

Tool manipulation is represented similarly in the brains of the blind and the sighted

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Blind people think about manipulating tools in the same regions of the brain as do people who can see, according to a new study. The researchers say this adds to evidence that the brain has a fairly defined organization, while still being able to adapt to unusual conditions, such as not having any vision.

When you look at a glass in front of you on the desk, it sets off a lot of reactions in your brain. Part of your brain categorizes it: "That's a glass!" Another part of the brain thinks about the glass's shape and size, its exact location, and what you would have to do with your hand and arm if you were going to reach out and grab it. All that activity goes on even if you just look at the glass. This is a complicated set of thoughts, linking visual information and motor control. A few years ago, Bradford Z. Mahon, Jens Schwarzbach, and Alfonso Caramazza of the University of Trento in Italy investigated the first part - categorizing the item - and found that [blind people](#) did this in the same part of the brain as people with vision, even though it seems on the surface to be linked directly to [visual information](#).

For the new study, the researchers wanted to see if the same was true of the second part - thinking about how to manipulate the object. To do that, they scanned the brains of blind and sighted volunteers while they thought about tools and other objects. Each person laid in an [MRI scanner](#) while they heard a set of words from a category - either tools, like saw, scissors, and fork; animals, like butterfly, turtle, and cat; and objects you don't manipulate, like bed, fence, and table.

Functional MRI scanning showed which parts of the brain are active when the volunteer heard each word. Blind people, even people who were born blind, tended to think about a tool in the same part of the brain as a sighted person. And, like visual people, a non-tool like a cat or a fence generally didn't spark those same regions of the brain. The research is published in [Psychological Science](#), a journal of the Association for Psychological Science.

"I think the exciting implication is that the way that our brains process the world may be less dependent on our experience than previously thought," says Mahon. "It doesn't mean experience is not important. Experience is critical for providing all of the content that we represent about the world. But how that content is organized in our [brain](#) seems to be highly constrained, and the interesting possibility is that those constraints are built in by genetics."

More information: "The Representation of Tools in Left Parietal Cortex Is Independent of Visual Experience". Psychological Science.

Provided by Association for Psychological Science

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