

World-first device may help solve child language mystery

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(PhysOrg.com) -- Researchers are one step closer to understanding why children can learn languages far more easily than adults, thanks to a world-first device that allows scientists to measure the magnetic fields generated by a child's brain.

Cognitive scientists from Macquarie University will use a brain imaging system called MEG, or magnetoencephalography - the first brain imaging system specifically designed for children's smaller head sizes - to discover how much of our language ability is learned from experience, and how much is part of our biological make-up.

Professor Stephen Crain, Director of the Centre for Language Sciences,

and Deputy Director of the Macquarie Centre for Cognitive Science (MACCS), said the child MEG system promises to lead to major advances in our understanding of children's knowledge of language.

"Adults have considerable difficulty learning a new language, whereas young children learn languages without effort or special instruction. This is because children intuitively understand how all languages are structured," Crain said.

"All children, regardless of where in the world they come from, are born with an understanding of how human languages operate. This allows children to acquire the communication skills early on in life which are critical to their ongoing development.

"Until now, however, it's been impossible to investigate young children's knowledge of language, because young children can't tell us about what they are hearing. Now, using the child MEG, we can witness precisely what's going on in the brain of a child without requiring the child to communicate what they are experiencing."

Macquarie's \$1 million child MEG system is the first of its kind in the world and has been installed at the KIT-Macquarie Brain Research Laboratory alongside a \$1 million adult MEG system - currently the only adult system in the Southern Hemisphere.

Prof Crain said a major advantage of MEG is that it allows completely non-invasive measurements of brain activity.

"MEG measurements are completely safe and can be taken without any discomfort to the child whatsoever - and the measurements are very precise," Crain said.

"Until now the size of the available adult MEG systems has made it

difficult to obtain good brain signals from children, so this new child-specific system is a significant technical advance."

The child MEG device will also help scientists to understand the brain processes of children who have difficulty communicating, including those with autism, hearing problems, or specific language impairment (e.g. stuttering).

The child MEG system was funded in part by an Australian Research Council Linkage Industrial Partner Grant with the Yokogawa Electric Company, which is the industrial partner of the Kanazawa Institute of Technology or KIT. Additional financial support is provided by the HEARing Cooperative Research Centre.

Provided by Macquarie University

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