Right Supramarginal gyrus

The right-hemisphere supramarginal gyrus appears to play a central role in controlling our empathy towards other people. When this structure isn't working properly or when we have to make very quick judgments, our empathy becomes severely limited.

Research has shown that disrupting the neurons in the right supramarginal gyrus causes humans to project our emotions on others, inhibiting our ability to be empathetic. In addition, this disruption also causes people to be more egocentric, mainly because they aren't able to perceive the emotions of those around them.

Both the left and right supramarginal gyri of healthy, right-handed individuals are shown to be active when making phonological word choices.

Individuals who had lesions to the left hemisphere had more difficulty than those with lesions to the right hemisphere, reinforcing the dominance of the left hemisphere in language.

Humans tend to use the self as a reference point to perceive the world and gain information about other people's mental states. However, applying such a self-referential projection mechanism in situations where it is inappropriate can result in egocentrically biased judgments. To assess egocentricity bias in the emotional domain (EEB), Silani et al., developed a novel visuo-tactile paradigm assessing the degree to which empathic judgments are biased by one's own emotions if they are incongruent to those of the person we empathize with. A first behavioral experiment confirmed the existence of such EEB, and two independent fMRI experiments revealed that overcoming biased empathic judgments is associated with increased activation in the right supramarginal gyrus (rSMG), in a location distinct from activations in right temporoparietal junction reported in previous social cognition studies. Using temporary disruption of rSMG with repetitive transcranial magnetic stimulation resulted in a substantial increase of EEB, and so did reducing visuo-tactile stimulation time as shown in an additional behavioral experiment.

This findings provide converging evidence from multiple methods and experiments that rSMG is crucial for overcoming emotional egocentricity. Effective connectivity analyses suggest that this may be achieved by early perceptual regulation processes disambiguating proprioceptive first-person information (touch) from exteroceptive third-person information (vision) during incongruency between self- and other-related affective states.

The study extends previous models of social cognition. It shows that although shared neural networks may underlie emotional understanding in some situations, an additional mechanism subserved by rSMG is needed to avoid biased social judgments in other situations [1].

1)
Silani G, Lamm C, Ruff CC, Singer T. Right supramarginal gyrus is crucial to overcome emotional egocentricity bias in social judgments. J Neurosci. 2013 Sep 25;33(39):15466-76. doi: 10.1523/JNEUROSCI.1488-13.2013. PubMed PMID: 24068815.