Why we need more women in STEM leadership: innovations to identify solutions and overcome obstacles

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Diversity in Science

- Inclusive, diverse leadership is increasingly recognized as essential to conservation success

- Science workforce diversity refers to *cultivating talent and promoting the full inclusion of excellence across the social spectrum*

- Conservation profession will be more effective if it includes different genders, races, ethnicities, cultures and viewpoints (Tallis and Lubchenco 2014, Matulis and Moyer 2016)

Diversity in Science

- When trying to solve complex problems, success is often more likely to be achieved through diverse perspectives
- Randomly selected team of problem solvers outperformed group of best problem solvers – attributed to fact that best problem solvers become similar in ability

Table 1. Result of computational experiments

Group composition	Performance	Diversity, %
10 agents and 1 -12		
Best agents	92.56 (0.02)	70.98 (0.798)
Random agents	94.53 (0.007)	90.99 (0.232)
20 agents and 1-12		
Best agents	93.78 (0.015)	74.95 (0.425)
Random agents	94.72 (0.005)	91.46 (0.066)
Ten agents and 1-20		
Best agents	93.52 (0.026)	73.69 (0.843)
Random agents	96.08 (0.006)	94.31 (0.089)

Numbers in parentheses are standard deviations

Hong and Page 2004

Gender Diversity in Science

Including women in conservation decisions has been linked to improved outcomes globally in:

- Protected area management
- Community forest governance
- Fisheries management
- Climate change mitigation
- Water conservation

Women as leaders of grassroots environmental activism campaigns at local to international scales (Bell and Braun 2010)

Gender Diversity in Scientific Leadership

Gender diverse leadership associated with:

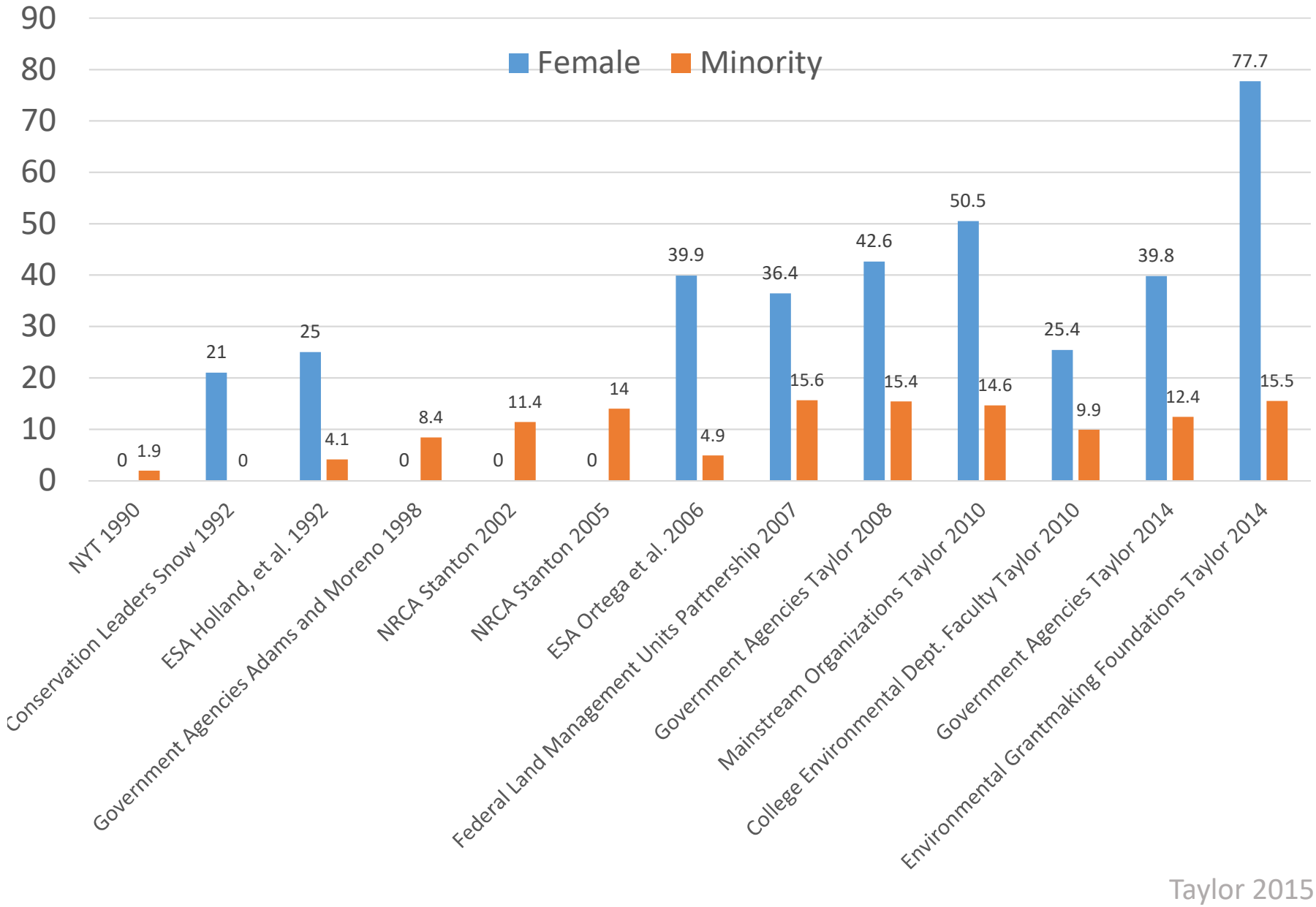
- High managerial performance
- Increased organizational profit
- Improved employee well-being

