

Nouns and verbs are learned in different parts of the brain

February 25 2010



Nouns and verbs are learned in different parts of the brain. Credit: Mestres-Misse et al.

Two Spanish psychologists and a German neurologist have recently shown that the brain that activates when a person learns a new noun is different from the part used when a verb is learnt. The scientists observed this using brain images taken using functional magnetic resonance, according to an article they have published this month in the journal *Neuroimage*.

"[Learning](#) nouns activates the left fusiform gyrus, while learning [verbs](#) switches on other regions (the left [inferior frontal gyrus](#) and part of the left posterior medial temporal gyrus)", Antoni Rodríguez-Fornells, co-author of the study and an ICREA researcher at the Cognition and [Brain](#) Plasticity Unit of the University of Barcelona, tells SINC.

The Catalan researcher, along with psychologist Anna Mestres-Missé, who is currently working at the Max Planck Institute for Human

Cognitive and Brain Sciences in Leipzig, and neurologist Thomas F. Münte from the Otto-von-Guericke University in Magdeburg, in Germany, have just published the results of their study confirming the neural differences in the map of the brain when a person learns new nouns and verbs in the journal *Neuroimage*.

The team knew that many patients with brain damage exhibit dissociation in processing these kinds of words, and that children learn nouns before verbs. Adults also perform better and react faster to nouns during cognitive tests.

Based on these ideas, the researchers devised an experiment to confirm whether these differences could be seen in the brain. To do this, they set 21 people a test to learn new nouns and verbs, and recorded their neural reactions using [functional magnetic resonance](#) imaging. This technique makes it possible to observe how regions of the brain activate while a person is carrying out a specific task.

The test consisted of working out the meaning of a new term based on the context provided in two sentences. For example, in the phrase "The girl got a jat for Christmas" and "The best man was so nervous he forgot the jat", the noun jat means "ring". Similarly, with "The student is nising noodles for breakfast" and "The man nised a delicious meal for her" the hidden verb is "cook".

"This task simulates, at an experimental level, how we acquire part of our vocabulary over the course of our lives, by discovering the meaning of new words in written contexts", explains Rodríguez-Fornells. "This kind of vocabulary acquisition based on verbal contexts is one of the most important mechanisms for learning new words during childhood and later as adults, because we are constantly learning new terms".



Nouns and verbs are learned in different parts of the brain. Credit: Mestres-Misse et al.

The participants had to learn 80 new nouns and 80 new verbs. By doing this, the brain imaging showed that new nouns primarily activate the left fusiform gyrus (the underside of the temporal lobe associated with visual and object processing), while the new verbs activated part of the left posterior medial temporal gyrus (associated with semantic and conceptual aspects) and the left inferior frontal gyrus (involved in processing grammar).

In addition, there was a positive correlation between activation of certain parts of the brain (the bilateral hippocampus and the bilateral putamen) and the efficiency of learning new nouns, but not new verbs.

"These results suggest that the same regions previously associated with the representation of the meaning of nouns and verbs are also associated with establishing correspondences between these meanings and new words, a process that is necessary for learning a second language", says Rodríguez-Fornells.

The researcher explains that the study cannot be used in practice for learning languages, "but it does touch on one of the most important aspects, which is the degree to which we use different information in verbal contexts, as well as possibly different neural networks, in learning different kinds of words with different grammatical functions".

More information: Mestres-Missé, A., Rodriguez-Fornells, A., Münte, T.F. "Neural differences in the mapping of verb and noun concepts onto novel words". *Neuroimage* 49 (3): 2826, 2010.

Provided by FECYT - Spanish Foundation for Science and Technology

Citation: Nouns and verbs are learned in different parts of the brain (2010, February 25)
retrieved 10 April 2024 from <https://medicalxpress.com/news/2010-02-nouns-verbs-brain.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.