Departmental-level approaches to Gender Equity in Biology

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Abstract

Gender equity remains a large issue in academia, with women comprising only about one fifth of professors in the US. There are many changes that can be made to increase equity, including institutional policies, cultural change and bottom-up strategies, but these can be difficult or slow to implement at a departmental level. Hiring is one area that can be easily tackled at a departmental level and is strongly influenced by implicit and systematic bias. Here we focus on two methods of tackling bias in recruitment – redefining merit and identified positions.

Keywords

Gender equity, recruitment

Introduction

There remains far fewer women in senior academic positions than men (OECD 2006), despite undergraduate cohorts being generally gender-neutral, or female-biased, since the mid-1980s (Luckenbill-Edds 2002). In the US women make up approximately 60% of undergraduates and half of PhD graduates in biological and life sciences, but only one-fifth of professors (Figure 1), despite there being no difference in academic ability or performance between men and women (O'Dea et al. 2018). This is reflected in authorships, with women accounting for less than one-third the authorships on scientific papers, and just under one-third first authorships (Larivière et al. 2013). Current strategies are not working quickly enough to address this inequity. For example, with the current rate of change in biology authorships, it will take 25 years before parity in authorship is achieved (Holman et al. 2018). A recent report in *Science* suggested an approach to training and action that embeds evidence and evaluation (Moss-Racusin et al. 2014). This is essential to avoid current *ad hoc* approaches and anecdotal responses.

Issues of equity are important ideologically, but there is also evidence that workplaces with a good gender ratio perform better. Having a higher percentage of women than is currently found in academia increases the collective intelligence of collaborations and teams (Woolley et al. 2010), with mixed-gender authorship teams receiving 34% more citations than gender-uniform authored papers (Campbell et al. 2013). Having fewer women in science decreases productivity and limits innovation (Bell et al. 2009). There is also an argument that as science is largely publicly funded, underrepresented groups such as women should have increased representation (Wallon et al. 2015).

We recognise that gender equity is only one form of equity that academia struggles with. For example, people of colour, LGBTQIA+ people, people with a disability, people

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from culturally and linguistically diverse backgrounds, and people from working class backgrounds are all underrepresented in science. This is particularly exacerbated when individuals belong to more than one marginalised group. It is important that these identities are acknowledged and considered in hiring processes, particularly considering the diverse student body in biology, many of whom lack a clear role model in academia. By promoting equity and addressing bias in the selection process, hopefully diversity across and within these areas will also increase. If not, more targeted programs could be introduced to address other areas of inequity in academia.

Gender inequity in academia is caused by a combination of factors, including carer roles and expectations, lack of role models, sexual harassment and bullying, and implicit bias. Ensuring effective institutional policies, such as around shared parental leave, is important in addressing these. Cultural shifts are also necessary, such as greater acceptance of men taking extended parental leave and reduced tolerance of sexual harassment. However, while important, these are often long-term changes. 'Bottom-up' strategies include mentoring, networking programs, and professional development opportunities, which require women to opt-in and participate. These programs can have positive impacts (Laver et al. 2018), but can also exacerbate existing inequalities by requiring additional labour from the people the programs are trying to support. Here, we focus on two changes to recruitment and selection, as these are easily implemented at a departmental level.

Rethinking Merit

Merit is rarely explicitly defined as most academics are confident that they can identify strong performance and are committed to maintaining excellence in their departments. In selecting candidates, several factors are considered, including research achievements (through, for example, the number of papers published), teaching ability (e.g. student

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reviews), and academic service (e.g. committee work, mentoring or outreach). However, some of these are more easily measured than others and factors are not weighted consistently by all selection panel members. This leads to considerable potential for subjectivity in decisions, with a bias towards factors that are more easily compared quantitatively, such as publications, and against those that are hard to measure, like mentoring. This can lead to gender inequity through both implicit bias and the measures used in defining merit. Stating that appointments are made on merit and there is no need for action ignores a large body of evidence to the contrary.

Implicit bias

There is strong evidence that implicit bias plays a role in hiring and promotion decisions. Implicit bias, or unconscious bias, occurs without the person making a conscious decision. For example, several studies have explored the concept of 'aesthetic capital' and the 'ugliness penalty,' the effect that better-looking people have more success in a range of endeavours, including job interviews and loan applications (Tietje & Cresap 2005). Even small levels of implicit bias can have a large impact on the structure of an organisation, with a bias against women of only 1% at multiple points capable of explaining current levels of senior women in STEMM fields (Martell et al. 1996). Simply put, if you 'pick the best' and men have a small advantage they repeatedly win in pairwise assessments between otherwise equal top two applicants. We therefore need to understand implicit bias and how it affects perceptions of merit.

