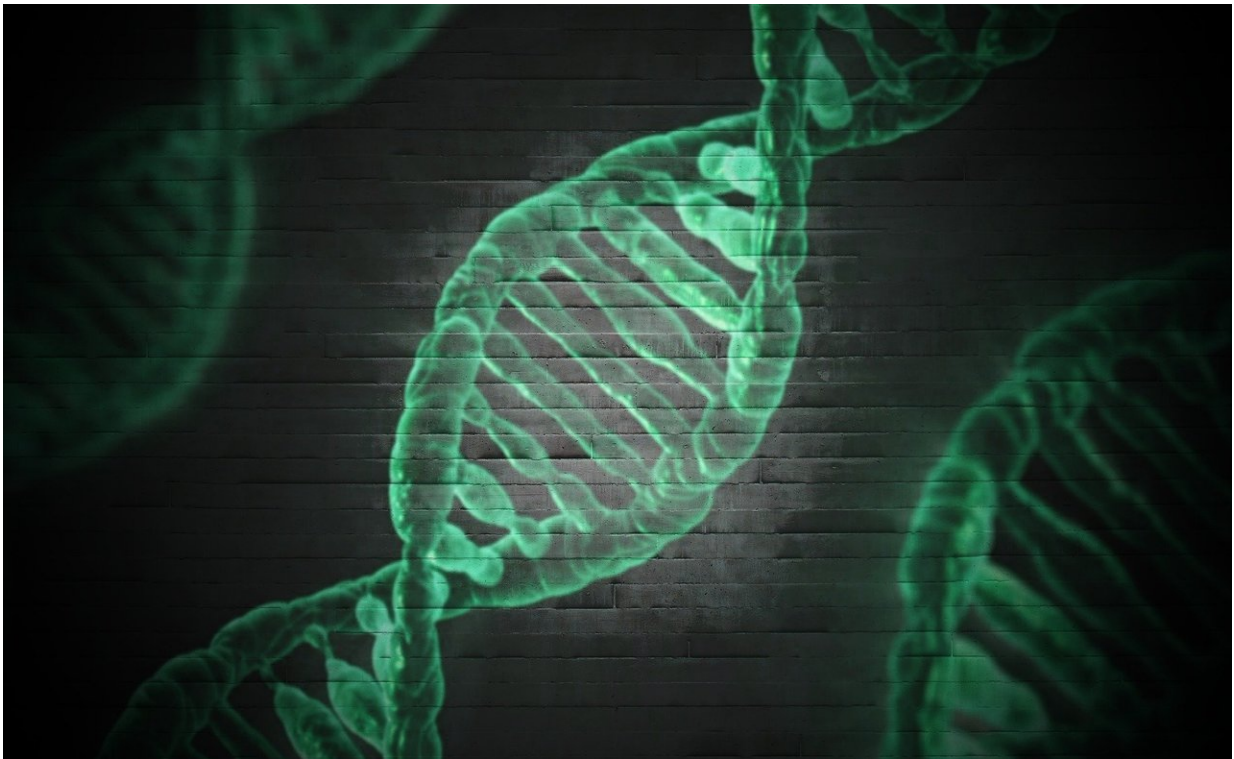


University choice and achievement partly down to DNA

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Research from King's College London has shown for the first time that genetics plays a significant role in whether young adults choose to go to university, which university they choose to attend and how well they do.

Previous studies from King's College London have shown that genetics plays a major role in academic achievement at school, with 58% of individual differences between students in GCSE scores due to genetic factors. However, there are few studies looking at genetic influences on [academic achievement](#) beyond school education.

Using data from the Twins Early Development Study, funded by the Medical Research Council, the researchers found that genetic factors explained 57% of the differences in A-level exam results and 46% of the difference in achievement at university. They also found genetics accounted for 51% of the difference in whether [young people](#) chose to go to university and 57% of the difference in the quality of the chosen university.

Dr. Emily Smith-Woolley, from the Institute of Psychiatry, Psychology & Neuroscience (IoPPN), who co-led the research said: 'We have shown for the first time that genetic influence on [educational achievement](#) continues into higher education. Our results also demonstrate that the appetite [young adults](#) have for choosing to continue with higher education is, in part, influenced by their DNA.'

The researchers also found that shared environmental factors—such as families and schools—influenced the choice of whether to go to university, accounting for 36% of the differences between students. In a previous study, the researchers also found shared environment accounts for almost 40% of the differences in whether students chose to take A-levels.

However, shared environmental influences appear to become less important over time for educational achievement. While shared environment accounts for up to 20% of differences in achievement in secondary school, the researchers found the influence of shared environment dropped off for achievement at A-levels and was negligible

for achievement at university.

Dr. Ziada Ayorech, from the IoPPN, who co-led the research said: 'Unlike secondary school, where students tend to share educational experiences, university provides young people with greater opportunity to be independent and to carve out their interests based on their natural abilities and aptitudes. Students' unique environments—such as new friends, and new experiences—appear to be explaining differences in university achievement and the role of shared environment becomes less significant.'

Interestingly, differences in the quality of university young people chose was strongly influenced by genetics (47%) even after accounting for A-level achievement, suggesting factors other than ability play an important role in university choice. University quality was assessed using the 'Complete University Guide' rankings for the year in which the students entered university.

The results were based on studying 3,000 pairs of twins from the UK as well as 3,000 genotyped individuals. Comparing identical and non-identical twin pairs allows researchers to determine the overall impact of genetics on how much people differ on measures like exam scores. If identical twins' exam scores are more alike than those of non-identical twins this implies the difference between twin pairs is due to [genetic factors](#).

Twin studies are not able to identify specific genetic variations which are linked to educational achievement. Nonetheless, the researchers were able to demonstrate a small genetic effect on university success just using DNA from individuals. They used 'genome-wide polygenic scores', which add-up the effects of thousands of DNA variants which have previously been linked to educational success in large genetic studies.

Genome-wide polygenic scores only explained a small fraction of the differences in A-level exam results, [university](#) achievement and young people's choices in higher education, and not the higher percentages identified from comparing twins. The researchers say this discrepancy is because much larger genetic studies are needed to identify more DNA variants linked to educational success.

The results were published in the journal *Scientific Reports*.

More information: Emily Smith-Woolley et al, The genetics of university success, *Scientific Reports* (2018). [DOI: 10.1038/s41598-018-32621-w](#)

Provided by King's College London

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