

Gender Gap in Recognition Prevails

When men and women physics undergraduates receive the same amount of recognition from their peers for being good at physics, men report significantly higher perceptions of peer recognition than women.

By Katherine Wright

Recognition matters. In the workplace, for example, having achievements acknowledged can boost an employee's morale and productivity. Meanwhile, at home, having contributions noted can make an individual feel valued and appreciated, leading to a stronger sense of belonging and closer relationships. Recognition also matters in the physics classroom, where it has been shown to be strongly tied to a student's physics identity and their success in a given physics class. This recognition might come in the form of praise when they receive top marks in a class quiz or end of semester exam, or if they design a thoughtful experiment or collect

particularly clean data in a laboratory course.

Previous studies have shown that, compared to men, women physics students perceive that they gain less of this recognition from their peers. And other studies have shown that where direct feedback is given, women do in fact receive fewer direct nominations from their peers. However, the relationship between these perceived and received peer recognitions has been largely unexplored. Now Meagan Sundstrom of Drexel University, Pennsylvania, and Natasha Holmes of Cornell University have looked at the interplay between the two in a study that encompassed over 1700 students enrolled in introductory physics courses at eight institutions in the United States [1]. The findings indicate that for students who receive the same amount of direct recognition from peers, women physics students report perceiving they have significantly less recognition than men. The results could help inform testable interventions for physics classrooms.

In their study, Sundstrom and Holmes defined perceived peer recognition as the extent to which students felt like their physics classmates viewed them as someone who was good at physics and performed well in class. Received peer recognition was quantified by how many of a student's physics peers nominated them as being excellent in a given physics class. These nominations were given via a survey and were unknown to the individuals who received them.

"It's a blunt instrument for measuring received recognition, but it's quantifiable and scalable," Holmes says. Sundstrom agrees. "There could be ways of prompting students to give each other



Results from a survey of over 1700 students suggest that how students internalize recognition is key to how much recognition they perceive they are getting.

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verbal recognition during class time, or even writing it down and submitting it, but that's an idea we've come up with for future work," she says.

To collect their data, Sundstrom and Holmes used an online survey that was sent out to students toward the end of the semester of the class they were taking. In the survey the students were asked to rate their perceived recognition. They were also asked to nominate fellow students who they felt should be called out for their physics abilities. The survey was completed by 1721 students, each taking one of 27 introductory physics classes. Just over half of those classes were lecture courses, while just under half were laboratory courses. Students were surveyed at eight different PhD-granting institutions, which included those with minority-serving status, as well as public and private institutions.

In line with the results of existing studies, Sundstrom and Holmes found that men, on aggregate, reported significantly higher perceptions of peer recognition than women in both lab and lecture settings. This finding held even when men and women received the same number of nominations from their peers, which was the case in the lab settings. Women received disproportionately fewer direct peer nominations in surveys taken by those in lecture courses, where the fraction of nominations that went to men was much larger than the fraction of men taking the classes. The team controlled for the academic year, academic major, and race or ethnicity, finding the same results across the board.

"There is a systematic gap where some students report higher perceptions of recognition, even when they receive the same amount of peer recognition as other students," Sundstrom says. Quantifying this gap, Sundstrom and Holmes calculated that women would need to receive, on average, three additional nominations from their peers to raise their perception level to that of the men. That number is relatively high and could be hard to achieve, Sundstrom says, given that most survey respondents nominated only one peer for recognition.

For Holmes the results suggest that how students internalize recognition is key to how much recognition they perceive they are getting. Two students could be called on in class to answer questions, and after answering them correctly, one may feel they belong in the class and the other may think it was a fluke

and that they shouldn't be there. For Holmes that makes this gender gap between perceived and received recognition a harder problem to solve. "It's not just making sure students are recognized, it's helping students recognize they are being recognized, and there we are battling against a whole bunch of societal norms," she says. Further studies are needed to understand how to shift how different people internalize recognition, and those studies need to go beyond physics and physicists. "It's obviously not just what's happening in the classroom. It's a lot of other stuff," Holmes says.

Zahra Hazari, who studies science education at Florida International University, points out that while women physics students are less likely to attribute their successes to their own abilities and perceive significantly less recognition, there hasn't been empirical evidence from physics classrooms that tie these two things together. "The study provides new direct empirical evidence that women are less likely to internalize the recognition they receive across both lab and lecture courses in physics, in addition to actually receiving less recognition from peers in lecture courses," she says.

Like Sundstrom and Holmes, Hazari regards the findings as highlighting the need to address cultural and environment issues in educational settings. "If we know that women are less likely to internalize recognition, how do we design environments that will allow them to better internalize that they are 'physics' people," she says. For example, Hazari notes that in environments where the culture of physics is very individualistic, anyone who values communality—helping others, benefiting society—may not see themselves as a physics person, even if they are recognized for their individual capabilities.

"We need to get a better understanding of why students are internalizing things differently," Sundstrom says. Only with that information could effective interventions be implemented. Those interventions could be as simple as devoting a few minutes at the end of a lecture or lab for students to give shout outs to each other. "Some students are internalizing the recognition they get from peers very, very differently, and so any kind of interventions and studies I think we can dig into will likely help all students," Holmes says.

Katherine Wright is the Deputy Editor of *Physics Magazine*.

REFERENCES

1. M. Sundstrom and N. G. Holmes, “Bias in physics peer recognition does not explain gaps in perceived peer recognition,” **Nat. Phys.** (2025).