

The sense of self in the brain: neural correlates of self-recognition

Results:

The exact relation between the sense that one's body is one's own (body-ownership) and the sense that one controls one's own bodily actions (agency) has been the focus of much speculation, but remains unclear. On an 'additive' model, agency and body-ownership are strongly related; the ability to control actions is a powerful cue to body-ownership. This view implies a component common to the senses of body-ownership and agency, plus possible additional components unique to agency. An alternative 'independence' model holds that agency and body-ownership are qualitatively different experiences, triggered by different inputs, and recruiting distinct brain networks. We tested these two specific models by investigating the sensory and motor aspects of body-representation in the brain using fMRI. Activations in midline cortical structures were associated with a sensory-driven sense of body-ownership, and were absent in agency conditions. Activity in the pre-SMA was linked to the sense of agency, but distinct from the sense of body-ownership. No shared activations that would support the additive model were found. The results support the independence model. Body-ownership involves a psychophysiological baseline, linked to activation of the brain's default mode network. Agency is linked to premotor and parietal areas involved in generating motor intentions and subsequent action monitoring. The apparently inconsistent results between psychophysical and neuroimaging experiments are interpreted in the context of our recent understanding of neuropsychological syndromes that affect action- and/or body-awareness.

Published work:

Full papers:

Haggard P & Tsakiris M. (2009) The experience of agency: feeling, judgment and responsibility. *Current Directions in Psychological Science*, 18(4), 242-246

Tsakiris M, Longo MR & Haggard P (2010). Having a body versus moving your body: neural signatures of agency and body-ownership. *Neuropsychologia*, 48(9):2740-2749

Contributions included in books:

Tsakiris M (2008) The self-other distinction: insights from self-recognition experiments. In Morganti F, Carassa A, Riva G (Eds) *Enacting Intersubjectivity: A Cognitive and Social Perspective to the Study of Interactions*. IOP Press: Amsterdam.

Area(s) of interest:

Physiology, Psychology, Cognitive Neuroscience

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