

This post is about Ceci and William's PNAS article, [Understanding current causes of women's underrepresentation in science](#), which has spawned a particular kind of narrative — one that has been around for a while, but which now bears the imprint of evidence. This narrative is captured in a [recent headline](#) from ScienceDaily: "Choices — not discrimination — determine success for women scientists, experts argue." The implication is that if only women would stop complaining about their feelings of "isolation, dissatisfaction and discrimination" (p. 3160), we could pay attention to important problems that are real and not imaginary.

Ceci & Williams 2011, mostly in their own words

Ceci & William's goal is to find out whether there is currently sex discrimination in three important areas: (1) manuscript reviewing, (2) grant reviewing, and (3) interviewing/hiring. "Current" means within the last 20 years. They make a strong case that while such discrimination may have taken place in the past, there is no evidence of discrimination against women in current large, carefully analyzed studies of real world reviewing and hiring data. On p.3161, Ceci & Williams conclude that "past strategies to remediate women's underrepresentation can be viewed as a success story; however, continuing to advocate strategies successful in the past to combat shortages of women in math-based fields today mistakes the current causes of women's underrepresentation."

Still, it is true that men come out ahead of women in these three areas even in the last 20 years. Ceci & Williams point out, however, that these differences go away if you control for institution, teaching load, funding, and research assistance. "A key issue", they say, "separable from sex discrimination, is why women occupy positions providing fewer resources and what can be done about this situation. Some of these choices are freely made; others are constrained and should be changed." And (in the supplementary text) "When women PhD recipients choose not to apply for tenure-track posts, their refusal represents a choice, one that many of their male and many of their female colleagues do not make."

Some grounds for skepticism

Here are just a few of many reasons to be skeptical of Ceci & Williams' claim that they have definitely debunked the existence of sex discrimination in grant/manuscript reviewing, and interviewing/hiring...

(1) Narrow definition of discrimination. Ceci & Williams explicitly state that their definition of sex discrimination is restricted only to cases in which there are gender disparities once you control for resources (institution, teaching load, funding, and research assistance) (p. S2). Maybe you agree with this definition, in which case, break out the champagne! No more discrimination! But it seems to me that accepting this definition requires accepting that it is all down to women's "choices" (more on this below) whenever they end up with fewer resources. That's a biiiig assumption and very unlikely given the psychology literature.

(2) How to cure discrimination. Assuming Ceci & Williams' analyses are sound and we agree with their narrow definition of sex discrimination, do we take a lack of sex discrimination as reason to halt all our efforts to prevent discrimination? Well that depends on [what mental model you choose](#). Ceci & Williams seem to think of the problem of sex discrimination in a business framework. Like a debt we need to pay, a certain amount of effort is required to reach the desired sum. Once we've hit our target, we're done. Therefore, once we've reached a point at which there is no gender

imbalance, Mission Accomplished. By the same lights — once we reach a certain level of parity in civic realms, why continue to waste resources enforcing anti-discrimination laws? Well, you may respond, perhaps sex discrimination is more like a chronic disease. If we support this analogy, then Ceci & Williams have shown that we're out of the Intensive Care Unit — but that doesn't mean we can shirk the effort necessary for future disease prevention and maintenance.

(3) Conflating causes and forms of discrimination. See how Ceci & Williams move effortlessly from talking about the forms of discrimination to an inference about the causes of discrimination on p. 3158: "Although real barriers are still faced by women in science, especially mathematical sciences, our findings suggest that historic forms of discrimination cannot explain current underrepresentation, and that resources should be redirected toward current rather than historical causes of women's underrepresentation in math-based careers." Sorry, C&W, I have to dispute that. Just because the form of discrimination has changed over time, doesn't mean the causes of discrimination have also changed. One hypothesis is that the cause of discrimination of women, where it exists, is a set of unfairly held stereotypes and misapplied generalizations that hold women are inferior in math and science. Just because these ideas are not acted on in the same way they were in the 1950s doesn't mean these ideas are no longer endorsed — or even if they are not explicitly endorsed, that they do not influence behavior.

