



NEWS RELEASE

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Pre-teen children believe ‘brilliance’ is a male trait, and this stereotype increases in strength up to the age of twelve

Children hold stereotypical views that ‘*brilliance*’ is a male trait, and this belief strengthens as they grow up to the age of twelve, researchers from Singapore and the United States have reported.

The study led by **Nanyang Technological University, Singapore** (NTU Singapore) in collaboration with **New York University**, was published in the scientific journal *Child Development* in May 2022. It involved 389 Chinese Singaporean parents and 342 of their children aged 8 to 12.

Tests were carried out to measure the extent to which parents and their children associate the notion of brilliance with men, and to probe the relationship between parents and their children’s views.

The study defined brilliance as an exceptional level of intellectual ability and results showed that children are as likely to associate brilliance with men, as their parents are.

This belief was stronger among older children and stronger among those children whose parents held the same view.

While previous research on gender stereotypes has found the idea that giftedness is a male trait can emerge at around the age of six, it was not known whether and how this stereotype changes over the course of childhood, until now.

Lead author of the study, **Associate Professor Setoh Peipei from NTU Singapore’s School of Social Sciences**, said the Singapore-based study is the first to identify that the tendency to associate brilliance with men (also known as the ‘brilliance equals to men’ stereotype) increases in strength through the primary school years, and reaches the level of belief seen in adults by the age of 13.

“Stereotypical views about how boys are smarter than girls can take root in childhood and become a self-fulfilling prophecy,” said Prof Setoh. “For girls, this may lead them to doubt their abilities, thus limiting their ideas about their interests and what they can achieve in life.”

“Our research work shows parents must also be included in policies and school programmes to effectively combat children’s gender stereotypes from a young age,” she added.

For example, as previous studies have found that parents use different explanation styles for daughters and for sons, the research team said programmes to train parents and teachers to be mindful of balancing their behaviour during interactions with children - especially with girls - could be introduced.

The authors say the study offers evidence to support Singapore’s push to close the gender gap in the Science, Technology, Engineering, and Mathematics (STEM) sectors.

While Singapore has the second highest in the world OECD PISA scores in mathematics, science and reading, a recent study by the Promotion of Women in Engineering, Research, and Science (POWERS) programme at NTU Singapore found that women in Singapore are less confident in their math and science abilities compared to men.¹ Women are also more likely than men to perceive gender barriers to STEM career entry and career progress.

How the study was conducted

The researchers used the Implicit Association Test (IAT) – a commonly-used implicit measure of stereotyping – to evaluate parents’ and children’s behaviour. During the test, participants were asked to categorise photographs of men and women, along with two sets of words. One set of ‘genius words’ referred to the notion of brilliance and included words such as “super-smart” and “genius”, while the other set of words referred to creativity (control attribute).

During the first half of the trials, participants had to press a key to categorise the male photographs with the genius words. This process was repeated in the second half of the trials with female photographs and genius words (See Figure 1). Participants with an implicit association of men being brilliant will react faster to the task of categorising genius words with the male photographs than the same task with female photographs.

Results revealed an average D score (a metric of the strength of the stereotypical

¹ [“Closing the STEM gender gap in Singapore”](#), whitepaper by POWERS, published 4 March 2022

‘intellectual brilliance = men’ association) of 0.16, indicating that Singaporean children associate brilliance with men more than women² and that this stereotypical belief increased in strength with age among the child sample and reached stereotype levels comparable to those of adults by age 12. Thereafter, there was little change in their perspective.

In the second part of the study, the researchers investigated scores from parent-child pairs who took the tests separately but at the same time and found that children’s scores were correlated to their parents’ test scores. This finding suggests that during the earlier years of primary school, parents may play a role in their children’s acquisition of the ‘brilliance equals to men’ stereotype.

Further analysis revealed that as the age of the boys that were tested got older, they were less likely to hold the same stereotypical views of males as more brilliant as their parents. However, for girls, their stereotypes remained closely linked to their parents’ stereotypes throughout the primary school years.

Co-author Andrei Cimpian, Professor of Psychology at New York University said, “This study adds to the evidence that the gender imbalances observed in many prestigious careers are not a function of differences between women and men in their inherent aptitudes or interests. Rather, these imbalances are the product of the messages that young people are getting from those around them about what women and men are supposedly – and supposed to be – like. As a society, we have a responsibility to work toward addressing this issue.”

