

# TEACHER-FACILITATOR MATERIALS FOR CORNELL INSTITUTE FOR WOMEN IN SCIENCE VIDEO SERIES

## STEREOTYPES MATTER

A lot has been written about the negative effects of stereotypes about women and math. Stereotype Threat (ST) refers to a decrease in test performance in situations where individuals feel threatened by the possibility that their performance will confirm – to others and/or themselves – a negative stereotype about their group abilities. This ST phenomenon, which may disrupt females' reasoning and computational efficiency while taking a test, has proved to be related to females' lower performance on tests of advanced math and science. But what does this mean and how is ST measured?

The figure below comes from a scientific report by Akira Miyake and colleagues who are physicists. They were concerned that females in their physics class were not performing on exams as well as males so they instituted a simple procedure to reduce ST, one that has been used in numerous studies. The procedure asks students to write about personally important values (such as relationships with friends and family or learning about something new). Students assigned to the control group also wrote about values, but in their case they wrote about least important values. The writing exercise is brief (10 to 15 min) and is unrelated to the subject matter of the physics course. Students were asked to do this once at the start of the course and once as online homework and once before the first midterm exam. In the graph on the left panel is the effect of this procedure on students' combined midterm and final exam scores, consisting entirely of objective multiple choice questions. On the right panel are students' scores on two administrations of the Force and Motion Conceptual Evaluation test (FMCE), a nationally normed physics test. As can be seen, this simple 10-15 minute exercise carried out three times during the semester made a significant difference. In the right panel we see that females in the control condition continued to show substantial inferiority to males. Males improved their FMCE scores more over the course of the semester than did Control group women. However, in the affirmation condition the gap between males and females entirely disappeared! Likewise, in the left panel we see that control group females' final scores continued to show inferiority compared to males but the affirmation group narrowed the gap greatly.

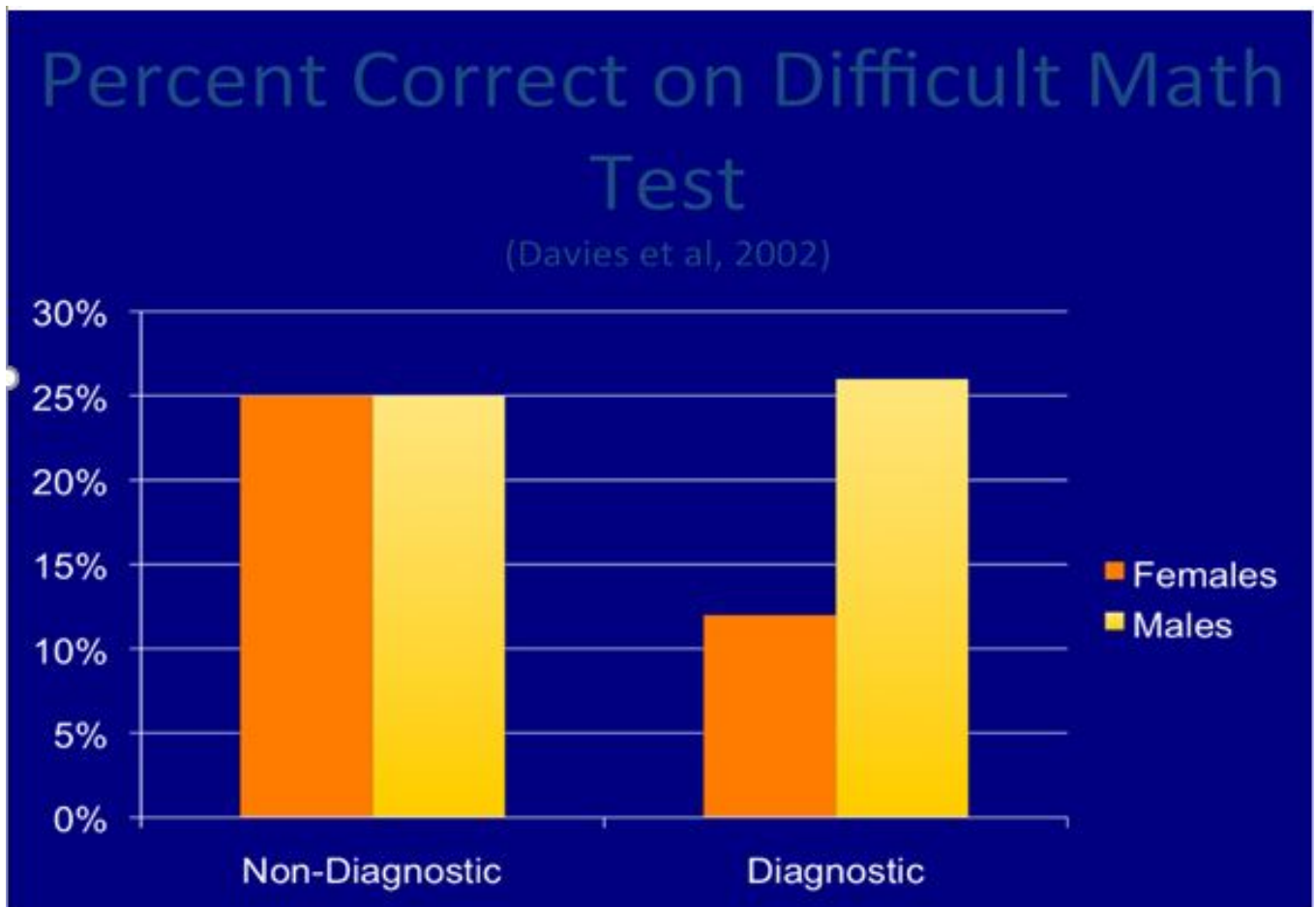
There are many similar studies that show the benefit of simple strategies to overcome ST. In the other figure below, Davies and his colleagues showed that just by informing women that a test they were about to take was diagnostic of their math ability was enough to make them perform more poorly than if the same was given without this information. Given that some research has shown that women switch out of science majors in their first year

