
The left temporal pole is not necessary for mentalizing.

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Abstract

Neuroimaging studies have shown that the anterior temporal lobes (aTLs) are part of the neural network consistently activated when people are engaged in Theory of Mind (ToM) tasks, i.e., tasks requiring to reason about other people's mental states. These findings have led some researchers to conclude that the aTLs play a critical role in our mentalizing ability, by either subtending the social scripts (Gallagher & Frith, 2003) or the social concepts that we need to infer other people's mental states (e.g., Ross & Olson, 2010). Here, we report the case of a patient, C.M., who suffers from semantic dementia following a brain degeneration affecting mainly the left aTL. The patient showed a severe impairment in tasks probing his semantic knowledge about the world, including social semantic knowledge tested in a series of tasks contrasting social and non-social concepts. However, despite his lesion, C.M. was perfectly able to attribute various types of mental states to other people in a range of non-verbal ToM tasks, including intention, knowledge and false belief reasoning tasks, even when material that has been shown to activate the left temporal pole in neuroimaging studies (e.g., Brunet et al.'s attribution of intention task, 2000) was used. These findings challenge the assumption that the aTLs play a critical role in ToM: they suggest that, as far as the left temporal pole is concerned, despite its recurrent activation in neuroimaging studies, this region is not necessary for inferring mental states, at least in non-verbal tasks.

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