

First example of a heritable abnormality affecting semantic cognition found

Four generations of a single family have been found to possess an abnormality within a specific brain region which appears to affect their ability to recall verbal material, a new study by researchers at the University of Bristol and University College London has found.



This is the first suggestion of a heritable abnormality in otherwise healthy humans, and has important implications for our understanding of the genetic basis of cognition.

[Dr Josie Briscoe](#) of [Bristol's School of Experimental Psychology](#) and colleagues at the Institute of Child Health in London studied eight members of a single family aged from eight to 72. Despite all having high levels of intelligence since childhood, they experience profound difficulties in recalling sentences and prose, and language difficulties in listening comprehension and naming less common objects.

While their conversation is articulate and engaging, they can experience the inability to 'find' a particular word or topic - a phenomenon similar to the 'tip-of-the-tongue' problem experienced by many people. They also report associated problems such as struggling to follow a narrative thread while reading or watching television drama.

Dr Briscoe said: "With their consent, we conducted a number of standard memory and language tests on the affected members of the family. These showed they had difficulty repeating longer sentences correctly and learning words in lists and pairs. This suggests their difficulties lie in semantic cognition - the way people construct and generate meaning from words, objects and ideas.

"Given the very wide variation in age, the coherence of their difficulties in semantic cognition was remarkable."

The researchers also used Magnetic Resonance Imaging (MRI) to study the brains of the affected family members and found they had reduced grey matter in the posterior inferior portion of the temporal lobe, a brain area known to be involved in semantic cognition.

Dr Briscoe said: "These brain abnormalities were surprising to find in healthy people, particularly in the same family, although similar brain regions have been implicated in research with older adults with neurological problems that are linked to semantic cognition.

"Our findings have uncovered a potential causal link between anomalous neuroanatomy and semantic cognition in a single family. Importantly, the pattern of inheritance appears as a potentially dominant trait. This may well prove to be the first example of a heritable, highly specific abnormality affecting semantic cognition in humans."

The study is published in the 20 June edition of Proceedings of the Royal Society B.

Paper'A specific cognitive deficit within semantic cognition across a multi-generational family' by Josie Briscoe and Rebecca Chilvers, Torsten Baldeweg and David Skuse in [Proc. R. Soc. B](#)

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