," only local, sensory-specific systems seem to be

needed.

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