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Two Nobels for women — why so slow?

Women in science still don't get what they deserve, explains **Virginia Valian**, *20 years on from her landmark book on bias.*

Last week brought great news and irksome news for science. The total number of women to win science Nobel prizes grew from 17 to 19, with Frances Arnold's chemistry award for enzyme engineering and Donna Strickland's prize for laser physics. The last time a woman won the physics Nobel was in 1963; before that, it was 1903. At that rate, we would expect another around 2068.

My hope is that two female prizewinners in one year portends a faster pace for recognition of women's achievements in science.

Unfortunately, last week also brought a talk that shows how much further we have to go in appreciating women's contributions. At CERN, Europe's particle-physics laboratory near Geneva, Switzerland, Alessandro Strumia of the University of Pisa in Italy spoke at a session on women in physics. According to attendees (and my reading of his slides), Strumia asserted that women are given unfair advantages and yet are scarce owing to a lack of ability and lack of interest — claims that are controversial, at best. As evidence of discrimination against men, Strumia named a woman who was hired for a job he had also applied for; he suggested his qualifications had been stronger, because he had more citations. His talk also seemed to presume that citations are the only measure of scientific quality, and played down evidence that women are cited less often than men, even after controls for quality. CERN issued a statement describing the talk as "highly offensive", and said that it would suspend Strumia from CERN-affiliated activities pending an investigation. (Strumia maintains that his presentation was not sexist or biased.)

I have spent the past 25 years studying the structural and psychological reasons for the paucity of women at the top of almost every field in academia, and I have written two books documenting data that show how women's careers are hindered. The first, *Why So Slow?*, appeared in 1998; the second, *An Inclusive Academy: Achieving Diversity and Excellence*, co-authored with psychologist Abigail Stewart of the University of Michigan in Ann Arbor, came out earlier this year. The second book shows that, despite improvements, progress is still slow.

To take just one example, an analysis of six disciplines at leading US universities in 2013 and 2014 found that men gave colloquia disproportionately more often than women did. The result held even after adjusting for the representation of women in each field (C. L. Nittrouer *et al. Proc. Natl Acad. Sci. USA* **115**, 104–108; 2018). It also found that women and men rated the importance of giving talks equally, and that they accepted invitations with similar frequency. Women don't choose not to talk. They simply aren't invited to do so as often as they should be.

Experiments and field studies find that both men and women slightly overrate men's performance and abilities and slightly underrate women's. The many instances in which women don't get their due — among others, being ignored in meetings, not being invited to peer-review research

or being denied a Wikipedia entry (as happened with Strickland), a promotion or telescope time — add up. The accumulation of these disadvantages acts like compound interest, widening disparities over time.

In 2004, I gave a talk to an honours society at a City University of New York campus. I was the first female speaker since the series had begun in the 1960s. The next woman after me spoke in 2013. The lack of female speakers was not due to a dearth of options, or, I think, to any intention to discriminate. In fact, that is where most people go wrong. They mistake their intentions — to judge on merit — for fact. Scientists, who think that they are responsive to data, might be especially likely to mistakenly trust their own judgement as being unbiased.

In one study, researchers asked faculty members in chemistry, physics and biology departments to rate a CV for an applicant applying for a lab-manager position (C. A. Moss-Racusin *et al. Proc. Natl Acad. Sci. USA* **109**, 16474–16479; 2012). In general, faculty members were more likely to hire the lab manager if the CV was for a man (the team used 'John') than for a woman ('Jennifer'), despite the CV being identical in every other way. They were also more willing to mentor John than Jennifer, and to offer him a higher starting salary. The preference for the man was marked in those who thought that gender equity was not a problem.

When I reviewed Strumia's slides, I was perturbed by how much his talk ignored and oversimplified solid scientific work on sex and gender differences. I also saw that he gave short shrift to the large body of psychological, sociological and economic data that show how individuals and institutions put women (and under-represented groups, such as people of colour or those with disabilities) at a disadvantage. I would have expected more familiarity with scholarship that I and many others have documented.

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Why am I discussing this backsliding talk in a happy week of two Nobel prizes for women? Because the talk matters: children, students, graduates, assistant professors and others develop an idea of what they can aspire to be in part by seeing who have become lecturers and principal investigators — as well as who wins prizes. We need to see a range of people. And we need evidence that people already there will accept us.

No field can afford to ignore or alienate half its potential contributors. If we want talent, we have to welcome it and nurture it, in all its diversity. In our book, Stewart and I describe policies that can make participation and recognition more fair, such as developing explicit criteria for identifying and evaluating candidates, rather than relying on flawed proxies, such as prestige. To do the best possible science, we need to bring out the best that people can offer. ■

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