The GRE fails to identify students that will graduate and hurts diversity, new study finds

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Researchers are urging universities across the United States to find a new way to identify the next generation of scientists. A new study discovered that traditional admissions metrics for physics Ph.D. programs such as the Graduate Record Examination (GRE) do not predict completion and hurt the growth of diversity in physics, which is already the least diverse

of the sciences.

A team of researchers led by Rochester Institute of Technology Professor and Associate Dean for Research and Faculty Casey Miller completed a multivariate statistical analysis of about one in eight physics Ph.D. students from 2000 to 2010 and published the findings in *Science Advances*. They discovered that while women and underrepresented minorities tend to perform worse on the GRE Physics Subject Test, students' performance had no bearing on Ph.D. completion. Undergraduate GPA was the most robust predictor of Ph.D. completion they found. Miller said this the largest study that has ever been done in physics specifically looking at the correlations between admissions data and outcomes at the graduate level.

"What we show here is that there is no correlation with the physics GRE test and graduation," said Miller. "That's a big deal because the test is used in a large fraction of the Ph.D. programs in the U.S. and they use it with a minimum acceptable score. First off, if it's meaningless then it doesn't make any sense to use it that way. The second problem is that the test, like all standardized tests, shows significant gender and race-based differences. When you use a minimum acceptable score on a tool that has race and gender-based differences, the outcome is fewer women of all races and underrepresented minorities of all gender identities get into Ph.D. programs, despite the tool being ineffective at telling us who will finish."

Studies indicate that less than 5 percent of physics Ph.D. degrees are granted annually to people who identify as Black, Latino or Native American, and just 20 percent of physics Ph.D. degrees are granted to women. Miller said that to help close the gap, universities need to develop better methods to assess the non-academic factors that make successful Ph.D. students.

"If you ask faculty, the most important things that make a great student are non-cognitive things like perseverance and grit that we don't measure right now," said Miller. "One of my goals is to develop an assessment of such competencies for the front end of the admissions process. The advantage of that is that decades of research on such measures has not shown any significant race or gender-based differences on performance."

More information: Casey W. Miller et al. Typical physics Ph.D. admissions criteria limit access to underrepresented groups but fail to predict doctoral completion, *Science Advances* (2019). DOI: 10.1126/sciadv.aat7550

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