Gender diversity linked to effective conservation, with female participation in natural resource management groups associated with greater:

- Collaboration
- Persistence
- Conflict-resolution

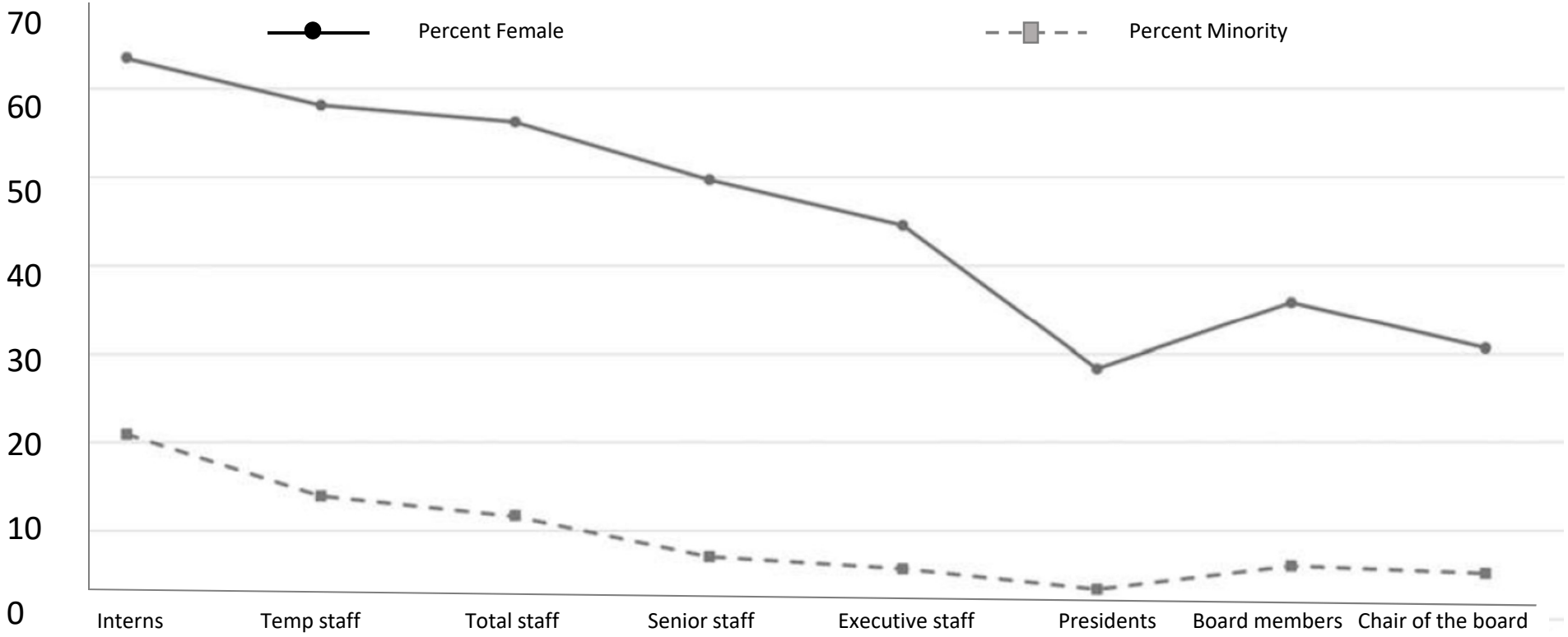
(Westerman et al. 2005)

