RECOGNIZING BIASES THAT AFFECT WOMEN GEOSCIENTISTS IN THE WORKPLACE

P. L. King, A. Edwards, and N. J. Abram[1]

Women are underrepresented in the geosciences[2]. Many different factors affect a woman's ability to continue and succeed in science. These include a lack of senior women role models; the need for people in partnerships to decide whose career to follow and then to obtain satisfying long-term jobs; inescapable career interruptions for women who choose to have children; and a social bias and expectation that women will take on significant family responsibilities. Programs have been initiated worldwide to try to improve the representation of women in science[3], and many organizations have aspirations to increase diversity and the fair treatment of women in their workplaces. Yet gender diversity continues to be a systemic problem in the geosciences. In this article, we focus on *biases* – presumptions that we all have and that we can learn to recognize and actively manage. Many studies show that we impede women's advancement through inadvertent biases in our decision-making, judgment and day-to-day actions (e.g. Ross 2008). How does this happen in the workplaces of "good," well-intentioned scientists, of all genders, who are trained to think rationally and systematically?

FORMS OF BIAS

Bias can take both useful and detrimental forms. Bias helps us make sense of large amounts of information, focus our efforts, and inform our actions. Bias can also irrationally affect our treatment of, for example, students who read tabloid magazines, if we assume that such students will never make good scientists. We can all try and be unbiased yet be prone to *unconscious biases*. In many countries, both men and women intuitively believe that men are more competent than women, especially in mathematics and science (AAUW 1998). This leads to learned stereotypes where boys are frequently asked harder questions and rewarded for assertive behavior, whereas girls are rewarded for being nurturing. In school, college and university settings, there are near equal proportions of male and female students. However, in the workplace, especially at higher levels, unconsciously acquired bias has led to a higher percentage of men in leadership and science jobs (e.g. Ross 2008; Devillard et al. 2012; Ivie and Tesfaye 2012).

"...we impede advancement of women through inadvertent biases in our decision-making, judgment and day-to-day actions."

FEMALE BIAS IN THE SCIENCE WORKPLACE

Even if we do not see or even feel female bias, it is common in the science workplace in the following areas:

1. Female-Biased Comments and Words

Commonly women receive comments that have undertones to indicate that their success is somehow not related to intellect or work, but is instead related to their gender (Ross 2008). For example, "She got a grant, but the competition was easy this round," "She got the job because they needed a woman," and "She's organized (or a good mentor) like all women."

Some words are only used to refer to women. We rarely refer to men as soft-spoken, ditzy, bouncy, strident, ambitious/bossy and frumpy. Instead we use words like quiet, off-in-their-own-world, energetic, short-tempered, a born-leader and unattractive – words that tend to describe forgivable attributes.

2. Female-Biased Assumptions

Female-biased assumptions may not be verbalized, but they do form a basis for our opinion of other people that may harm day-to-day interactions and long-term advancement. Assumptions affect all genders, but typically affect women more. Examples include:

- Gender issues will go away when biased people retire.
- Women in the workplace are usually office staff, technicians or students.
- Mothers and part-time workers are less committed to their careers – they are not up to speed because they took time off; they are probably caring for family when they're not at their desks; they won't have time to work on new research; and, they won't be able to undertake remote fieldwork or go to conferences.
- Putting women on all our hiring and promotion committees will solve female bias.
- Hiring more women would compromise on excellence because good women don't apply, or are still coming up through the ranks, or have dual career or family issues.
- Younger women have "had it easy" compared to older women, and women in general have an advantage over men.

Ensuring that all staff are aware of the inadvertent cumulative effects of these workplace biases greatly reduces their impact. Gender bias also affects how we visualize ourselves, resulting in feelings amongst women and men like:

- I can't influence bias because it is too systemic (or, alternately, it doesn't exist).
- I don't see anyone like me ahead, so how will it be possible for me to succeed?
- I can't take on students or plan research right now because I am considering having a baby.

