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## **Study shows gender bias in science is real. Here's why it matters.**

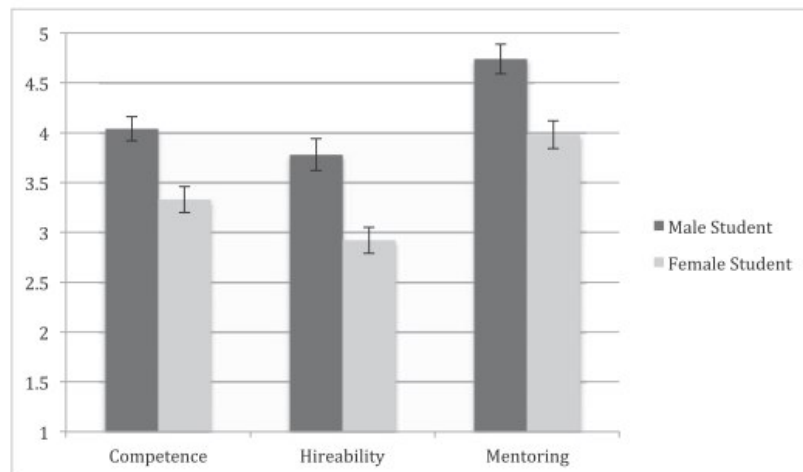
By Ilana Yurkiewicz | September 23, 2012

It's tough to prove gender bias.

In a real-world setting, typically the most we can do is identify differences in outcome. A man is selected for hire over a woman; fewer women reach tenure track positions; there's a gender gap in publications. Bias may be suspected in some cases, but the difficulty in using outcomes to prove it is that the differences could be due to many potential factors. We can speculate: perhaps women are less interested in the field. Perhaps women make lifestyle choices that lead them away from leadership positions. In a real-world setting, when any number of variables can contribute to an outcome, it's essentially impossible to tease them apart and pinpoint what is causative.

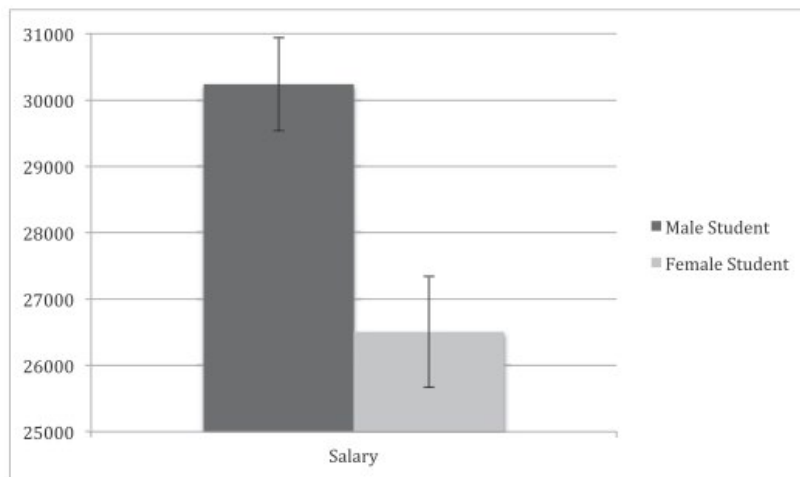
The only way to do that would be by a randomized controlled experiment. This means creating a situation where all variables other than the one of interest are held equal, so that differences in outcome can indeed be attributed to the one factor that differs. If it's gender bias we are interested in, that would mean comparing reactions toward two identical human beings – identical in intelligence, competence, lifestyle, goals, etc. – with the one difference between them that one is a man and one is a woman. Not exactly a situation that exists in the real world.

But in a [groundbreaking study](#) published in *PNAS* last week by [Corinne Moss-Racusin](#) and colleagues, that is exactly what was done. On Wednesday, Sean Carroll [blogged about](#) and brought to light the research from Yale that had scientists presented with application materials from a student applying for a lab manager position and who intended to go on to graduate school. Half the scientists were given the application with a male name attached, and half were given the exact same application with a female name attached. Results found that the “female” applicants were rated significantly lower than the “males” in competence, hireability, and whether the scientist would be willing to mentor the student.



**Fig. 1.** Competence, hireability, and mentoring by student gender condition (collapsed across faculty gender). All student gender differences are significant ( $P < 0.001$ ). Scales range from 1 to 7, with higher numbers reflecting a greater extent of each variable. Error bars represent SEs.  $n_{\text{male student condition}} = 63$ ,  $n_{\text{female student condition}} = 64$ .

The scientists also offered lower starting salaries to the “female” applicants: \$26,507.94 compared to \$30,238.10.