Diversity in Environmental Organizations



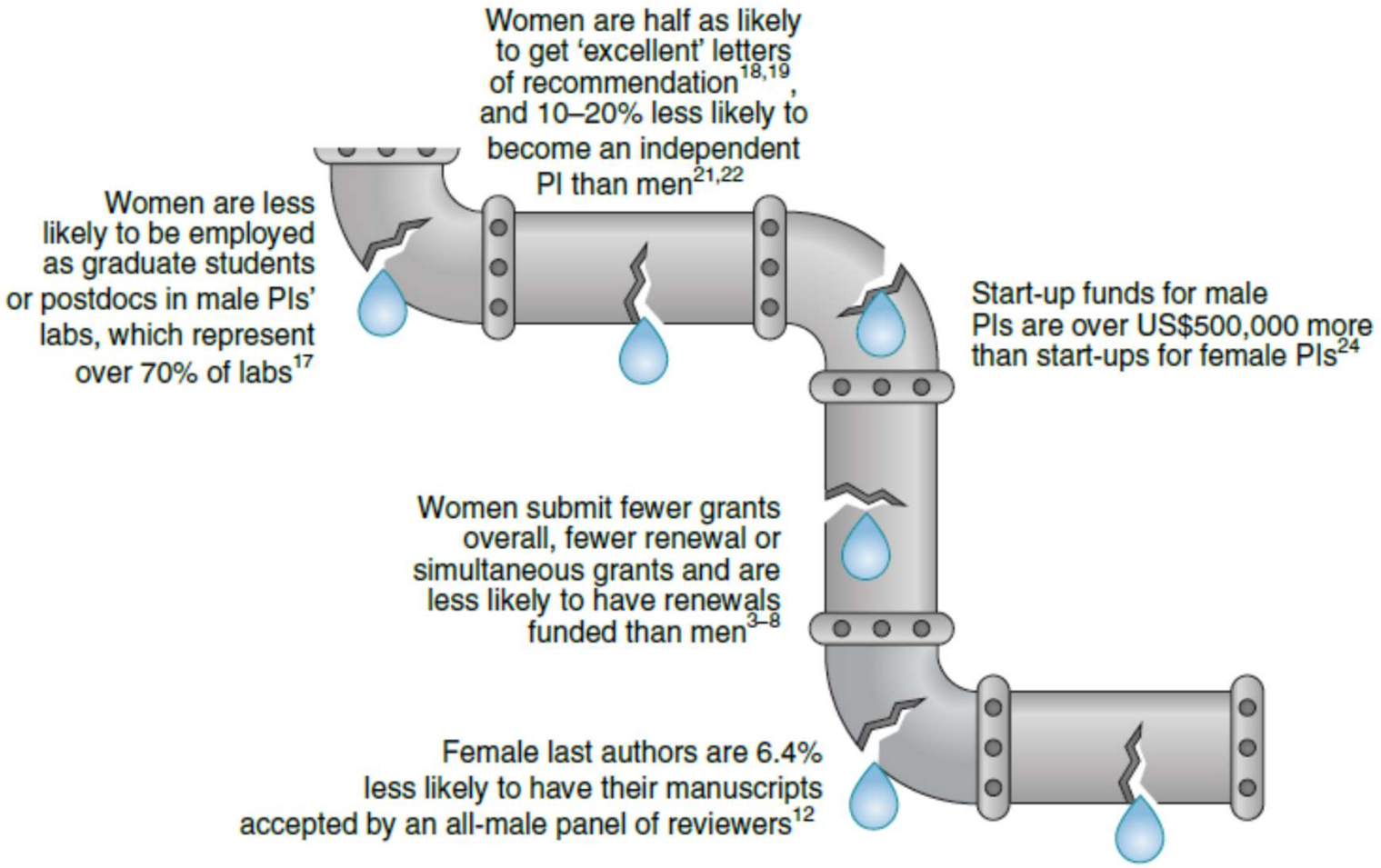
