

Genes may play role in educational achievement, study finds

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Researchers have identified genetic markers that may influence whether a person finishes high school and goes on to college, according to a national longitudinal study of thousands of young Americans. The study is in the July issue of *Developmental Psychology*, a publication of the American Psychological Association.

"Being able to show that specific genes are related in any way to [academic achievement](#) is a big step forward in understanding the developmental pathways among young people," said the study's lead author, Kevin Beaver, PhD, a professor at the College of [Criminology](#) and [Criminal Justice](#) at Florida State University.

The three genes identified in the study – DAT1, DRD2 and DRD4 – have been linked to behaviors such as attention regulation, motivation, violence, cognitive skills and intelligence, according to the study. Previous research has explored the genetic underpinnings of intelligence but virtually none has examined genes that potentially contribute to educational attainment in community samples, said Beaver.

He and his colleagues analyzed data from the National Longitudinal Study of Adolescent Health, also known as Add Health. Add Health is a four-wave study of a nationally representative sample of American youths who were enrolled in middle or high school in 1994 and 1995. The study continued until 2008, when most of the respondents were between the ages of 24 and 32. The participants completed surveys, provided DNA samples and were interviewed, along with their parents.

The sample used for this analysis consisted of 1,674 respondents.

The genes identified in this research are known as dopamine transporter and receptor genes. Every person has the genes DAT1, DRD2 and DRD4, but what is of interest are molecular differences within the genes, known as alleles, according to Beaver. Subjects who possessed certain alleles within these genes achieved the highest levels of education, according to the findings.

Dopamine transporter genes assist in the production of proteins that regulate levels of the neurotransmitter dopamine in the brain, while dopamine receptor genes are involved in neurotransmission. Previous research has shown that dopamine levels play a role in regulating impulsive behavior, attention and intelligence.

The presence of the alleles alone did not guarantee higher levels of education, the study found. Having a lower IQ was more strongly associated with lower levels of education. Also, living in poverty and essentially "running with a bad crowd" resulted in lower levels of education despite the genetic effects.

Even though the genetic variants were found to be associated with educational levels, having a specific allele does not determine whether someone will graduate from [high school](#) or earn a college degree, according to Beaver. Rather, these [genes](#) work in a probabilistic way, with the presence of certain alleles simply increasing or decreasing the likelihood of educational outcomes, he said. "No one gene is going to say, 'Sally will graduate from high school' or 'Johnny will earn a college degree,'" he said. "These genetic effects operate indirectly, through memory, violent tendencies and impulsivity, which are all known predictors of how well a kid will succeed in school. If we can keep moving forward and identify more [genetic markers](#) for educational achievement, we can begin to truly understand how genetics play a role

in how we live and succeed in life."

More information: "Dopaminergic Polymorphisms and Educational Achievement: Results From a Longitudinal Sample of Americans," Kevin M. Beaver, PhD, Florida State University; John Paul Wright, PhD, University of Cincinnati; Matt DeLisi, PhD, Iowa State University; Michael G. Vaughn, PhD, Saint Louis University; *Developmental Psychology*, Vol. 48, No. 4.

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