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Diagnosed autism is more common in an IT-rich region *Research provides important insight into ‘systemizing’ theory of autism*

A new study from Cambridge University has for the first time found that autism diagnoses are more common in an IT-rich region.

The Medical Research Council (MRC) funded study, published today in the *Journal of Autism and Developmental Disorders*, has important implications for service provision in different regions and for the ‘hyper-systemizing’ theory of autism.

Professor Simon Baron-Cohen, Director of the Autism Research Centre (ARC) at the University of Cambridge, led the study (which was conducted in the Netherlands) with Dr Rosa Hoekstra, a Dutch autism researcher based at ARC and The Open University.

The researchers predicted that autism spectrum conditions (ASC) would be more common in populations enriched for ‘systemizing’, which is the drive to analyse how systems work, and to predict, control and build systems. These skills are required in disciplines such as engineering, physics, computing and mathematics.

The team had previously discovered evidence for a familial association between a talent for systemizing and autism in that fathers and grandfathers of children with ASC are over-represented in the field of engineering. The team had also previously found that mathematicians more often have a sibling with ASC, and students in the natural and technological sciences, including mathematics, show a higher number of autistic traits.

The researchers tested for differences in the prevalence of ASC in school-aged children in three geographical regions in the Netherlands: Eindhoven, Haarlem, and Utrecht-city. The region Eindhoven was selected because it is rich in IT having the Eindhoven University of Technology there, as well as the High Tech Campus Eindhoven, where IT and technology companies such as Philips, ASML, IBM and ATOS Origin are based. (The Philips factory has been in Eindhoven since 1891. Since then, the region has attracted businesses in IT and technology.)

The growth of the High Tech Campus Eindhoven has led to Eindhoven becoming a major technology and industrial hub: 30% of jobs in Eindhoven are now in technology or ICT, in Haarlem and Utrecht this is respectively 16 and 17%.

The two control regions were selected because they have similar size populations and a similar socioeconomic class. Schools in each region were asked to provide the number of children enrolled, the number having a clinical diagnosis of ASC and/or two control neurodevelopmental conditions (dyspraxia and ADHD). The participating schools in the three regions provided diagnostic information on a total of 62,505

children. The researchers found school-reported prevalence estimates of ASC in Eindhoven was 229 per 10,000, significantly higher than in Haarlem (84 per 10,000) and Utrecht (57 per 10,000), whilst the prevalence for the control conditions were similar in all regions.

Simon Baron-Cohen commented: “These results are in line with the idea that in regions where parents gravitate towards jobs that involve strong ‘systemizing’, such as the IT sector, there will be a higher rate of autism among their children, because the genes for autism may be expressed in first degree relatives as a talent in systemizing. The results also have implications for explaining how genes for autism may have persisted in the population gene pool, as some of these genes appear linked to adaptive, advantageous traits.”

Rosa Hoekstra added: “We need to conduct a follow-up study to validate the diagnoses and to test the alternative explanations for the elevated rate of autism in Eindhoven, including the possibility that children with autism may more often remain undetected in the two other regions. These results are important findings in the field of autism epidemiology, since they suggest regional variation in autism prevalence. In our follow-up study we plan to study the causes of this variation in more detail. This will help local authorities plan services appropriately for the number of children with autism.”

The research team also included Martine Roelfsema (a Dutch graduate student), Sally Wheelwright and Dr Carrie Allison (experts in autism screening), and Professor Carol Brayne and Dr Fiona Matthews (experts in public health research and biostatistics).

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Notes to editors:

1. **Authors:** Martine T. Roelfsema, Rosa A. Hoekstra, Carrie Allison, Sally Wheelwright, Carol Brayne, Fiona E. Matthews, Simon Baron-Cohen (2011). Are autism spectrum conditions more prevalent in an information-technology region? A school-based study of three regions in the Netherlands. *Journal of Autism and Developmental Disorders*, DOI 10.1007/s10803-011-1302-1

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3. **Funding sources:** Research grants from the Medical Research Council (UK);

Target Autism Genome; the Nancy Lurie Marks Family Foundation; NIHR CLAHRC for Cambridgeshire and Peterborough NHS Foundation Trust; the Erasmus fund, the Bekker la Bastide fund and the University of Amsterdam and the Netherlands Organisation for Scientific Research (NWO Rubicon)

4. The Eindhoven region comprised the municipalities of Eindhoven, Veldhoven and Waalre. The Haarlem region comprised the municipalities of Haarlem and Haarlemmermeer. The Utrecht region comprised Utrecht-city. The populations of Eindhoven, Haarlem and Utrecht regions respectively are 269,504, 285,215 and 288,401. The three regions have a similar average income per household, a similar percentage of children with special needs, and similar rates of individuals with mental health conditions.

5. For almost 100 years the **Medical Research Council** has improved the health of people in the UK and around the world by supporting the highest quality science. The MRC invests in world-class scientists. It has produced 29 Nobel Prize winners and sustains a flourishing environment for internationally recognised research. The MRC focuses on making an impact and provides the financial muscle and scientific expertise behind medical breakthroughs, including one of the first antibiotics penicillin, the structure of DNA and the lethal link between smoking and cancer. Today MRC funded scientists tackle research into the major health challenges of the 21st century. www.mrc.ac.uk