

# Busting the “Men are Better at Physics” Myth

Men and women perform equally well in introductory physics courses, according to a new study that looked at the exam grades of over 10,000 students.

By **Katherine Wright**

When asked to draw a physicist, most people will draw a man. This stereotype is reinforced by a widely held view that women who study physics are not as good at grasping the physics concepts as their male counterparts are. Hoping to see if this notion held any water, a team of researchers led by Tatiana Erukhimova of Texas A&M University studied the exam scores and final grades of over 10,000 students enrolled in introductory physics courses at their institution. The team found no consistent difference in the performance of men and women students [1].

The study’s results counter the notion that men are better at physics than women, Erukhimova says. “That is a powerful message for students and instructors.”



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There is growing awareness that gender stereotypes—cultural assumptions about the roles, traits, and capabilities of men and women—can create unequal learning environments for men and women (see [Viewpoint: How Stereotypes Impact Women in Physics](#)). But whether this negative effect leads to poorer outcomes for undergraduate women studying physics remains unclear. “There is no consensus on whether a gender difference exists in physics course grades,” Erukhimova says.

Erukhimova and her colleagues are not the first to search undergraduate exam grades for potential gender disparities. A plethora of studies exist, with most analyzing the results of so-called concept-inventory tests. These standardized tests first appeared in the 1990s and are used to assess conceptual understanding of key physics concepts, such as those embodied in Newton’s laws of motion or in Maxwell’s equations of electromagnetism. But they quickly became a tool for studying gender differences in student performance, Erukhimova says.

Studies based on these tests consistently put men on top. Analyses show that men’s grades are, on average, 12% higher for inventory tests about force and motion, for example. But these tests have some key issues that make them problematic as a tool for gender-related performance studies.

Inventory tests are optional, and students typically receive no course credit for taking them, says Jonathan Perry, who works at the University of Texas at Austin and was part of the new study. That means that opt-in is inconsistent, and students may not take the test seriously. The tests also target a small subset of the concepts that students learn. The results of inventory tests have a place for assessing the efficacy of an instructional

method or for comparing the teaching performance of different institutions, Perry says. But they aren't suited for analyzing gender differences in learning outcomes.

To avoid the pitfalls of studying inventory tests, Erukhimova, Perry, and their colleagues decided instead to look at the scores of midterm and final exams for students studying four introductory physics courses at Texas A&M. These exams are mandatory and count toward a student's final grade. They also capture the progress of students throughout a semester, rather than at just one point in time, Erukhimova says.

The team analyzed data from classes taught by 19 different instructors between 2007 and 2019, which included the exam scores and final grades of over 10,000 students. The results show no evidence of a correlation between gender and the final grade a student received for three out of four of the classes. In the one class where a statistically significant gender difference was observed—algebra-based mechanics for life-science and

pre-med majors—women performed better than men. But even then, gender was not a strong predictor of success, Perry says.

“The results are unexpected,” Perry says. The team had thought that they would find some gender disparity in their data.

Erukhimova hopes that the results will help put to bed the stereotype that men are better at physics than women, a belief that she has personally seen negatively impact the confidence of many of her women students. “All students should have equal opportunities and equal chances for success in physics,” she says.

Katherine Wright is a Senior Editor for *Physics*.

#### REFERENCES

1. M. Dew *et al.*, “Gendered performance differences in introductory physics: A study from a large land-grant university,” *Phys. Rev. Phys. Educ. Res.* **17**, 010106 (2021).