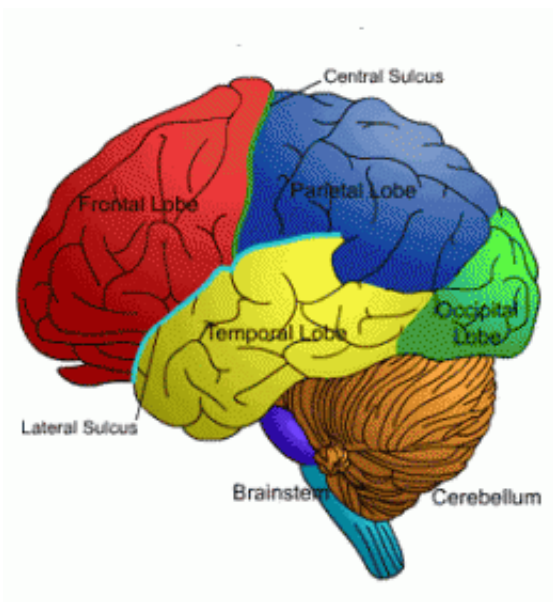


New evidence confirms link between IQ and brain cortex

March 4 2014



Brain diagram. Credit: dwp.gov.uk

Rate of change in the thickness of the brain's cortex is an important factor associated with a person's change in IQ, according to a collaborative study by scientists in five countries including researchers at the Montreal Neurological Institute and Hospital – The Neuro, at McGill University and the McGill University Health Centre. The study has potentially wide-ranging implications for the pedagogical world and for judicial cases in which the defendant's IQ score could play a role in determining the severity of the sentence.

The cortex is the thin, outermost layer of nerve cell tissue of the brain, typically measuring a few millimeters in thickness. The cortex contains [nerve cell bodies](#) and is critical for cognitive functions such as perception, language, memory and consciousness.

"Often, small differences in IQ scores are observed when people's IQs are tested twice over a period of time. However, in some instances, dramatic changes in IQ scores are observed," said Dr. Sherif Karama, assistant professor of psychiatry at McGill University, psychiatrist at Douglas Mental Health University Institute and affiliate at The Neuro where he conducted the study published in the scientific journal, Neuro Image. "These dramatic changes are generally attributed to measurement errors rather than assumed to reflect real changes in general cognitive ability."

The cortex begins to thin after the age of five or six as part of the normal aging process. This study by Professor Karama and his colleagues involved 188 children and adolescents over a period of two years. MRIs of the study participants were taken at six sites across the US. This study is the first to show the association between cortical thickness and development in full scale IQ. They found that within a relatively short period of 2 years:

- people with a significant increase in IQ did not have the expected cortical thinning,
- people whose IQ stayed the same had the normal expected cortical thinning,
- people with a significant decrease in IQ had exaggerated cortical thinning.

"Finding that IQ is not fixed and correlates to changes in brain anatomy has important implications as it shows that some of the changes in IQ are real and not merely due to measurement error. This finding should make

people wary of sticking to an early IQ assessment given the role it plays in school entrance criteria, detection of the gifted, as well as in eligibility for social security disability income or even the death penalty. In some US states, people with an IQ below 70 are not eligible for the death penalty."

The reasons behind the changes in IQ are not clear at this point. Some of these may be due to programmed developmental trajectories or other factors such as nutrition and education, noted Professor Karama.

More information: This paper was published in the January 2014 issue of *NeuroImage*: [www.sciencedirect.com/science/ ...
ii/S1053811913009749](http://www.sciencedirect.com/science/.../S1053811913009749)

Provided by McGill University

Citation: New evidence confirms link between IQ and brain cortex (2014, March 4) retrieved 19 April 2024 from <https://medicalxpress.com/news/2014-03-evidence-link-iq-brain-cortex.html>

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