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Negative stereotypes shown to affect learning, not just performance

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This is Robert J. Rydell of Indiana University. Credit: Indiana University

Negative stereotypes not only jeopardize how members of stigmatized groups might perform on tests and in other skill-based acts, such as driving and golf putting, but they also can inhibit actual learning, according to a new study by Indiana University researchers.

While the effect of negative performance stereotypes on test-taking and in other domains is well documented, the study by social psychologist Robert J. Rydell and his colleagues in IU's Department of Psychological and Brain Sciences is the first to show that the effects might also be seen further upstream than once thought, when the skills are learned, not just

performed.

"The effect on learning could be cumulative," says Rydell, whose research focuses on stereotype threat involving women and mathematics. "If women do not learn relatively simple skills early on, this could spell trouble for them later on when they need to combine a number of more simple skills in new, complicated ways to solve difficult problems. For example, if a young girl does not learn a relatively simple principle of algebra or how to divide fractions because she is experiencing threat, this may hurt her when she has to use those skills to complete problems on geometry, trigonometry, or calculus tests."

This reduced learning may ultimately hamper efforts to help women enter into careers in science and mathematics, where they are currently underrepresented.

The study, "Stereotype threat prevents perceptual learning," was published on Monday (July 26), in the Proceedings of the National Academy of Sciences Early Edition. Co-authors are Richard M. Shiffrin, Kathryn L. Boucher, Katie Van Loo and Michael T. Rydell, all from IU.

The study was designed to examine "attention and perceptual learning in a visual search," not mathematical learning specifically, because the tasks used in the experiments allowed researchers to easily differentiate between learning effects and performance effects. Through a series of experiments involving Chinese characters and color judgment tasks, the researchers were able to show that actual learning had not occurred in the group of women who had been reminded of the negative stereotypes involving women's math and visual processing ability. Instead of finding it difficult to express learning, which is a typical effect of stereotype threat, they had not learned the same skill that women in the control group, who had not been exposed to the negative stereotypes, had learned.

The women in the stereotype threat group appeared to try too hard to overcome the negative stereotype, ultimately searching for the characters in the experiment in a focused yet unproductive manner rather than letting the figures just "pop out," as they normally would have after some training.

"The results seem to fit with the view that the women under threat try harder to carry out the task, thereby persisting in effortful serial search throughout training, and failing to find and learn an alternative strategy that makes search easier and less effortful," the authors wrote.

"Women who are good at the skill they are performing are more likely to show stereotype threat because they have more invested in disproving the stereotype and are more distracted by the stereotype," Rydell said.

Rydell said he and his colleagues have conducted additional research specifically on mathematical learning and the results are forthcoming. They think the effect of stereotype threat on learning warrants more study by scientists and more attention by educators.

"(The present study) points to the importance of creating environments that reduce the impact of stereotype threat during mathematical skill acquisition by women," the authors concluded in their PNAS article. "If creating such an environment is not done, the learning deficits that result could well be cumulative, causing problems that continually worsen as development proceeds."

Provided by Indiana University