

Presence or absence of early language delay alters anatomy of the brain in autism

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Quinn, an autistic boy, and the line of toys he made before falling asleep. Repeatedly stacking or lining up objects is a behavior commonly associated with autism. Credit: Wikipedia.

A new study led by researchers from the University of Cambridge has found that a common characteristic of autism – language delay in early childhood – leaves a 'signature' in the brain. The results are published today (23 September) in the journal *Cerebral Cortex*.

The researchers studied 80 adult men with [autism](#): 38 who had delayed [language](#) onset and 42 who did not. They found that language delay was associated with differences in brain volume in a number of key regions, including the temporal lobe, insula, ventral basal ganglia, which were all smaller in those with language delay; and in brainstem structures, which were larger in those with delayed language onset.

Additionally, they found that current language function is associated with a specific pattern of grey and white matter volume changes in some

key brain regions, particularly temporal, frontal and cerebellar structures.

The Cambridge researchers, in collaboration with King's College London and the University of Oxford, studied participants who were part of the MRC Autism Imaging Multicentre Study (AIMS).

Delayed language onset – defined as when a child's first meaningful words occur after 24 months of age, or their first phrase occurs after 33 months of age – is seen in a subgroup of children with autism, and is one of the clearest features triggering an assessment for developmental delay in children, including an assessment of autism.

"Although people with autism share many features, they also have a number of key differences," said Dr Meng-Chuan Lai of the Cambridge Autism Research Centre, and the paper's lead author. "Language development and ability is one major source of variation within autism. This new study will help us understand the substantial variety within the umbrella category of 'autism spectrum'. We need to move beyond investigating average differences in individuals with and without autism, and move towards identifying key dimensions of individual differences within the spectrum."

He added: "This study shows how the brain in men with autism varies based on their early [language development](#) and their current language functioning. This suggests there are potentially long-lasting effects of delayed language onset on the brain in autism."

Last year, the American Psychiatric Association removed Asperger Syndrome (Asperger's Disorder) as a separate diagnosis from its diagnostic manual (DSM-5), and instead subsumed it within '[autism spectrum disorder](#).' The change was one of many controversial decisions in DSM-5, the main manual for diagnosing psychiatric conditions.

Professor Simon Baron-Cohen, senior author of the study, said "This new study shows that a key feature of Asperger Syndrome, the absence of language delay, leaves a long lasting neurobiological signature in the brain. Although we support the view that autism lies on a spectrum, subgroups based on developmental characteristics, such as Asperger Syndrome, warrant further study."

Dr Lai concluded: "It is important to note that we found both differences and shared features in individuals with autism who had or had not experienced [language delay](#). When asking: 'Is autism a single spectrum or are there discrete subgroups?' - the answer may be both."

More information: Meng-Chuan Lai, Michael V. Lombardo, Christine Ecker, Bhismadev Chakrabarti, John Suckling, Edward T. Bullmore, Francesca Happé, MRC AIMS Consortium, Declan G. M. Murphy and Simon Baron-Cohen. Neuroanatomy of Individual Differences in Language in Adult Males with Autism. *Cerebral Cortex*. DOI: [10.1093/cercor/bhu211](https://doi.org/10.1093/cercor/bhu211)

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