Implicit bias against women is present in academia in all genders. For example, a recent study sent an identical CV for a laboratory manager position to multiple potential supervisors. Those given the CV for 'Jennifer' rated the applicant less competent and less hireable, and offered them less mentoring and a lower salary, than those given the CV for 'John',

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93 regardless of the gender of the potential supervisor (Moss-Racusin et al. 2012). In general,
94 women are perceived to be less suited for leadership roles and are often criticised for showing
95 signs of leadership praised in men (e.g. competitiveness or aggression) (Rudman 1998).

96 The use of merit as an indicator can be strongly impacted by implicit bias. A recent
97 study indicates that when an organisation is explicitly presented as meritocratic, managers
98 favour male employees over equally qualified female employees by awarding them larger
99 monetary rewards. This phenomenon has been dubbed the 'merit paradox' whereby a focus
100 on merit results in more biased outcomes (Castilla & Benard 2010). This means that the use
101 of merit as a hiring strategy is not objective, as it is often held to be.

102 ***Defining merit***

103 The current definition of merit used in academia often emphasises career paths and
104 characteristics that are more typically masculine, disadvantaging women and other minority
105 groups. For example, men often have more publications than women (Symonds et al. 2006),
106 for several reasons. Men are socialised to be more assertive and effective at self-promotion
107 (Rudman 1998), which can lead to them having their name included on more publications .
108 Additionally, women tend to have more career breaks than men due to societal expectations
109 around caring responsibilities, leading to fewer publications. Recent work suggests that the
110 peer review process is biased, with reviewers more likely to accept manuscripts from those of
111 the same gender and country as themselves (Murray et al. 2018). Since there are already more
112 men in STEMM fields, this perpetuates the existing inequity. Similar patterns are found with
113 talks, with men more likely to be invited to speak in conference symposia and specialised
114 courses (Isbell et al. 2012; Débarre et al. 2018).

115 Papers authored by women generally have fewer citations, getting cited less than
116 identical papers authored by men (Maliniak et al. 2013; Larivière et al. 2013), most likely due

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to a combination of implicit bias and differences in self-citation. Men are 56% more likely to self-cite than women (King et al. 2017), which may increase the total number of citations they receive.

Another metric used in assessing merit is student evaluations of teaching. However, these are significantly biased against women, with students rating female teachers lower on every aspect of teaching, including 'objective' measures like how soon assignments are returned (Boring et al. 2016) or in identical courses (MacNell et al. 2015; Mitchell & Martin 2018). This is exacerbated when the teacher is a woman of colour (Perry et al. 2015; Pittman 2010) or LGBTQIA+ (Ewing et al. 2003).

Women, particularly women of colour, those from working class backgrounds and LGBTQIA+ women, are also more likely to spend more time mentoring and on other academic service work than men (Misra & Lundquist 2015). Time spent on this essential but 'invisible' work means there is less time available for these academics to spend on work that is valued in hiring (Social Sciences Feminist Network Research Interest Group 2017; Guarino & Borden 2017).

This evidence leads to the conclusion that the selection process for academic positions needs to be re-considered. Research quality, rather than quantity, should be the most important factor. One method is to ask applicants for their top papers, an approach being increasingly used. Alternatively, applicants could be asked to provide a research narrative that explains their goals and impact, as is currently required for ARC Future Fellowships. There is also a need to recognise and reward less measurable activities that also contribute to academic work, such as excellence in teaching, contributions to service, mentoring and outreach.

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Identified Positions

An identified position is an advertised position open only to people with a certain characteristic, in this instance women and non-binary people, with the aim of increasing representation of under-represented groups. Identified positions and quotas are short-term solutions, used to rectify past and current inequalities in how people of different genders are treated.

Identified positions are being increasingly used in academia to address gender inequity. For example, several Australian universities have recently advertised identified positions for women in STEMM fields (e.g. University of Adelaide, University of Melbourne and The Australian National University). International universities have also introduced identified positions, such as the Delft Technology Fellowship at the Delft University of Technology. Quotas can also be applied to governance roles; for example, Austrian universities are bound by legislation to ensure all university bodies have 50% women. However, such policies can place undue pressure on the small number of women eligible.

The impact on gender equity from identified positions is much faster than from other measures, as they force change to happen, instead of relying on discussions and policies that may not translate into organisational change (Wallon et al. 2015). A projection based on a US university showed that given equal rates of men and women being hired and leaving (eliminating any hiring and retention biases), gender parity would be reached in 57 years. If only women were hired this would be reached in 11 years, showing the dramatic impact that identified positions could have on gender equity (Marschke et al. 2007).

Ideally, increasing the representation of women through identified positions will allow a ‘critical mass’ of women in senior positions to be reached, making these measures unnecessary. While implicit bias occurs in all genders, research has shown that increasing the

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number of women can help balance the gender ratio further. For example, mixed-gender review committees promote men and women at equal rates while those comprising only men are less likely to promote women (De Paola & Scoppa 2015; Zinovyeva & Bagues 2010). In the private sector, areas with more women in managerial positions have increased hiring and promotion of other women (Kurtulus & Tomaskovic-Devey 2012), while women are more likely to correctly rate another woman's job performance than men are (Bowen et al. 2000).