3. Different Treatment of Women

Research shows that female bias results in *micro-inequities* (small slights) that accumulate to negatively impact women in the workplace relative to men, or relative to how women are treated in the wider community (Rowe 2008). A high-profile study at the Massachusetts Institute of Technology found that sidelining of female scientists was "often accompanied by differences in salary, space, awards, resources and response to outside offers between men and women faculty, with women receiving less despite professional accomplishments equal to those of their colleagues" (King 1999; Hopkins 2000). A widespread finding is that women in male-dominated workplaces (like science) are excluded from *social networks* that are important for building cohesion amongst coworkers and for sharing valuable knowledge and skills (Ross 2008; Rowe 2008). Exclusion is most widespread once a woman rises through the workforce. People assume that women have responsibilities or interests that prevent them from socializing after work or feel uncomfortable inviting a woman out. Women may assume that they have not been invited to gatherings, and other people may assume that women "know" to invite themselves. Don't trust assumptions: just politely ask.

Bias may also occur in *recruitment and promotion* even when committees believe that they are being fair. For example, when science academics were asked to evaluate identical résumés and qualifications for "John" and "Jennifer" they assigned an average starting salary of $30,238 to John, but only $26,508 to Jennifer (Moss-Racusin et al. 2012). Such bias occurs when committees are composed of people who have "made it" and are more sympathetic to people like themselves, and then justify decisions using assumptions (e.g. input level on multi-authored papers)[4]. Similarly, students evaluate women more harshly than they do men: students in an online course gave professors they thought

1 Research School of Earth Sciences
Australian National University
Acton ACT 2601 Australia
E-mail: u3482508@anu.edu.au

2 www.americangeosciences.org/workforce/reports

3 www.nsf.gov/crssprgm/advance/awards.jsp; www.nsf.gov/career-life-balance/; dst.gov.in/scientific-programme/women-scientists-a.htm; www.genderinscience.org

were male higher evaluations than those they thought were female, regardless of what gender the professors actually were (MacNell et al. 2014). It is important that members of committees understand the effects of hidden assumptions on how they evaluate others.

ADVANTAGES OF ADDRESSING BIAS AND IMPROVING DIVERSITY

Gender-balanced workplaces can better embrace different perspectives, produce a more holistic approach, spur greater creativity in problem-solving, and lead to improved decisions (Hong and Page 2004; Campbell et al. 2013). In science, papers with a diverse author list are more likely to be cited (Freeman and Huang 2014). Studies show that gender-balanced companies perform better and retain their employees longer because the organizations are viewed as fair (Devillard et al. 2012). Furthermore, men in environments that include women also benefit from flexible working arrangements to help them play a more active role in parenting or elder care without it damaging their career prospects (Devillard et al. 2012).

WHAT CAN WE DO ABOUT BIAS?

1. Recognize That Bias Is Normal

An important first step in actively managing bias, and ultimately eliminating its effect, is to recognize that it is a very common problem, even amongst the well-intentioned of all genders. Women are up to three times more likely to recognize bias and sexism and are almost four times less likely to justify bias than men (Moss-Racusin et al. 2015). Therefore, it is critical for everyone to be aware of their unconscious biases in order to move towards a fair and respectful workplace. Individuals can explore their personal biases privately by taking the Project Implicit test (implicit.harvard.edu/implicit) or visiting the www.genderbiasbingo.com website.

2. Engage Leaders

Some institutions promote gender equality targets in the evaluation of senior staff because evidence shows that reducing bias is most effective when leaders play an active role and "show through their actions that diversity is a top priority" (Devillard et al. 2012). However, it is critical that any change is managed so that it does not engender defensiveness and resistance. Successful leaders build on their colleagues' strengths and achievements (however small) and ensure equality in resources and entitlements (Ross 2008; Devillard et al. 2012). Leaders should also provide all employees with advice on career advancement: "tough" advice to women on how to succeed should not be withheld because of assumptions that it is inappropriate or may be badly received (Ross 2008).

