Stereotypes lower math performance in women, but effects go unrecognized

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Credit: George Hodan/public domain

A new study from Indiana University suggests that gender stereotypes about women's ability in mathematics negatively impact their performance. And in a significant twist, both men and women wrongly believe those stereotypes will not undermine women's math performance—but instead motivate them to perform better.

The research, led by IU social psychologist Kathryn L. Boucher, appears early online in the May issue of the *Journal of Experimental Social Psychology*.

"This study's implications go beyond the classroom into the many other social environments where negative stereotypes about women play a role," said Boucher, a postdoctoral research associate in the IU Bloomington College of Arts and Sciences' Department of Psychological and Brain Sciences. "They force us to ask whether people not affected by similar stereotypes can effectively recognize and find ways to reduce their impact. It also puts into perspective the enormous challenge of eliminating the effects of stereotypes despite growing awareness about their harm to women and society."

A recent example of "stereotype threats" Boucher and collaborators point to is the current lawsuit in California brought by venture capitalist Ellen Pao alleging years of discriminatory practices and attitudes based on gender that she says prevented her advancement at a Silicon Valley venture capital firm.

"This study has major implications for women in technology and business environments, where women's abilities are regularly impugned by negative stereotypes," said Mary C. Murphy, assistant professor in the Department of Psychological and Brain Sciences at IU Bloomington, who oversaw the study. "These are the places where women are most likely to experience stereotype threat—and if their supervisors and co-workers cannot anticipate how these threats interfere with performance, that's a serious problem. It's one of the ways women end up underrepresented in science, technology, engineering and math."

The study's main goal was to find out whether observers could recognize the anxiety and underperformance experienced by women when judged under negative stereotypes. In the IU study, over 150 study participants,

split nearly evenly between men and women, were given 10 minutes to solve seven difficult math problems on a computer with no scrap paper.

Before completing the test, a negative stereotype about women was introduced by telling participants that the researchers were trying to find out why women are generally worse at math than men.

Half the participants were then told they would be asked to solve math problems and they responded to a survey about their expected performance; the other half were told they would simply be asked to predict how they thought women might feel in this test-taking situation and how they would perform on the test.

The work confirmed earlier studies by finding that female test-takers performed worse and reported greater anxiety and lower expectations about their performance compared to men when negative stereotypes about gender were introduced at the start of the experiment. But the study went beyond previous research by also measuring men's and women's insights into the experience of the people actually performing under these conditions.

Boucher found that expectations did not match reality: While both sexes expected female test-takers to experience greater anxiety and pressure to perform under the influence of negative gender stereotypes, both male and female observers expected women to successfully overcome these roadblocks. Observers expected stereotypes to increase women's anxiety, but they did not anticipate that the anxiety would undermine performance.

Moreover, this misperception occurred in both men and women. Being a woman did not confer any special insight into women's experiences of stereotype threat; female observers were almost equally likely to overestimate the performance of other women under stereotype threat.

Study participants reported they thought the negative stereotypes would function as a "motivating challenge," even though women who actually performed the math problems didn't report this level of motivation when asked about their performance.

The results remained true controlling for how strongly participants felt negative attitudes could affect a person's performance or how concerned they were personally about how others would judge their responses.

The consequences of these misperceptions are significant, Boucher said. The disconnect between reality and perception in these scenarios could translate to reduced support for programs and policies that mitigate the impact of negative gender stereotypes since people do not think they affect real-world performance.

"While many factors can impact performance outside a controlled environment—be it the classroom or the boardroom—it's unlikely that performance evaluators currently consider negative stereotypes about women as a serious cause for impaired performance, and so it is unlikely that they will take steps to reduce them," Boucher said.

"Thoughtful applications of this study's findings, however, could help address women's achievement gaps, and increase their representation, in the fields where they're most negatively stereotyped. Recognizing the problem is the first step to addressing it."

More information: *Journal of Experimental Social Psychology*, www.sciencedirect.com/science/ … ii/S0022103115000037

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