

Which side of the brain rotates a mental picture?

March 9 2011

Consider the simple situation in which you are walking around the kitchen and decide to pick up your own cup of tea, which is identical to others lying on the table. Your brain chooses the correct cup of tea by using different types of information that you have stored about the position of the cup in relation to the kitchen table. The information can be represented in qualitative terms (left, right, above, below) or quantitative terms (distances and angles).

Previous studies have claimed that the brain's left hemisphere is critical for processing qualitative (technically 'categorical'), information and the right for quantitative ('metric') processing. However, new neuropsychological findings published in the February 2011 issue of *Cortex* show that this is not the case.

A multidisciplinary team led by cognitive neuroscientist Tim Shallice and [neurosurgeon](#) Miran Skrap working in Udine, Italy, studied the difficulties faced by 55 patients who had recently had an operation to remove a [brain](#) tumour from either the left or right side of the brain. The patients were shown a series of images of a dot inside an upright or tilted frame and were asked to reproduce its position inside an identical upright frame, a task requiring [mental rotation](#) of the image.

The team found that patients whose tumours had been in the right parietal or in the left prefrontal cortices made a considerably larger number of errors than other patients. Moreover, these two critical groups behaved rather differently from each other. The right parietal patients

placed the mark in the right position with respect to a corner. However, they chose the wrong corner much more often than the other patients. The left prefrontal patients got the corner right but were otherwise highly inaccurate in their responses. It was therefore the patients with tumours of the right [parietal cortex](#) who were unable to process the categorical spatial information and perform the mental rotation. A left prefrontal tumour instead led to difficulties in the setting up of the specific program within the brain which was necessary to organize the sequence of operations required to carry out the task.

More information: The article is "Two qualitatively different impairments in making rotation operations" by Tania Buiatti, Alessandro Mussoni, Alessio Toraldo, Miran Skrap, and Tim Shallice, and appears in *Cortex*, Volume 47, Issue 2 (February 2010).

<http://www.sciencedirect.com/science/journal/00109452>

Provided by Elsevier

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