(3) False choice between discrimination and choice. By asserting that discrimination and choice are distinct, Ceci & Williams pave the way to the conclusion that women's underrepresentation is something that they do to themselves — whether freely or as a way to satisfy women-specific societal and biological imperatives. Sorry, C & W, I have to dispute this too. Differences in choices made between two groups may reflect that they don't actually get to make the same choice. Perhaps one of these groups is getting a raw deal. Even within Ceci & Williams' own paper, we find examples of bias against women in science and academic contexts found in scientific studies conducted since 2000 and thus "current". Here's one on p. 3160: "For stereotypically male tasks, if there is ambiguity about the quality of the women's contribution to a joint task, it is downplayed." Well, gee. As [Alison Gopnik writes in Slate](#), "Those studies show that women are subject to bias from the very start of their careers. Is it any wonder that many of them, keenly aware that their efforts are being downgraded compared to those of men, would withdraw from a competition that is systematically unfair?" Ceci and Williams argue that using the language of discrimination is "not only inaccurate, it also leads to interentions that are unlikely to remedy the underrepresentation." The language of choice may do the same thing.

And now for something completely different

In the above, I tried to provide some reasoned arguments to dispute the idea that Ceci & Williams' analysis proves that discrimination is dead. And I'd like to say that these were the main reasons why I disagree with their conclusions. Deep down, however, I have to admit that some of my motivation comes from flagrantly anecdotal person experiences and I feel it would be disingenuous to conclude without touching upon them.

Scientists and intellectuals have been my heroes since childhood. I don't know how it started or why, but that's how it was for me. In elementary school, I had a Marie Curie phase. I loved the idea that someone could be so curious about something that they would follow their passion no matter where it led, even if people told them they couldn't. I believed that Marie Curie inoculated me against future foes. If someone important told me one day that I couldn't do something because of some stupid stereotype, I wouldn't let them dissuade me. Of course, this never happened. No one told me I couldn't do something because I was a woman, probably because I started my training 100+ years after Curie did. The idea I had prepared to fight was something I never encountered. Phew.

What I ended up really struggling with, what I wasn't prepared for, were the smaller choices that together make up the big choice of whether or not you want to be a research scientist. As an apprentice researcher, you often depend on the advice of those senior to you about what projects are appropriate, what subfields and techniques you are well-suited for, and so on. Based on what happened with those decisions, you would have different outcomes and consequently, different choices later on. Like a Choose Your Own Adventure book for PhDs, early scientific training is a massive decision tree of contingencies. No one can know all the consequences of such decisions, but you make your best guess with the guidance of your mentors.

So, as in this [Slate article](#), you may find yourself a young scientist in a new lab tangling with some new project or technique, and urged to decide whether something is your "true interest" or your "real talent."

Perhaps you are struggling to master new skills in order to answer a question you judge to be important and interesting — aka, the story of the last five years of my life. Perhaps you are starting to doubt yourself, or a mentor suggests, "why don't you do what you're really good at?"

Now, is this person guiding you to a different path because they know you well and have assessed your abilities and potential with unbiased accuracy? Will your answer to this question depend on whether the person guiding you is or isn't a woman, and if you are or aren't a woman, and if the path is or isn't leading in the direction of a traditionally male-dominated field? As Vendatam writes in [this article](#), it could be that the reasons we judge ourselves and others to be well-suited for a particular goal may be "only partially—and perhaps tangentially—tied to our interests, determination, and talent."

Imagine that in the future, we've done all the right studies and we've found out that Ceci & Williams (and Tierney and Hoff) are right. Gopnik and Vendatam and everyone else including me are wrong. Awesome! I would love to know that all my worries are unfounded and that I can devote that precious thoughtspace to other topics. I would love to know that I can believe the best about the human community I am a part of, and that everyone who comes through a science PhD program ends up doing exactly what they most want to do in life.

I just can't help but wonder if that might not be true...

Further reading

[Ceci & Williams, 2011, PNAS](#)

[Tierney in the New York Times](#)

[Gopnik in Slate](#)

[Vendatam in Slate](#)

[Hoff in the Washington Post](#)

[The Guardian](#)

[Why So Slow?](#)

[Unlocking the Clubhouse](#)

[Female Science Professor](#)

[Kessel & Vitulli, Association for Women in Mathematics](#)