Genetics play role in character traits related to academic success, study says

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Character traits, such as grit or desire to learn, have a heavy hand in academic success and are partially rooted in genetics, according to a psychology study at The University of Texas at Austin.

Though academic achievement is dependent on cognitive abilities, such as logic and reasoning, researchers believe certain personality and character traits can motivate and drive learning.

In a study in the *Journal of Personality and Social Psychology*, UT Austin psychology associate professor Elliot Tucker-Drob found that genetic differences among people account for about half of the differences in their character, and that the remaining variation in character was influenced by environmental factors occurring outside of the home and school environments.

"Until now, parenting and schooling have been suggested by research as likely explanations for character, but our study suggests otherwise," said Tucker-Drob, who examined how genetic and environmental factors influence character and its relation to academic achievement using data from 811 third- to eighth-grade twins and triplets.

Twin studies, such as the Texas Twin Project at the UT Austin Population Research Center and Department of Psychology, compare similarities of identical and fraternal twins to estimate genetic influences on personality, interests, school grades and behavior problems. By comparing siblings, researchers learned that outside of what could be genetically explained, variance in a child's character could be attributed to unshared environmental effects, ruling out experiences shared by siblings such as parenting and attending the same school.

"As with intelligence and personality, genetics form a sizable part of the basis for character," said Tucker-Drob, co-director of the Texas Twin Project. He and his colleagues examined seven educationally relevant character measures that represented work ethic, enjoyment or desire to learn, attitudes toward education, and self-appraised abilities. The researchers also assessed how character measures were associated with the "big five" personality traits—openness, conscientiousness, extraversion, agreeableness and neuroticism—which have been used in past research to predict academic achievement.

In the study, genetics accounted for 69 percent of a person's general character, with 31 percent of variance accounted for by environmental influences. Furthermore, each character measure was heavily correlated with openness and conscientiousness, which were 48 and 57 percent heritable respectively.

Character measures promoting intellectual curiosity, such as intellectual self-concept, were linked more heavily to openness, which showed sizable associations with academic achievement; those representing work ethic, such as grit, associated more with conscientiousness, which was modestly correlated with academic

achievement.

"This may indicate that aspects of character that are associated with interest and desire to learn may be stronger drivers of academic achievement than aspects of character associated with diligence and hard work," said Tucker-Drob, noting that one way genes influence academic achievement is by influencing aspects of character that are relevant for learning.

Because character was not found to be systematically associated with the family environment, "programs to improve character will need to be creative," said co-author and psychology associate professor Paige Harden, co-director of the Texas Twin Project. "Interventions will need to introduce experiences that are not already varying across families, in order to positively affect children's character and ultimately their academic achievement."

Provided by University of Texas at Austin