> "Until I learned about unconscious bias, I didn't understand why my contributions were often ignored in meetings, but if a man made exactly the same suggestion later then it was viewed as the best solution. I considered speech therapy to lower the pitch of my voice. When I revealed this "deafness" to a few colleagues they reacted in shock. My voice is now getting heard more often because my colleagues and I acknowledged that the problem was real."
>
> *– Anonymous woman scientist*

3. Ensure Best Practice in Hiring and Promotion

Most of us believe that gender diversity is a worthy ideal, but busy scientists are generally not trained in this area. So … bring in the experts. Human resources departments may provide training around fair hiring practices, including advertising, sourcing of candidates, job descriptions, the gender composition of the search panel and their awareness of diversity issues, and interview procedures (e.g. Ross 2008; Corrice 2009; Devillard et al. 2012). Some workplaces ensure that employee evaluations, promotions and terminations are transparent so that every employee understands what is expected, how decisions are made and what they need to do to progress, whether they are working part-time, full-time or flexibly. Committees should ensure that sufficient time is taken to deliberate over promotion and hiring decisions to avoid bias (Corrice 2009). It is important that committees understand that skewed representations of applicants may arise from unconscious biases in recommenders (Corrice 2009) and from student evaluations (above).

4. Provide Support Through Training and Diversity Initiatives

Staff are empowered when they are made aware of hidden forms of bias because this helps them understand their own situation and that of others. Training is particularly helpful for staff who are transitioning into the workforce, taking temporary leave or returning to the workplace. Also, training and mentoring is helpful for staff who are reticent about asking for coauthorship or a promotion. Some institutions have policies available to help staff balance career and work, such as funds for bringing a baby to a conference or offering childcare on-site, and dual hiring programs. Women need to be aware of available assistance. Finally, we can combat hidden biases against women by providing images of women in posters, lectures, web sites and reports, and acting in an inclusive manner (Ross 2008).

4 www.genderbiasbingo.com

ACKNOWLEDGMENTS

We appreciate funding from the Australian National University (ANU) Gender Institute, College of Mathematical and Physical Sciences, and Research School of Earth Sciences. We are grateful for the positive support of our colleagues including V. Bennett, S. M. Eggins, F. Jenkins, M. A. King, H. McGregor and D. Van Rooy, and comments from J. Rosso and P. Roycroft.

REFERENCES

AAUW (1998) Gender Gaps: Where Schools Still Fail Our Children. American Association of University Women. Washington, DC, 149 pp

Campbell LG, Mehtani S, Dozier ME, Rinehart J (2013) Gender-heterogeneous working groups produce higher quality science. PLoS ONE 8, doi: 10.1371/journal.pone.0079147

Corrice A (2009) Unconscious bias in faculty and leadership recruitment: a literature review. Analysis in Brief 9: 1-2

Devillard S, Graven W, Lawson E, Paradise R, Sancier-Sultan S (2012) Making the Breakthrough – Women Matter 2012. McKinsey & Company. 32 pp. Available from: www.mckinsey.com/client_service/organization/latest_thinking/women_matter

Freeman RB, Huang W (2014) Collaboration: strength in diversity. Nature 513, doi: 10.1038/513305a

Hong L, Page SE (2004) Groups of diverse problem solvers can outperform groups of high-ability problem solvers. Proceedings of the National Academy of Sciences 101: 16385-16389

Hopkins NH (2000) Experience of women at the Massachusetts Institute of Technology. In: Women in the Chemical Workforce: A Workshop Report to the Chemical Sciences Roundtable. National Academies Press, p 110-124. Available from: www.ncbi.nlm.nih.gov/books/NBK44861/?report=classic

Ivie R, Tesfaye CL (2012) Women in physics: a tale of limits. Physics Today 65: 47-50

King KR (1999) MIT concedes bias against female faculty. The Tech 119, Tuesday, March 30. http://tech.mit.edu/V119/N15/15women.15n.html

MacNell L, Driscoll A, Hunt A (2014) What's in a name: exposing gender bias in student ratings of teaching. Innovative Higher Education, doi: 10.1007/s10755-014-9313-4

Moss-Racusin CA, Dovidio JF, Brescoll VL, Graham MJ, Handelsman J (2012) Science faculty's subtle gender biases favor male students. Proceedings of the National Academy of Sciences 109: 16474-16479

Moss-Racusin CA, Molenda AK, Cramer CR (2015) Can evidence impact attitudes? Public reactions to evidence of gender bias in STEM fields. Psychology of Women Quarterly, doi: 10/1177/0361684314565777, January 8, 2015

Ross H (2008) Proven strategies for addressing unconscious bias in the workplace. CDO Insights 2: 1-18. Available from: www.cookross.com/docs/UnconsciousBias.pdf

Rowe M (2008) Micro-affirmations & micro-inequities. International Ombudsman Association Journal 1: 45-48