

Nature trumps nurture when it comes to academic achievement, study says

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Let's imagine for a minute that family resources had no impact on the likelihood that an American student would graduate high school and go on to earn a college degree or beyond. In this idealized world, which factors would influence a student's likelihood of academic achievement, and how do nature and nurture conspire to dictate those outcomes?

A new study confirms the well-established finding that intelligence -- a highly heritable trait -- reigns supreme in this calculation. But the new research also stakes out a surprisingly powerful role for a slew of personality and other individual traits -- including persistence and belief in one's power -- in influencing a child's educational attainment.

But here's the catch: Given the key role that genetic inheritance plays in these other important factors, nature indisputably trumps nurture in determining an adolescent's level of academic achievement.

In all, inheritance accounts for roughly 62% of British students' performance on a test universally administered at the end of compulsory education, at around the age of 16. The researchers were able to account for three-quarters of that heritability, attributing it to a wide range of factors, including temperament and intelligence. Environmental factors -- the quality of teaching, the style of parenting, the challenges or comforts of home, and habits picked up along the way -- contribute 26% to the likelihood of a student's academic success.

In Britain, these test scores -- not a child's ability to pay for university education -- powerfully influence students' options for further education.

The **findings**, published Monday in the journal PNAS, are based on a study of 6,653 pairs of twins in Britain. The twins -- 2,362 pairs of them identical and 4,291 pairs of them fraternal -- were born in 1994, 1995 and 1996. A multinational team of researchers, led by Eva Krapohl of King's College London, authored the research.

In addition to taking the General Certificate of Secondary Education (GCSE) tests, the participants answered a battery of questions, which measured such individual factors as academic enjoyment, engagement with school, optimism, grit, happiness, life satisfaction, physical health, behavior problems and anxiety.

The researchers asked the teens to describe school and home environments, including such factors as parental monitoring and support and levels of chaos or predictability in both. The twins' parents were asked to report and rate their children's behavioral problems, including antisocial behavior, depression and impulsivity.

When they're large enough, twin studies can be a powerful way to suss out the relative contributions of genetics and environment -- nature and nurture -- on a given outcome. Since each child was raised in the same home with his or her twin, environmental factors can be roughly assumed to be the same for each pair.

Studying identical twins, who share the same DNA, and fraternal twins, who are no more similar than any pair of biological siblings, allows researchers to infer the role of genetics. Researchers can assume environmental factors play a major role when fraternal twins consistently turn out the same despite genetic differences. When identical twins are more similar to each other across traits than are fraternal twins, researchers attribute those likenesses to genetics.

Calculating the degree of likeness and difference between the nearly 7,000 sets of twins, and using past research findings that assign heritability scores for different traits and factors, the researchers were able to determine how heavily genetics and environment contributed to the test outcomes.

The authors of the PNAS study say their findings may nudge attitudes about education policy, but do not clearly point to reforms. Appreciating the overwhelming role of genetics in determining an adolescent's academic achievement, for instance, "counters the deplorable tendency to blame teachers and parents rather than recognizing that learning is inherently more difficult for some children," they wrote.

We may value equality of educational opportunity, for instance, but that should not be confused with equal outcomes, they added.

"Equality of educational opportunity will not get rid of genetic differences between children," they wrote.

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