

How the brain copes in language-impaired kids

Researchers at UCL (University College London) have discovered that a system in the brain for processing grammar is impaired in some children with specific language impairment (SLI), but that these children compensate with a different brain area.

The findings offer new hope for sufferers of SLI, which affects seven per cent of children and is a major cause of many not reaching their educational potential. To date, it has not been clear whether these children generally struggle to process language, or whether they have specific problems with grammar. The UCL findings reveal the latter for a sub-group (G-SLI), and suggest that educational methods that enhance these compensatory mechanisms may help such children overcome their difficulties.

Grammar is a complex and exclusively human ability, yet by the age of three most children can make grammatically correct sentences. Children with G-SLI, however, continue to make grammatical errors, sometimes into adulthood. As teenagers they might make errors that other children rarely make after age five; for example, they may struggle to understand who ‘him’ or ‘himself’ refers to in the sentence “Mowgli said Baloo was tickling him/himself”, or when asking a question say “Who Joe see someone?” rather than “Who did Joe see?”.

In the UCL study, funded by the Wellcome Trust, electrophysiological brain measurements of children with SLI showed normal responses for a variety of language tasks, but a specific deficit in brain circuitry involved in grammatical processing. The study, published online in the journal PLoS ONE, also found that the G-SLI children appeared to be partially compensating by using neural circuitry associated with vocabulary/word meaning or world knowledge (semantic processing). For example, a child could work out the meaning of “The baby was carried by the old man” but not “The girl was pushed by the boy”. The latter sentence requires knowledge of grammar to understand who is doing what to whom.

Professor Heather van der Lely, Director of the UCL Centre for Developmental Language Disorders & Cognitive Neuroscience, says: “Specific language impairment is not as well known as autism, yet the disorder affects seven times as many children, and prevents them reaching their potential.

“We have discovered that a number of these children have specific problems with grammar, reflected in our measurements of a circuit in the brain which appears to be uniquely involved in grammar. G-SLI children with a deficit here appear to be compensating by harnessing another brain area involved in general word processing. Not only does this offer an intriguing insight into how such children may be coping with language, but it suggests a new way is needed to help them to overcome their difficulties in broader education.

Source: University College London

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