

# Non-cognitive skills: DNA-based analyses suggest a hidden key to academic success

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A new *Nature Human Behaviour* [study](#), jointly led by Dr. Margherita Malanchini at Queen Mary University of London and Dr. Andrea Allegrini at University College London, has revealed that non-cognitive

skills, such as motivation and self-regulation, are as important as intelligence in determining academic success. These skills become increasingly influential throughout a child's education, with genetic factors playing a significant role.

The research, conducted in collaboration with an international team of experts, suggests that fostering non-cognitive skills alongside [cognitive abilities](#) could significantly improve educational outcomes.

"Our research challenges the long-held assumption that intelligence is the primary driver of [academic achievement](#)," says Dr. Malanchini, Senior Lecturer in Psychology at Queen Mary University of London.

"We've found compelling evidence that non-cognitive skills—such as grit, perseverance, academic interest, and value attributed to learning—are not only significant predictors of success but that their influence grows stronger over time."

The study, which followed over 10,000 children from age 7 to 16 in England and Wales, employed a combination of twin studies and DNA-based analyses to examine the complex interplay between genes, environment, and academic performance.

## **The power of non-cognitive genetics**

One of the most striking findings is the increasing role of genetics in shaping non-cognitive skills and their impact on academic achievement. By analyzing DNA, researchers constructed a "polygenic score" for non-cognitive skills, essentially a genetic snapshot of a child's predisposition towards these skills.

"We discovered that genetic effects associated with non-cognitive skills become increasingly predictive of academic achievement over the [school](#)

[years](#). In fact, their effect nearly doubles between the ages of 7 and 16," explained Dr. Allegrini, Research Fellow at University College London.

"By the end of compulsory education, genetic dispositions towards non-cognitive skills were equally as important as those related to cognitive abilities in predicting [academic success](#)."

This finding challenges the traditional view of educational achievement as determined largely by intelligence. Instead, the study suggests that a child's emotional and behavioral makeup, influenced by both genes and environment, plays a crucial role in their educational journey.

## **The role of environment**

While genetics undoubtedly contributes to non-cognitive skills, the study also emphasizes the importance of environment. By comparing siblings, researchers were able to isolate the impact of shared family environment from [genetic factors](#).

"We found that while family-wide processes play a significant role, the increasing influence of non-cognitive genetics on academic achievement remained evident even within families," said Dr. Allegrini. "This suggests that children may actively shape their own learning experiences based on their personality, dispositions, and abilities, creating a feedback loop that reinforces their strengths."

## **Implications for education**

The findings of this study have profound implications for education. By recognizing the critical role of non-cognitive skills, schools can develop targeted interventions to support students' emotional and [social development](#) alongside their academic learning.

"Our education system has traditionally focused on cognitive development," said Dr. Malanchini. "It's time to rebalance that focus and give equal importance to nurturing non-cognitive skills. By doing so, we can create a more inclusive and effective learning environment for all students."

The study also highlights the need for further research into the complex interplay between genes, [environment](#), and education. By understanding these factors, educators and policymakers can develop more effective strategies to support students' overall development and achieve better educational outcomes.

Dr. Malanchini concluded, "This study is just the beginning. We hope it will inspire further research and lead to a transformation in how we approach education."

**More information:** Genetic associations between noncognitive skills and academic achievement over development, *Nature Human Behaviour* (2024). [DOI: 10.1038/s41562-024-01967-9](https://doi.org/10.1038/s41562-024-01967-9)

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