Neighbourhood deprivation linked to structural changes in the brain

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(Medical Xpress)—Researchers from the University of Glasgow have published findings demonstrating a link between neighbourhood deprivation and brain structure.

The tests demonstrated that the cortical morphology (thickness and surface area) of the regions of the brain responsible for controlling a range of core functions such as language and problem solving were significantly smaller in people living in the most socio-economically deprived populations.

The study was conducted by the researchers from the University of Glasgow and the Glasgow Centre for Population Health. The findings are part of the major interdisciplinary study 'Psychological, Social and Biological Determinants of Ill Health' which aims to investigate the psychological, behavioural and biological determinants of ill health. They are presented in two papers published in the academic journals, *Psychosomatic Medicine* and *Frontiers of Human Neuroscience*.

The team used a state-of-the-art brain imaging technique called 'complex network analysis' to compare subjects from the most deprived neighbourhoods with those from more affluent areas. The work demonstrates that brain networks in people from the most deprived populations contain properties that suggest that a number of specialised parts of the brain (modules) were weaker and less efficient at processing information.

The study's lead author Dr Rajeev Krishnadas said: "These modules characterize the basic architecture of the brain that make it an efficient information processing system. The fact that people from the more deprived neighbourhoods had weaker modules, suggests that their information processing systems may be less efficient. These findings provide preliminary evidence for the neuroscientific basis of the relationship between socioeconomic deprivation and poor cognitive and mental health".

Dr Jonathan Cavanagh, from the University of Glasgow's Institute of Health and Wellbeing, said: "These results must be interpreted with caution. The design of the study is such that causality cannot be inferred from them. What they do highlight is that the brain is perhaps vulnerable to the biological stressors associated with poverty and deprivation and there are tentative indications that inflammatory processes may drive some of the structural changes we are seeing with brain imaging.

More information: Krishnadas R, McLean J, Batty GD, Burns H, Deans KA, Ford I, McConnachie A, McLean JS, Millar K, Sattar N, Shiels PG, Tannahill C, Velupillai YN, Packard CJ, Cavanagh J. "Socioeconomic deprivation and cortical morphology: psychological, social, and biological determinants of ill health study." *Psychosom Med*. 2013 Sep;75(7):616-23

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