COMMENT

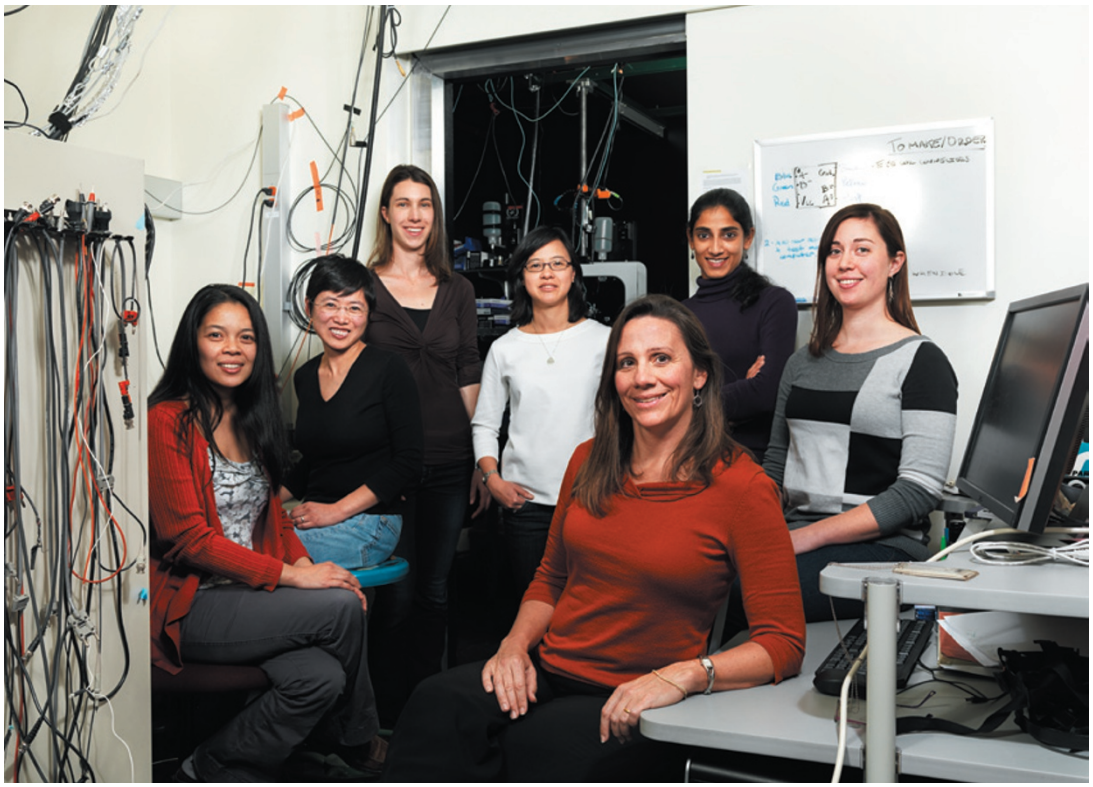
WOMEN Quotas could overburden already-stretched science stars **p.39**

WOMEN Europe must build on its impressive efforts to close the gender gap **p.40**

WOMEN Why do biographers stereotype female scientists as weird? **p.43**

TECHNOLOGY Two takes on why the Internet is no cure-all for social ills **p.45**

CODY PICKENS



Neurobiologist Jennifer Raymond (front) and her colleagues in their lab at Stanford University in California.

Most of us are biased

Let's move beyond denial, own up to our prejudices against women and retrain our brains to overcome them, says **Jennifer Raymond**.

I have a bias against women in science. Please don't hold this against me. I am a woman scientist, mentor and advocate for women in science, and an associate dean in my school's Office of Diversity, with a budding field biologist as a daughter. Yet my performance on the Implicit Association Test (https://implicit.harvard.edu/implicit/demo), which measures unconscious associations between concepts, revealed that I have a tendency to associate men with science and career, and women with liberal arts and family. I didn't even need to wait for my score; I could feel that my responses were slower and that I made more mistakes when I had to group science words such as 'astronomy' with female words such as 'wife' rather than male words such as 'uncle'.

The results from hundreds of thousands of people indicate that I am not an outlier — 70% of men and women across 34 countries view science as more male than female[1].

Gender bias is not just a problem in science. A host of studies shows that people tend to rate women as less competent than men across many domains, from musical abilities to leadership[2], and that many individuals hold biases about competency on the basis of other irrelevant attributes, such as skin colour, body weight, religion, sexual orientation and parental status.

Such biases have important consequences in the workplace. One study showed that mothers are 79% less likely to be hired and are offered US$11,000 less salary than women with no children[3]. By contrast, the same study shows that parenthood confers an advantage to men in the workplace.