Taylor 2015

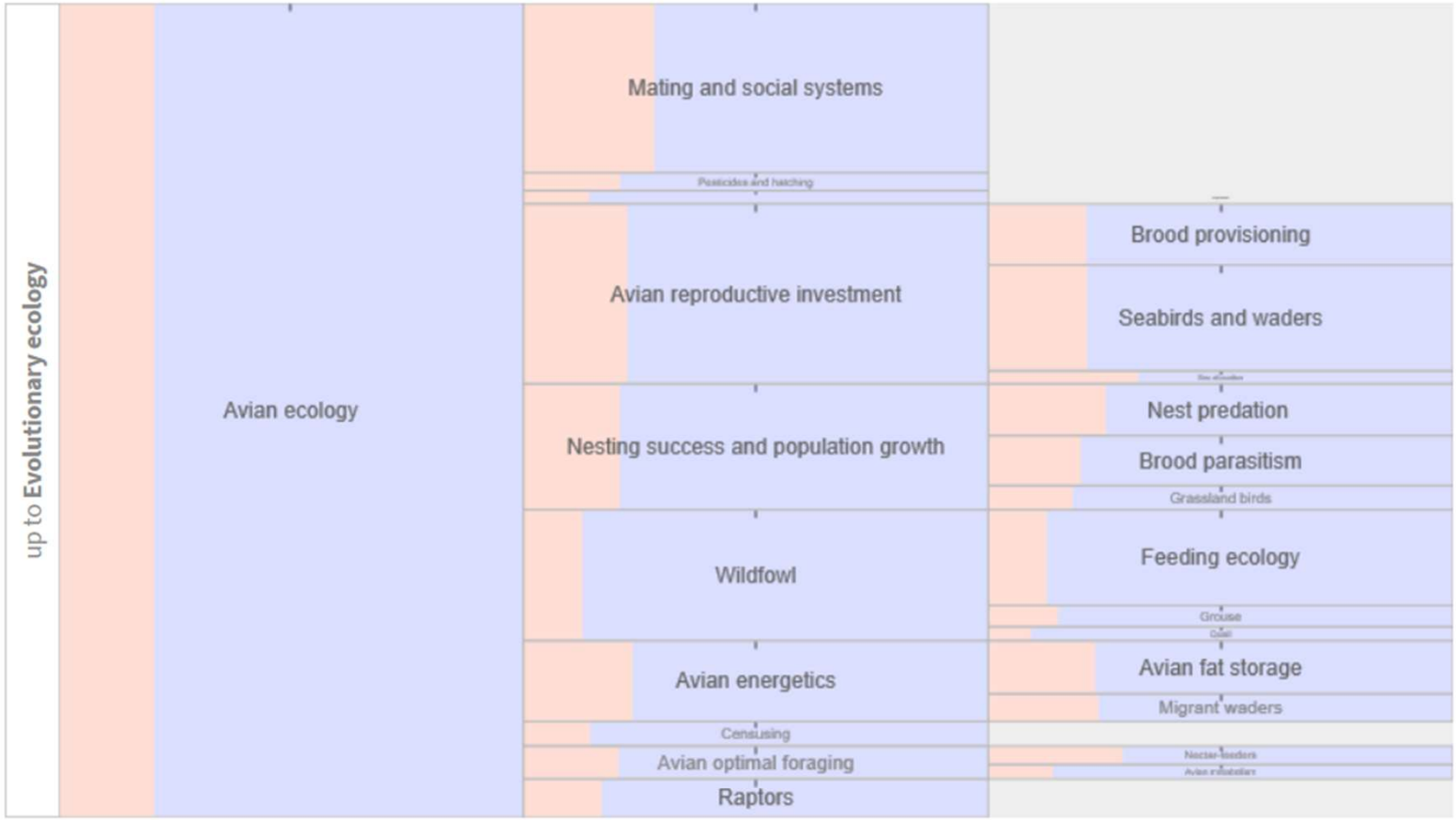
Diversity in Environmental Organizations

