

# Same genes may influence GCSE results across range of subjects

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Many of the same genes may affect GCSE results across a broad range of subjects according to a new study from the Institute of Psychiatry, Psychology & Neuroscience at King's College London.

The research, published today in *Scientific Reports*, also suggests that educational achievement at GCSE is highly heritable, with over half of the difference between results potentially due to inherited differences in DNA.

Previous studies have shown that academic achievement in the core subjects of English, mathematics and science at GCSE may be influenced by the same genetic traits. However, it was previously unclear if these genetic factors have an influence on a wider range of academic subjects.

The researchers analysed genetic data from 12,500 twins to investigate if genetic factors could influence GCSE results.

They found that academic achievement in English, mathematics, science, humanities, second languages, business informatics and art was affected by the same [genes](#). This shared genetic influence was found even when genetic effects due to general intelligence were removed.

All GCSE results were highly heritable, demonstrating that genes explain a larger proportion of the differences between children (54-65 per cent) than shared environmental factors, such as home and school environment

combined (14-21 per cent).

The study's first author, Kaili Rimfeld from the Institute of Psychiatry, Psychology & Neuroscience (IoPPN) at King's College London, said: 'Our findings suggest that many of the same genes influence achievement across a broad range of disciplines, moving beyond core subjects such as English and maths to include humanities, business, art and languages. For the first time, we found that these general genetic effects on academic achievement remained even when the effects of general intelligence were removed.'

'We also found that over half of the differences between children's educational achievement for all of these disciplines was explained by inherited differences in their DNA, rather than school, family and other environmental influences.'

'The standardised curriculum used here in the UK could be one explanation for this strong genetic influence because all children have access to the same education and take the same standardised exams, thus the environmental differences are reduced.'

Professor Robert Plomin, last author from the IoPPN at King's College London, said: 'Understanding the specific genetic and environmental factors influencing individual differences in educational achievement - and the complex interplay between them - could help educationalists develop effective personalised learning programmes, to help every child reach their potential by the end of compulsory education.'

Provided by King's College London

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