Persistence makes the difference in minority participation in science, researchers say

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The problem of persistence has long troubled undergraduate programs hoping to guide promising students from underrepresented racial/ethnic groups into science careers, but a new study by science education researchers at the University of Wisconsin says that the problem appears to be translating students' initial interest into confidence that they can proceed in science. About half of all students from historically underrepresented minority (URM) backgrounds say they want to pursue science when they start out as undergraduates, but only about 17% of those students currently go on to earn bachelor's degrees in science.

In a new paper published in the journal *CBE-Life Sciences Education*, Angela Byars-Winston, Jenna Rogers, Janet Branchaw, Christine Pribbenow, Ryan Hanke, and Christine Pfund of the University of Wisconsin, Madison, report new data measuring URM undergraduates' beliefs about variables related to persistence. Confidence in one's ability to perform a task, referred to as self-efficacy beliefs, is a well-established variable that is highly correlated to persistence in science and engineering, the authors wrote. The Wisconsin researchers analyzed responses from a national sample of over 600 students involved in undergraduate research probing their research self-efficacy, such as the opportunity to conduct independent research, prepare a research poster or presentation, or be mentored to pursue research as well as the sources of this research self-efficacy. They also asked URM students about their expectations for a career in science. For example, did they believe they would find the work satisfying, earn respect from others, or earn an attractive salary? This new work presents several validated measures,

including the first validated scales for assessing the sources of research-related self-efficacy, say the researchers.

"Funding agencies are asking for quantifiable data on the return on their investment in programmatic interventions [for URM students]," Byars-Winston explains. "They want evidence that the programs they are funding are achieving increased participation and broader participation and higher persistence of people in those programs. The questions they want to ask have to be statistically tested and modeled." The scales reported in this paper could provide guidance and metrics both for creating and evaluating research programs for historically underrepresented students, Byars-Winston said.

The team also evaluated differences in responses between racial/ethnic groups and genders, finding that African-American men self-reported greater anxiety about their research performance than did other groups. Though the practical significance or the reason behind this difference for African-American men is unknown, say the authors, this finding is consistent with degree attainment levels for this group that have not risen in the last decade. This finding also begs the question of why other racial/ethnic groups of men and women reported less anxiety about their research performance. Observing these differences highlights the sensitivity of their study's scales, they wrote. "Our goal has been to provide tools that can be used by program directors and faculty who need the theoretical/quantitative work tested and vetted to help explain career persistence behaviors."

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