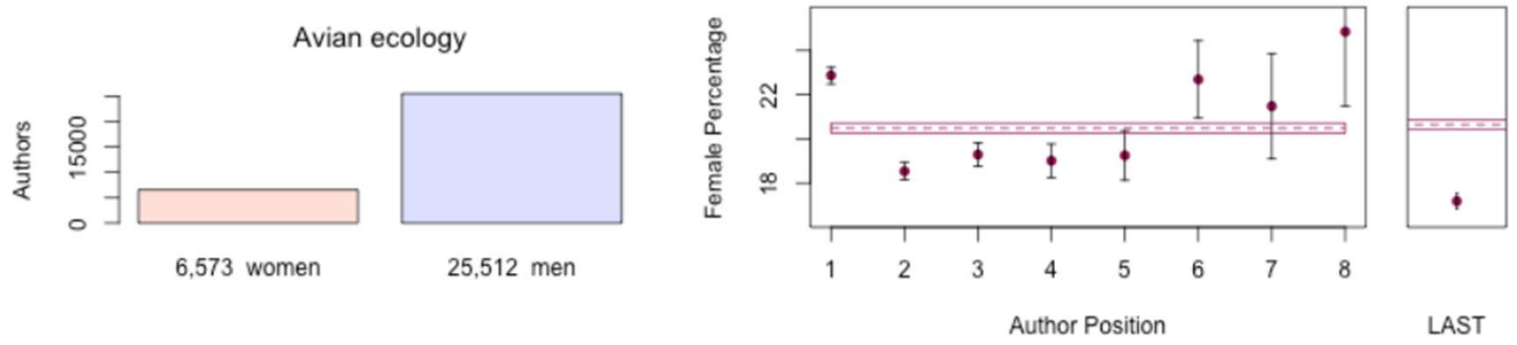


Taylor 2015

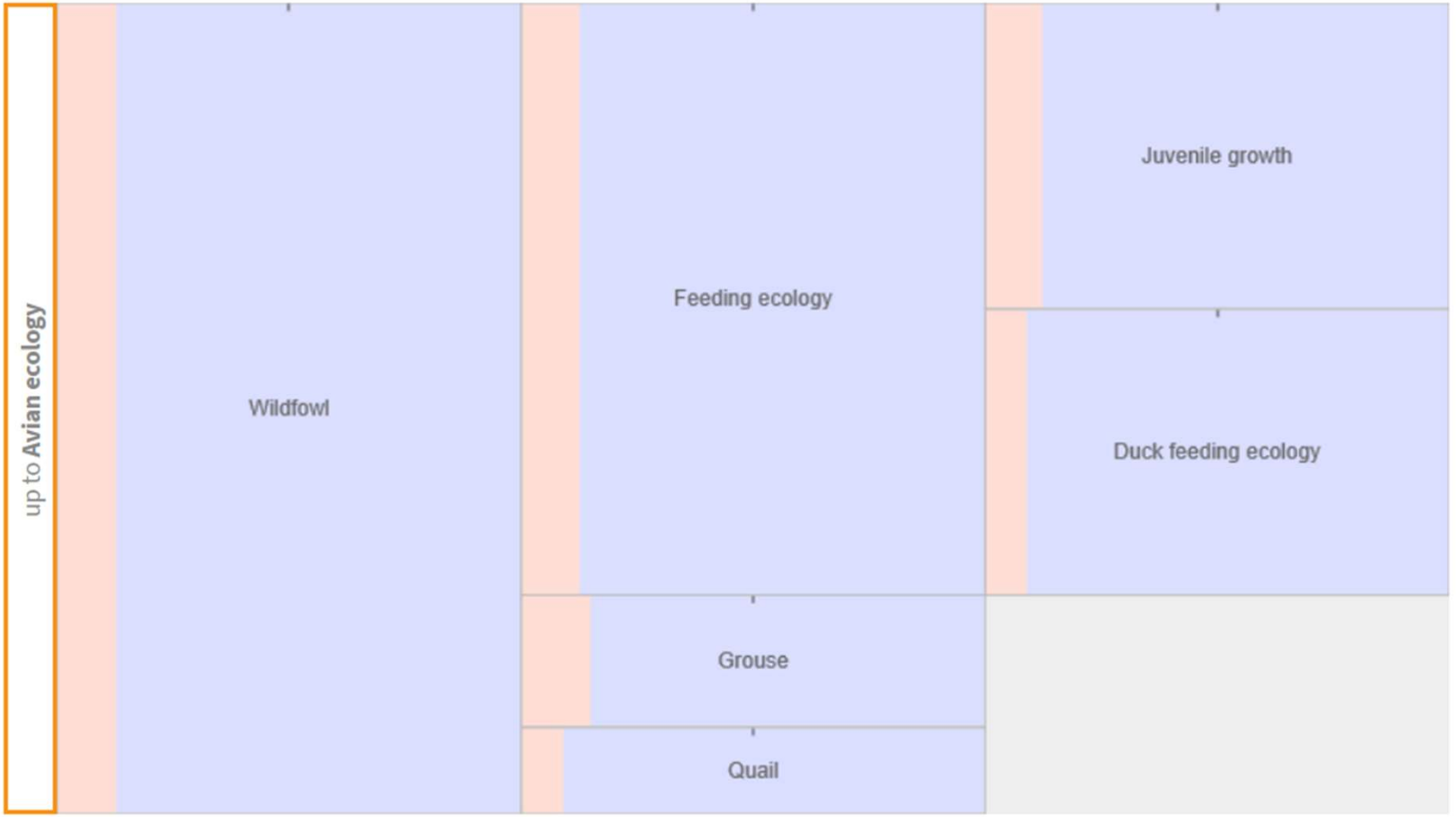
The Leaky Pipeline in STEM