Moving forward, the research team is studying whether this gender stereotype about brilliance may differently impact primary and secondary school girls’ and boys’ outcomes in math - a core STEM subject that is typically believed to require intellectual brilliance to excel in.

The project investigates various math outcomes that can predict children’s future participation in STEM fields, including math achievement, interest, and confidence in doing math. The researchers hope that by unravelling how the gender stereotype about brilliance functions to divert girls’ and boys’ interests and aspirations from an early age, the project will offer valuable insights into designing interventions to curb the circulation of gender stereotypes and ultimately help to close STEM gender gaps in society.

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² A D score above the neutral point of zero indicates that children found the ‘brilliance = men’ association more cognitively fluent, so it was easier for them to pair men with the concept of brilliance than women during the test.

Notes to Editor:

Paper titled "[*The acquisition of the gender-brilliance stereotype: Age trajectory, relation to parents' stereotypes, and intersections with race/ethnicity*](#)" published in *Child Development*, 30 May 2022
DOI: 10.1111/cdev.13809

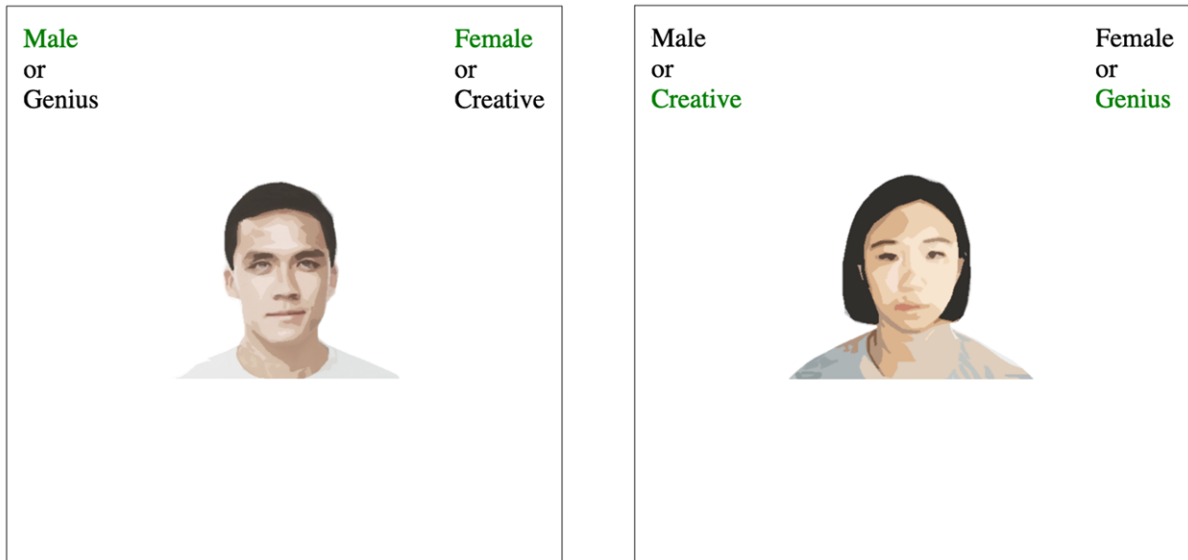


Figure 1. Sample test trials from the gender-brilliance IAT.

During half of the trials, participants had to press a key to categorise the male photographs with the genius words. This process was repeated in the second half of the trials with female photographs and genius words. Participants with an implicit “brilliance = men” association will react faster to trials involving pictures of men than pictures involving women. The photographs have been processed to protect the privacy of the volunteers.

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About Nanyang Technological University, Singapore

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the

Engineering, Business, Science, Medicine, Humanities, Arts, & Social Sciences, and Graduate colleges.

NTU is also home to world-renowned autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies, Earth Observatory of Singapore, and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Nanyang Environment & Water Research Institute (NEWRI) and Energy Research Institute @ NTU (ERI@N).

Under the NTU Smart Campus vision, the University harnesses the power of digital technology and tech-enabled solutions to support better learning and living experiences, the discovery of new knowledge, and the sustainability of resources.

Ranked amongst the world's top universities, the University's main campus is also frequently listed among the world's most beautiful. Known for its sustainability, over 95% of its building projects are certified Green Mark Platinum. Apart from its main campus, NTU also has a medical campus in Novena, Singapore's healthcare district.

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