

New Cortex Study Uncovers How We Recognize What is True and What is False

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A recent neuroimaging study reveals that the ability to distinguish true from false in our daily lives involves two distinct processes. Previous research relied heavily on the premise that true and false statements are both processed in the left inferior frontal cortex. Carried out by researchers from the Universities of Lisbon and Vita-Salute, Milan, the June *Cortex* study found that we use two separate processes to determine the subtle distinctions between true and false in our daily lives. Deciding whether a statement is true involves memory; determining one is false relies on reasoning and problem-solving processes.

The study examines the impact of true and false sentences on [brain activity](#) with a feature verification task and *functional Magnetic Resonance Imaging* ([fMRI](#)). Participants were asked to read simple sentences composed of a concept-feature pair (e.g. ‘the plane lands’) and to decide whether the sentence was true or false. Importantly, true and false statements were equated in terms of ambiguity, and exactly the same concepts and features were used across the two types of sentences. False statements differentially activated the right fronto-polar [cortex](#) in areas that have been previously related to reasoning tasks. The activations related to true statements involved the left inferior parietal cortex and the caudate nucleus bilaterally.

The former activation may be hypothesized to reflect continued thematic semantic analysis and a more extended memory search. The caudate activation may also reflect this search and matching processes as well as the fact that recognizing a sentence as true is in itself a positive reward

for the subject, as this area is also involved in processing reward-related information.

Considering the results from the present experiment and from previous studies, it is possible to reconcile the historically conflicting positions about language comprehension dating to Protagoras and Socrates. Paradoxically, it seems that when the differences between truth and falsehoods are clear-cut, we behave like relativists, and use similar processes to arrive at a decision. However, when differences are more subtle, (as in the *Cortex* study), we adhere to a categorical distinction and use qualitatively different processes to decide what is true from false.

Source: Elsevier

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