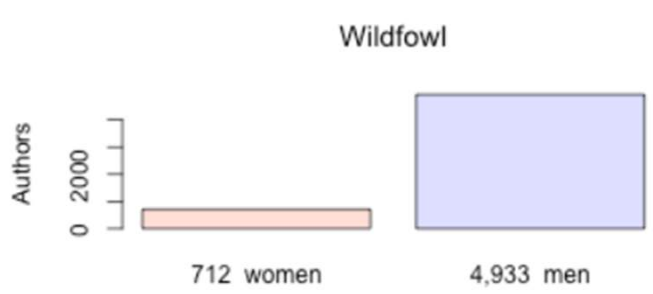


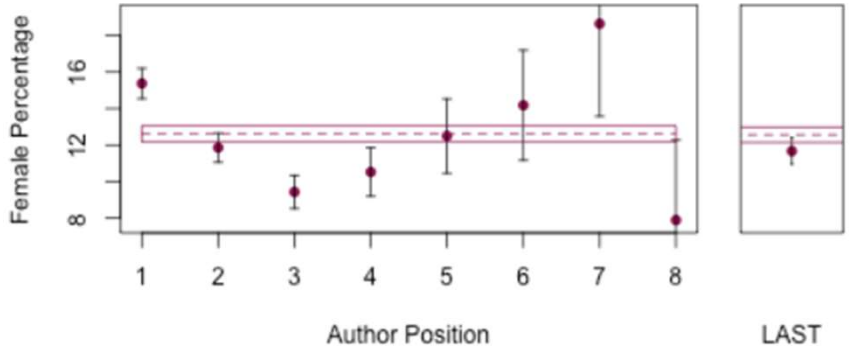




West et al. 2013







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