at rates greater than men because of doing poorly on introductory courses, such ST strategies ought to be deployed on a large scale.

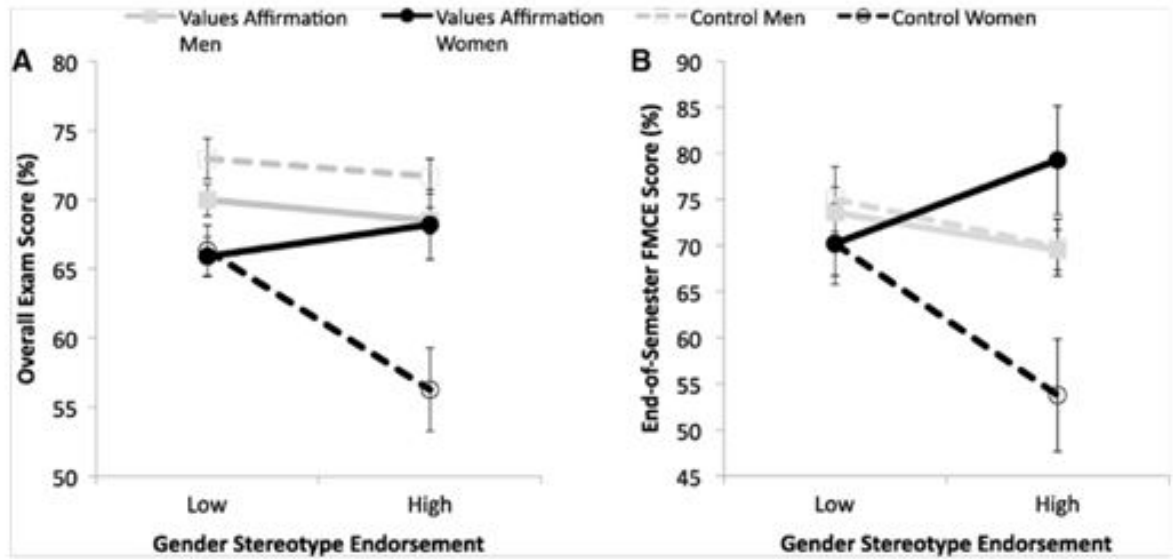
**Recommended Reading:**

Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010, November 26). Reducing the gender achievement gap in college science: A classroom study of values affirmation. *Science*, 330, 1234–1237. doi:10.1126/science.1195996

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**Fig. 3** Student performance on two outcome measures examined in this study as a function of gender (men versus women), affirmation condition (values affirmation versus control), and the level of stereotype endorsement.



A Miyake et al. Science 2010;330:1234-1237



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