

What happens when a word pops into your brain? Learning how we think could help improve artificial intelligence (AI)

How do we understand words? Scientists don't fully understand what happens when a word pops into your brain. A research group led by Professor Shogo Makioka at the Graduate School of Sustainable System Sciences, Osaka Metropolitan University, wanted to test the idea of embodied cognition. Embodied cognition proposes that people understand the words for objects through how they interact with them, so the researchers devised a test to observe semantic processing of words when the ways that the participants could interact with objects were limited.

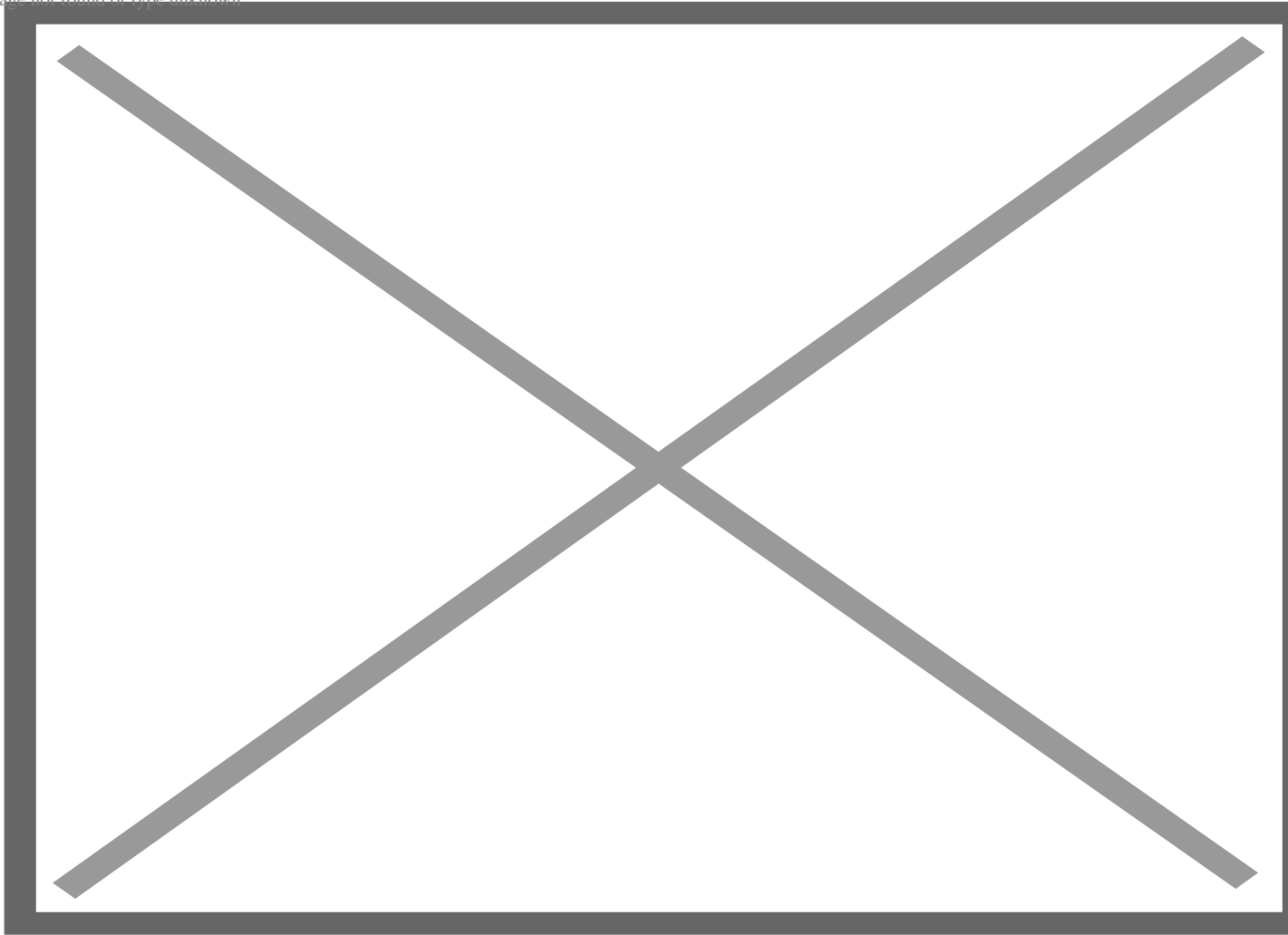
Words are expressed in relation to other words; a “cup,” for example, can be a “container, made of glass, used for drinking.” However, you can only use a cup if you understand that to drink from a cup of water, you hold it in your hand and bring it to your mouth, or that if you drop the cup, it will smash on the floor. Without understanding this, it would be difficult to create a robot that can handle a real cup. In artificial intelligence research, these issues are known as symbol grounding problems, which map symbols onto the real world.

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The results showed that the activity of the left brain in response to hand-manipulable objects was significantly reduced by hand restraints. Verbal responses were also affected by hand constraints. These results indicate that constraining hand movement affects the processing of object-meaning, which supports the idea of embodied cognition.

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When asked about which word represented the larger object, participants answered faster when their hands were free (left) than when hands were restrained (right). Restraining hands also lowered brain activity when processing words for hand manipulable objects in left brain areas associated with tools.

[This is an excerpt. Read the original post here.](#)