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**ARTICLE:** Persistent antisocial behaviour is associated with structural brain differences in midlife

**HIGHLIGHT:** A research team led by Christina Carlisi, Ahmad Hariri, Essi Viding and Terrie Moffitt across University College London, King's College London, and Duke University reports that antisocial behaviour that persists across the life course is associated with structural differences in the brain. These findings are based on a study that followed a birth cohort of 1,000 children, born in one city in New Zealand in the early 1970s and followed to midlife.

**PUBLICATION SOURCE (and embargo date):** The Lancet Psychiatry, published online XXXX 2020, embargoed until XXXX.

**CITATION:** Carlisi, C, et al. (2020). Associations between life-course-persistent antisocial behaviour and brain structure in a population representative longitudinal birth cohort. The Lancet Psychiatry. 2020;XXXXX. doi:XXXX

**FINDINGS:** Individuals who exhibited antisocial behaviour that began during childhood and persisted into adulthood had smaller grey matter in selected brain regions at age 45 when compared to individuals who only exhibited antisocial behaviour during adolescence (and when compared to those who have never shown patterns of persistent antisocial behaviour).

#### **WHY ARE THESE FINDINGS IMPORTANT?**

In developed nations, 30-40% of males are convicted of non-traffic related crimes, yet decades of research have shown that only a small fraction of the population commits a very large fraction of these crimes. The Developmental Taxonomy Theory of Antisocial Behaviour was posited in 1993 to formalise the distinction between two possible pathways for the persistence of antisocial behaviour: the few adults who are antisocial almost always have a history of antisocial behaviour since childhood, whereas in contrast the majority of adolescents who engage in antisocial misconduct leave it behind and become law-abiding as adults. This distinction has been highly influential in criminal justice and social policy reform, as well as clinical practice in the psychiatric diagnosis of conduct disorder.

- This study by Carlisi et al. is the first to use large-scale longitudinal data, following 1,000 individuals from birth to midlife to test if the brains of persistent antisocial individuals differ from ordinary young people who break the law.
- It not only confirms the hypothesis originally put forward in the Developmental Taxonomy Theory but shows that these antisocial groups have profound differences in the structure of their brains.
- While a *majority* of offenders had normal brain structure, a few did not, and the presence of brain abnormalities was linked to a higher risk of reoffending over years.
- This study's results suggest that there is a need for the justice system to develop policy that does not tar all juvenile offenders with the same brush.

## **SUPPORTING DETAILS**

**PARTICIPANTS:** Participants were members of the Dunedin Multidisciplinary Health and Development Study, an investigation of the health and behaviour of a representative cohort of 1037 consecutive births between April 1972 and March 1973 in Dunedin, New Zealand. This birth represents the full range of socioeconomic status, educational attainment, and health in the general population. Follow-ups have been carried out at ages 3, 5, 7, 9, 11, 13, 15, 18, 21, 26, 32, 38, and most recently 45, when 94% of the living cohort members took part.

**MEASURING ANTISOCIAL BEHAVIOUR:** At each of ages 7, 9, 11, 13, 15, 18, 21, and 26, Study Members (and in childhood, their parents) were asked about 6 key symptoms of antisocial behaviour: for example, stealing, fighting, vandalism, bullying, lying. Statistical modelling was used to group these individuals based on patterns of antisocial behaviour between ages 7-26 years and whether this behaviour was limited to adolescence versus began in childhood and persisted into adulthood.

**MEASURING BRAIN STRUCTURE:** Magnetic resonance imaging (MRI) was used to collect brain scans of Study Members at age 45. These scans measured two aspects of brain structure: the thickness of the brain's cortex, and the surface area of the brain. We then compared these brain scans between people who were antisocial mainly in adolescence, those who were antisocial starting in childhood and who continued this behaviour into adulthood, and those who never had patterns of persistent antisocial behaviour.

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**MAIN FUNDING SOURCES:** UK Medical Research Council, the Wellcome Trust, US National Institute on Aging (NIA), Health Research Council of New Zealand, New Zealand Ministry of Business, Innovation and Employment. Additional support was provided by the Avielle Foundation.