A 2012 study by Jo Handelsman of Yale University in New Haven, Connecticut, and her colleagues shook the scientific community by reporting that science faculty members have a pervasive bias against female ▶

WOMEN IN SCIENCE
The gender gap and how to close it
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BIAS BUSTERS

Ways to conquer gender assumptions

- **Raise awareness of gender bias as a first step to overcoming it.** Call for transparency in salaries, hiring, leadership and editorial decisions. Organize a discussion of implicit bias in science, and what can be done locally to address it. At Stanford University, we have a Gender Issues in Neuroscience discussion group that brainstorms ways to overcome challenges such as competition, response to failure, networking and speech and body language. We include men in these discussions because they are also affected by gender stereotypes and are an essential part of the solution.
- **Use gender-blind review[5] or other processes to mitigate bias** when reviewing applicants for a job, award, speaking engagement, grant or manuscript. Define measurable review criteria in advance to avoid a gut response, which is most vulnerable to bias. Be vigilant for rationalizations that could reflect an unconscious bias, such as "she's great, but seems awfully young/is not a good fit/is working in such a competitive area". Create an environment in which it is acceptable to question colleagues when bias might be influencing their behaviour. It is easier to detect bias in others than ourselves[8], so we need to help each other without judgement. It is especially helpful if men initiate conversations about gender bias so that women don't bear the full responsibility.
- **Make a conscious effort to offer women mentoring and other support**, including an equal salary to male peers, to overcome the documented tendency to offer women less[4]. Trumpet the achievements of female colleagues, because biases have the greatest influence when there is a dearth of specific information[9].
- **Women should overcome their own gender bias** because it could make them less likely to compete for prestigious jobs or awards[10]. Be proactive in seeking mentorship, and negotiate for salary and other resources. Offer your talent to employers who have programmes to help level the playing field for women. Join or start a women-in-science group, especially within your own scientific subspeciality, because such groups can provide speaking invitations, tenure letters, advice about the key issues and players in the field, and reviews of papers and grants. For about 15 years, women in my subspeciality have got together at our national neuroscience meeting for an annual event that we irreverently call the Babes of the Vestibular/Oculomotor System Dinner.
- **Fund pilot projects** to test innovative interventions to mitigate the effects of bias, and create a central repository for sharing strategies. These programmes will more than pay for themselves if they help to retain the best talent. Considerable resources are being invested in training each young scientist — if we want to be good stewards of that investment, we need to provide everyone, male and female, with a fair shot at success. Institutions should provide incentives, such as salary support or alleviation of other duties, to individuals who spearhead efforts to address implicit bias.

scientists[4]. This prevents us from doing our job of promoting the best scientists, and society is paying a price in terms of the advancement of science.

There is now sufficient evidence to move us beyond the denial phase of dealing with gender bias. Yet in talking to colleagues around the world, I find continued resistance to the idea that scientists, who take pride in being rational and objective, could be influenced by bias. One colleague was convinced that gender bias could affect the hiring of a lab manager, but he still doubted that it would affect a faculty-level hiring decision or the evaluation of a manuscript, even though the evidence suggests otherwise[5]. And I have seen junior colleagues shake their heads disapprovingly at the gender bias of older science faculty members, yet resist the idea that their generation might also have such bias.

Unfortunately, young people are not immune to gender bias. Many studies have been conducted on college-age subjects, and gender bias has even been reported in preschool children[6]. I tried to protect my own children from gender bias by doing things such as changing the gender of the characters in the children's books I read to them to reverse gender stereotypes, and using the feminine pronoun wherever possible — "Look at the elephant; she is so strong." Despite these efforts, my daughter had a bias against women in leadership positions by the age of three. One day in the park, she announced, "I am the captain; I'm a girl captain," suggesting that she knew she had to violate a gender stereotype to assume that leadership position. And although she has a scientist mum who runs a lab full of women, when my daughter took the implicit association test at age 8, it revealed a bias against women in science. My presence as a role model and other efforts at countering gender stereotypes were not enough to overcome the powerful cultural transmission of bias. Thus, it seems unlikely that unconscious gender bias will be eradicated any time soon, and the best we can do in the near term is to suppress its symptoms.

If we are vigilant, we can reduce the influence of bias on our decisions. Unconscious biases are mental habits that tend to dominate our gut reactions, but we also have more-rational decision processes, which compete with our biases for control of behaviour. Just as one can overcome physical habits such as biting one's fingernails or saying 'umm' when one speaks, one can suppress undesirable mental habits such as gender bias through deliberate, conscious strategies (see 'Ways to conquer gender assumptions'). By enabling more women to succeed, despite the existence of unconscious bias, this will gradually eliminate the stereotype of the successful scientist as male, which is the root of gender bias.

However, if left unrecognized and unchecked, bias can commandeer both our behaviour and our rational thought processes. Our brains are skilful at creating seemingly rational justifications for our behaviour, even when it is driven by bias. People who had to rate two 'applicants' for police chief — one who had more education and the other who had more experience — always chose the man over the woman, but justified their choice as arising from the value they placed on either education or experience, whichever factor was assigned to the man[7].

Denial that bias exists gives it more power. I am not proud of my unconscious bias against women in science. However, I know that I must first recognize my own bias to overcome it with deliberate practices that suppress its effects. I urge you to join me. ■

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