**Fig. 2.** Salary conferral by student gender condition (collapsed across faculty gender). The student gender difference is significant ( $P < 0.01$ ). The scale ranges from \$15,000 to \$50,000. Error bars represent SEs.  $n_{\text{male student condition}} = 63$ ,  $n_{\text{female student condition}} = 64$ .

This is really important. This is really important.

Whenever the subject of women in science comes up, there are people fiercely committed to the idea that sexism does not exist. They will point to everything and anything else to explain differences while becoming angry and condescending if you even suggest that discrimination could be a factor. But these people are wrong. This data shows they are wrong. And if you encounter them, you can now use this study to inform them they're wrong. You can say that a study found that absolutely all other factors held equal, females are discriminated against in science. Sexism exists. It's real. Certainly, you cannot and should not argue it's everything. But no longer can you argue it's nothing.

We are not talking about equality of outcomes here; this result shows bias thwarts equality of *opportunity*.

Here are three additional reasons why this study is such a big deal.

1) Both male and female scientists were equally guilty of committing the gender bias. Yes – women can behave in ways that are sexist, too. Women need to examine their attitudes and actions toward women just as much as men do. What this suggests is that the biases likely did not arise from overt misogyny but were rather a manifestation of subtler prejudices internalized from societal stereotypes. As the authors put it,

“If faculty express gender biases, we are not suggesting that these biases are intentional or stem from a conscious desire to impede the progress of women in science. Past studies indicate that people’s behavior is shaped by implicit or unintended biases, stemming from repeated exposure to pervasive cultural stereotypes that portray women as less competent...”

2) When scientists judged the female applicants more harshly, they *did not use sexist reasoning to do so*. Instead, they drew upon ostensibly sound reasons to justify why they would not want to hire her: she is not competent enough. Sexism is an ugly word, so many of us are only comfortable identifying it when explicitly misogynistic language or behavior is exhibited. But this shows that you do not need to use anti-women language or even harbor conscious anti-women beliefs to behave in ways that are effectively anti-women.

Practically, this fact makes it all the more easy for women to internalize unfair criticisms as valid. If your work is rejected for an obviously bad reason, such as “it’s because you’re a woman,” you can simply dismiss the one who rejected you as biased and therefore not worth taking seriously. But if someone tells you that you are less competent, it’s easy to accept as true. And why shouldn’t you? Who wants to go through life constantly trying to sort through which critiques from superiors are based on the content of your work, and which are unduly influenced by the incidental characteristics of who you happen to be? Unfortunately, too, many women are not attuned to subtle gender biases. Making those calls is bound to be a complex and imperfect endeavor. But not recognizing it when it’s

happening means accepting: “I am not competent.” It means believing: “I do not deserve this job.”

3) As troubling as these results are, they are also critical toward solutions. That biases against women are often subconscious means people need extra prodding to realize and combat them. I’m willing to bet that many in the study, just like [people who take Implicit Association Tests](#), would be upset to learn they subconsciously discriminate against women, and they would want to fix it. Implicit biases cannot be overcome until they are realized, and this study accomplishes that key first step: awareness.

From reading the comments on Sean Carroll’s post, most people who read this will have one of four reactions:

- 1) This is not surprising, but I’m glad we have something concrete to show what we’ve known all along.
- 2) This is surprising and disturbing.
- 3) Figure 2 is misleading because the y-axis does not start at zero. Therefore, I will reject everything else exposed by this study.
- 4) Equally qualified women *should* be discriminated against, because they could go off and get pregnant.

I’m afraid the 4’s do exist, and from my experience they are not very willing to have their minds changed. (For a concise article that touches on why their argument is flawed, I’d recommend [this piece](#) by my sister, Shara Yurkiewicz.)

What’s important is that the 2’s are out there. Certainly, some gender bias in the workplace still takes the form of blatant misogyny. But a large portion of it does not. It’s subtle. It’s subconscious. And many people who perpetrate it, if only made aware of what they are doing, would want to change. I once knew of a professor who consistently made eye contact with males when engaging in conversations about science; only when it was pointed out to him did he realize he was doing it, and he was grateful that someone told him so he could change.

The 2’s exist, but they can only change if they have the facts. These are the facts: equally competent women in science are viewed as less competent because of their gender. Remember them. Cite them. And if you want change, I would urge you to share them as widely as possible.



**About the Author:** Ilana Yurkiewicz is a fourth-year student at Harvard Medical School who graduated from Yale University with a B.S. in biology. She was an AAAS Mass Media Fellow, and her work has appeared in the New England Journal of Medicine, Aeon Magazine, Science Progress, The News & Observer, and The Best Science Writing Online 2013. She has an academic interest in bioethics, currently conducting ethics research at Harvard after previously interning at the Presidential Commission for the Study of Bioethical Issues. She is also interested in general internal medicine and quality and systems improvement. Follow on Twitter [@ilanayurkiewicz](#).  
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