

Brain recognises verbal 'Oh-shit' wave

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It seems that our brain can correct speech errors in the same way that it controls other forms of behaviour. Niels Schiller and Lesya Ganushchak, NWO researchers in Leiden, made this discovery while studying how the brain reacts to verbal errors. This research can contribute to improvements in the treatment of people who have problems with speaking or in understanding language.

Our brain is fairly good at preventing mistakes in speech. Unfortunately it does make the odd mistake. George W. Bush, famous for his verbal errors, made the mistake of referring to weapons of 'mass production' instead of 'mass destruction'. Former UK deputy Prime Minister John Prescott, had the same problem when he spoke of solving industrial disputes through 'meditation' instead of 'mediation'.

To see how the brain reacts to these kinds of mistakes, Schiller and Ganushchak asked volunteers to indicate whether or not certain sounds were in the words matching different pictures. So, for example, when shown a picture of a spoon, the volunteer was required to indicate whether or not a 'p' was in the word. This does not usually give any problems, but under pressure, when given less time, the volunteers make more mistakes. They then indicate for example that there is an 'f' in the word 'spoon' or that there is no 'p' in 'spoon'.

The researchers showed that the brain responds to such faulty utterances with a specific electrophysiological signal. It was already known that this wave occurs when making behavioural errors, such as pressing a wrong button by accident. This wave, called Error-Related Negativity, is

informally known as the 'Oh-shit' wave. The brain registers at once that something is amiss.

The most important conclusion of the study is that the way in which the brain uses language is not fundamentally different from how other actions such as grabbing or walking are carried out. The 'Oh-shit' wave registers errors so rapidly that they can sometimes be corrected in time. In this way you can stop yourself from falling down the stairs or saying the wrong thing.

The results of this research provide a better understanding of the brain and how it processes languages. Such new insights into the mechanisms that affect speech can help to improve therapy methods for people with language impairments.

This study is part of a broader research project that attempts to analyse the working of the brain when using language. Niels Schiller set up the project in 2003 with a grant from NWO's Vici programme. Lesya Ganushchak, who was a PhD student on that project, received a grant herself in 2008 from NWO's Rubicon programme aimed at gaining experience abroad.

Source: NWO

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