The two main issues with identified positions are interrelated. Colleagues may be concerned that underqualified people will be hired over others more qualified or with greater 'merit' (Wallon et al. 2015). There are many issues with the definition of merit (see previous section) which would have to be explored alongside the use of identified positions. There is also the concern that any successful hires may be viewed as 'tokens' and marginalised (Wallon et al. 2015). The stigma surrounding staff hired through identified positions would have to be addressed based on the organisational culture.

Proposals for consideration

We propose five actions that biology departments should consider implementing in their recruitment processes. While not all will be applicable to every department, we suggest that they are discussed extensively within departments to ensure a shared understanding of the issues and commitment to equity.

1. Aim to maintain the ratio of percentage of women group leaders in the range 40-60%. When the department moves outside this ratio, advertise gender-specific positions (e.g. open only to women/non-binary people only) until it returns to within these limits.
2. Expect all staff to take an implicit bias test and/or unconscious bias training. Have one person on all selection committees whose role is to challenge potentially biased statements (it is easier to recognise unconscious bias in others than in yourself).

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3. Reconsider the selection process to better reflect a broader range of activities, with a commitment to improved evaluation of activities that are difficult to quantify, for example mentoring, leadership in teaching, service and science communication.

4. Focus on research quality, not quantity, e.g. by assessing the ten best publications only or asking applicants for a research narrative that demonstrates impact.

5. Recognise that equal opportunity is not just a gender issue and ensure that fair consideration is given to people of colour, LGBTQIA+ people, those from low socio-economic backgrounds, those with disabilities, and those from culturally and linguistically diverse backgrounds.

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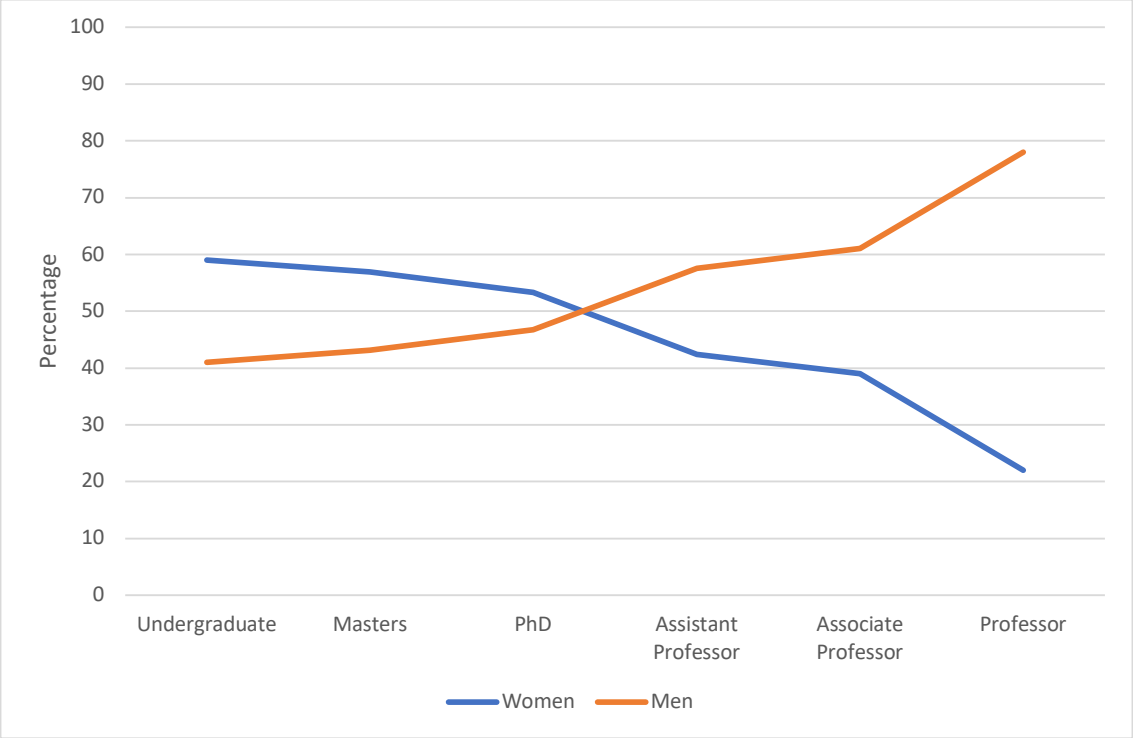
283 **Figure 1**

284 Gender equity in US universities for biological and life sciences, student data from
285 2014 and academic data from 2015. Data from (National Center for Science and Engineering
286 Statistics 2017)



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