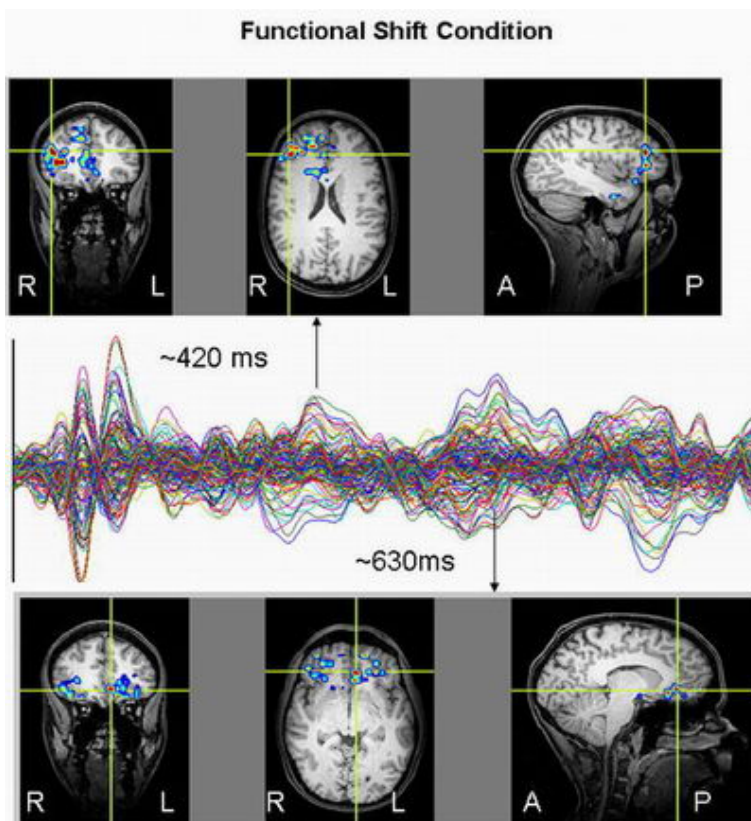


Reading Shakespeare has dramatic effect on human brain



Research at the University of Liverpool has found that Shakespearean language excites positive brain activity, adding further drama to the bard's plays and poetry.



The effect of functional shift on the brain. Credit: University of Liverpool

Shakespeare uses a linguistic technique known as functional shift that involves, for example using a noun to serve as a verb. Researchers found that this technique allows the brain to understand what a word means before it understands the function of the word within a sentence. This process causes a sudden peak in brain activity and forces the brain to work backwards in order to fully understand what Shakespeare is trying to say.

Professor Philip Davis, from the University's School of English, said: "The brain reacts to reading a phrase such as 'he godded me' from the tragedy of Coriolanus, in a similar way to putting a jigsaw puzzle together. If it is easy to see which pieces slot together you become bored of the game, but if the pieces don't appear to fit, when we know they should, the brain becomes excited. By throwing odd words into seemingly normal sentences, Shakespeare surprises the brain and catches it off guard in a manner that produces a sudden burst of activity - a sense of drama created out of the simplest of things."

Experts believe that this heightened brain activity may be one of the reasons why Shakespeare's plays have such a dramatic impact on their readers.

Professor Neil Roberts, from the University's Magnetic Resonance and Image Analysis Research Centre, (MARIARC), explains: "The effect on the brain is a bit like a magic trick; we know what the trick means but not how it happened. Instead of being confused by this in a negative sense, the brain is positively excited. The brain signature is relatively uneventful when we understand the meaning of a word but when the word changes the grammar of the whole sentence, brain readings suddenly peak. The brain is then forced to retrace its thinking process in order to understand what it is supposed to make of this unusual word."

Professor Roberts and Professor Davis together with Dr Guillaume Thierry, from the University of Wales, Bangor, monitored 20 participants using an electroencephalogram (EEG) as they read selected lines from Shakespeare's plays.

In this initial test electrodes were placed on the subject's scalp to measure brain responses.

Professor Roberts said: "EEG gives graph-like measurements and when the brain reads a sentence that does not make semantic sense it registers what we call a N400 effect – a negative wave modulation. When the brain reads a grammatically incorrect sentence it registers a P600 effect – an effect which continues to last after the word that triggered it was first read."

Researchers also found that when participants read the word producing the functional shift there was no N400 effect indicating that the meaning was accepted but a P600 effect was observed which indicates a positive re-evaluation of the word. The team is now using magnetoencephalography (MEG) and functional magnetic resonance imaging (fMRI) to test which areas of the brain are most affected and the kind of impact it could have in maintaining healthy brain activity.

Professor Davis added: "This interdisciplinary work is good for brain science because it offers permanent scripts of the human mind working moment-to-moment. It is good for literature as it illustrates primary human thinking. Through the two disciplines, we may discover new insights into the very motions of the mind."

Source: University of Liverpool

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