

Study reveals perceived gender bias against women is dominant factor in college major choice

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College-bound women are not less likely to enter specific fields because more math or science is required, but rather because of the gender discrimination they are likely to encounter in those fields, finds a new nationally representative longitudinal study published in the *American Educational Research Journal*.

Women are often underrepresented in many science, technology, engineering, and mathematics (STEM) majors and some non-STEM majors, such as philosophy and criminal justice. Rather than dividing majors into STEM and non-STEM, this new study looks beyond the STEM/non-STEM dichotomy to understand the underlying attributes of majors that may attract or repel [women](#) - in an effort to learn how to achieve [gender](#) equity in all fields.

"Our study examines what common attributes that cut across academic disciplines are predictive of who chooses those majors, so not whether majors like physics have an unequal gender distribution but whether disciplines perceived to be high in math or science requirements have unequal gender distributions," said Joseph R. Cimpian, associate professor of economics and education policy at the NYU Steinhardt School of Culture, Education, and Human Development, and the study's senior author.

The results of the study suggest that, by far, the most predictive attribute

of whether a female chose a college major was the degree of [discrimination](#) perceived in the field. This finding was consistent across all of the researchers' analyses, even when they matched males and females on prior backgrounds, achievement and interests, and regardless of which other attributes of college majors were included in the statistical models.

To examine the role of perceived gender bias in college majors, the researchers took an approach which avoided relying on the STEM/non-STEM dichotomy completely. Instead of using the college majors themselves or groups of majors (i.e. STEM or non-STEM) as variables of interest in the study, researchers classified 20 popular college majors based on the extent to which each major was perceived to exhibit each of six specific traits: math orientation, science orientation, [gender bias](#) against women, helpful orientation, money orientation, and creativity orientation.

To do this, the researchers recruited 330 undergraduate students at a large Southeastern university in order to understand students' perceptions of different college majors and develop the scales of the six traits. To assess gender discrimination, the survey included items such as 'Women in this major experience discrimination based on their gender' and 'This major is more welcoming to men than women.' To help ensure that the researchers were tapping into discrimination and not just reflecting existing unequal gender distributions across majors, the authors also surveyed respondents on how many females they believed to be in a field and accounted for these responses in all of their models.

Researchers then mapped the designated traits from the surveys to the majors of a separate group of 4,850 students in the Educational Longitudinal Study of 2002, a nationally representative longitudinal sample of U.S. students. The researchers subsequently replicated their analyses with a third data source and again found that [gender](#)

[discrimination](#) was the most telling factor for whether the major had more males in it.

"Some people may find it unsurprising that perceived discrimination matters, but what is striking is just how much it matters and how little other factors matter," noted Cimpian. "The relationships we find for perceived discrimination dwarf those of other predictive factors like the money orientation of the field. Similarly, the data does not support the notion that women are math-phobic or science-phobic, as some believe. Rather - and quite reasonably - women don't like to be discriminated against."

The researchers also found that women are actually more likely to be in fields perceived as more oriented toward money and less likely to be in fields oriented toward creativity, once the other attributes of the majors are accounted for.

Cimpian suggests that college administrators wishing to increase female participation in college majors examine the environments in the different majors. "Our findings speak to both STEM and non-STEM disciplines. If [college](#) administrators want to increase female representation in fields as varied as [criminal justice](#) or computer science, our results suggest that the best place to start may be by asking what messages people in these fields are sending about how important gender is to succeed in these fields. These may not be overt messages. They may be subtle suggestions about who is in the 'in group' in these majors in some instances, or they might be related to messages about innate ability as other research suggests. We need to better understand the various ways discriminatory messages are conveyed and address them in order to improve access to students regardless of their gender."

More information: Colleen M. Ganley et al, Gender Equity in College Majors: Looking Beyond the STEM/Non-STEM Dichotomy for

Answers Regarding Female Participation, *American Educational Research Journal* (2017). [DOI: 10.3102/0002831217740221](https://doi.org/10.3102/0002831217740221)

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