

# Students' genes cannot accurately predict educational achievement

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Pupils' genetic data do not predict their educational outcomes with sufficient accuracy and shouldn't be used to design a genetically personalized curriculum or tailor teaching, according to a new University

of Bristol study. The findings, which compared the genetic scores of 3,500 pupils with their exam results, are published in the journal *eLife* today.

Despite some claims that differences in pupils' genetic data could be used to personalize their education or identify those who are likely to struggle or thrive at [school](#), few studies have investigated how accurately genetic measures known as "polygenic scores" (which combine information from all [genetic material](#) across the entire genome) can predict future educational performance better than other measures of student aptitude.

To measure whether genetic data could predict a pupils' achievement, researchers from the Bristol Medical School and the MRC Integrative Epidemiology Unit took genetic and educational data from 3,500 children in Bristol's Children of the 90s study. They compared pupil's polygenic scores with their educational [exam results](#) at ages 7, 11, 14 and 16.

Their analysis showed that while the genetic scores modestly predicted [educational achievement](#) at each age, these predictions were little better than using standard information known to predict [educational outcomes](#), such as achievement at younger ages, parents' educational attainment or family socioeconomic position.

Dr. Tim Morris, the study's lead author and Senior Researcher Associate from Bristol Medical School, said: "Our analysis shows that some pupils with a low polygenic score are very high performers at age 16. Some of those who would be predicted from their genes to be in the bottom 5% are actually in the top 5% of performers. This contradicts the notion that it is possible to accurately predict how well any one child will perform in education from their DNA."

At the [population level](#), researchers found that children with higher polygenic scores, on average, had higher exam scores than those with lower polygenic scores. They add that [polygenic scores](#) can be informative for identifying group level differences, but they currently have no practical use for predicting individual educational performance or for personalized education.

Dr. Morris added: "Educational achievement is incredibly complex and influenced by a large range of factors including parental characteristics, family environment, personality, intelligence, genetics, teachers, peers and schools, and—often overlooked—chance or random events. This complexity will make it perhaps irresolvably difficult to accurately predict how well any one pupil will do from their DNA."

"The best piece of information we currently have for predicting how well a pupil will perform is how well they did in school earlier in childhood. Where we don't know this, such as at the start of schooling, we can make better predictions about a pupil's future educational performance by knowing how educated their parents are than by knowing their DNA."

**More information:** Tim T Morris et al. Can education be personalised using pupils' genetic data?, *eLife* (2020). [DOI: 10.7554/eLife.49962](https://doi.org/10.7554/eLife.49962)

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