

NEWS

Realistic social test identifies new language area in brain

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A test designed to capture the dynamic back-and-forth of conversation suggests the existence of a new language area in the brain. The brain's subcentral area, previously of unknown function, is activated specifically during interactions between people, the new work suggests.

Researchers presented the unpublished results yesterday at the **2017 Society for Neuroscience annual meeting** in Washington, D.C.

Language and communication difficulties are **hallmarks of autism**. To assess these problems, studies commonly track brain activity while the participant lies in a scanner and either talks or listens to words piped in through a speaker.

"Most of what we know about language comes from single subjects," says study leader **Joy Hirsch**, professor of psychiatry at Yale University.

These studies suggest that talking is associated with activity in a brain region called Broca's area, and listening with a nearby spot called Wernicke's area.

However, they don't reveal much about what happens in the brain during real-life, spontaneous communication, Hirsch says. Some scientists are developing ways to record brain activity **during real-life social interactions**.

Hirsch's new work suggests a novel place to look in the brain, and a new method of analysis, to gain insights into language impairments.

Double dialogue:

Hirsch and her team relied on functional near-infrared spectroscopy, in which sensors embedded in

a cap worn on the head measure blood flow in the brain. The method allows people to sit upright, as they would while conversing with others, rather than lying perfectly still in a scanner.

The researchers grouped their 58 participants into pairs. In the first part of the experiment, or the 'monologue phase,' they asked the members of each pair to take turns describing pictures of various objects, such as a clock, a coconut and a camera. In a 'dialogue' phase, each member of a pair commented on the other's description before describing his or her own picture.

Both parts of the experiment trigger activity in Broca's and Wernicke's areas. This finding was expected, especially because the researchers based their experiment on a classic test designed to elicit activity in these areas.

Activity in Broca's area is the same across both the monologue and the dialogue phases of the experiment. But Wernicke's area is more active during the dialogue phase, suggesting that it is specialized for interaction, not just for listening and comprehension.

The researchers then compared the partners' brain activity to see how well they match up during different phases of the test. They found two brain regions that are more in sync between partners during the dialogue phase of the test than in the monologue phase.

One is the superior temporal gyrus, which includes Broca's and Wernicke's areas. The other is the subcentral area, whose function is unknown. Hirsch's team reported earlier this year that this area is also active when people make eye contact¹.

The new results suggest that the subcentral area is specialized for interaction between people.

They also support the 'interactive brain hypothesis' — that is, that two brains interacting use different neural and cognitive processes than two individual brains doing the same task, Hirsch says.

"The interactive brain hypothesis provides an important direction for autism research," Hirsch says. Areas of the brain that are active during interactions may be involved in the social problems characteristic of autism. Her team is investigating whether activity in the subcentral area is altered in autism.

For more reports from the 2017 Society for Neuroscience annual meeting, please [click here](#).

REFERENCES:

1. Hirsch J. *et al. Neuroimage* **157**, 314–330 (2017) [PubMed](#)