

Measured -- The time it takes us to find the words we need

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(PhysOrg.com) -- The time it takes for our brains to search for and retrieve the word we want to say has been measured for the first time. The discovery is reported in a paper published in the *Proceedings of the National Academy of Sciences* of the USA today.

Most people think that words and [meaning](#) are the two sides of the same coin and that the form of a word is the same as its meaning, or at least, that word and meaning cannot be split. However, this is not the case. Word forms have an existence of their own in the human mind, disconnected, from meaning- at least, for a fraction of a second.

Until now, in the field of [speech](#) production, it was unknown when exactly a word form is retrieved by the human [brain](#) when, for instance, people have to name a picture.

As Professor Guillaume Thierry of Bangor University, one of the paper's authors explains:

"If you have to say the word apple upon seeing the picture of an apple, the brain does not access the word form "a-p-p-l-e" instantly, it takes time, and until now, it was unknown exactly how much time it took. Along with colleagues at Pompeu Fabra and Barcelona universities, we measured exactly when word forms are retrieved by the brain. That happens about one fifth of a second after a picture is shown."

Thierry explains: "This is a very short time, but it makes a lot of sense if

one considers that the average normal speech rate is about 5 words per second. Surely, if we can produce five [words](#) per second in normal speech, it means that we can dig each and every word from memory in about one fifth of a second."

Thierry and colleagues hope to understand every stage of word production: analysis of meaning, word access, word retrieval and programming of speech. They also intend to do the same thing in comprehension to reach a full understand of the stages the human mind goes through to understand and produce language.

Their experiment combined picture naming and a technique which measures electrical activity produced by the brain over the scalp. It also pioneered the recording of brain activity over the scalp, while participants spoke out loud. This proved a technical challenge as mouth movements produce electrical noise stronger than the power of signals produced by the brain.

The research is the fruit of collaboration between language laboratories in Barcelona Pompeu Fabra and Bangor universities.

More information: The time course of word retrieval revealed by event-related brain potentials during overt speech. Albert Costa, et al., *PNAS*. (*PNAS* Online Early Edition November 23-27, 2009).

Provided by Bangor University ([news](#) : [web](#))

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