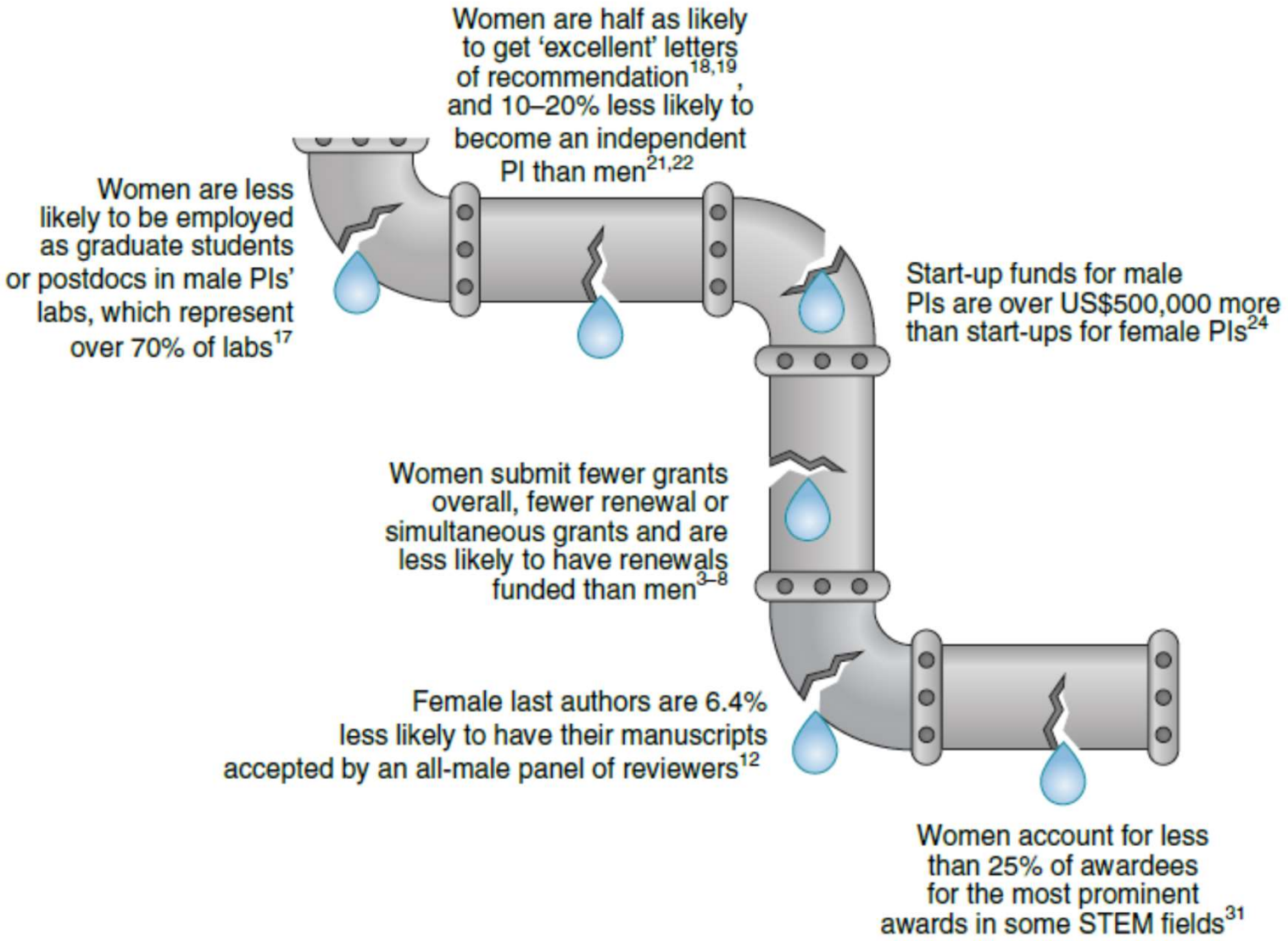


Grogan 2019

What factors could be contributing to these trends?

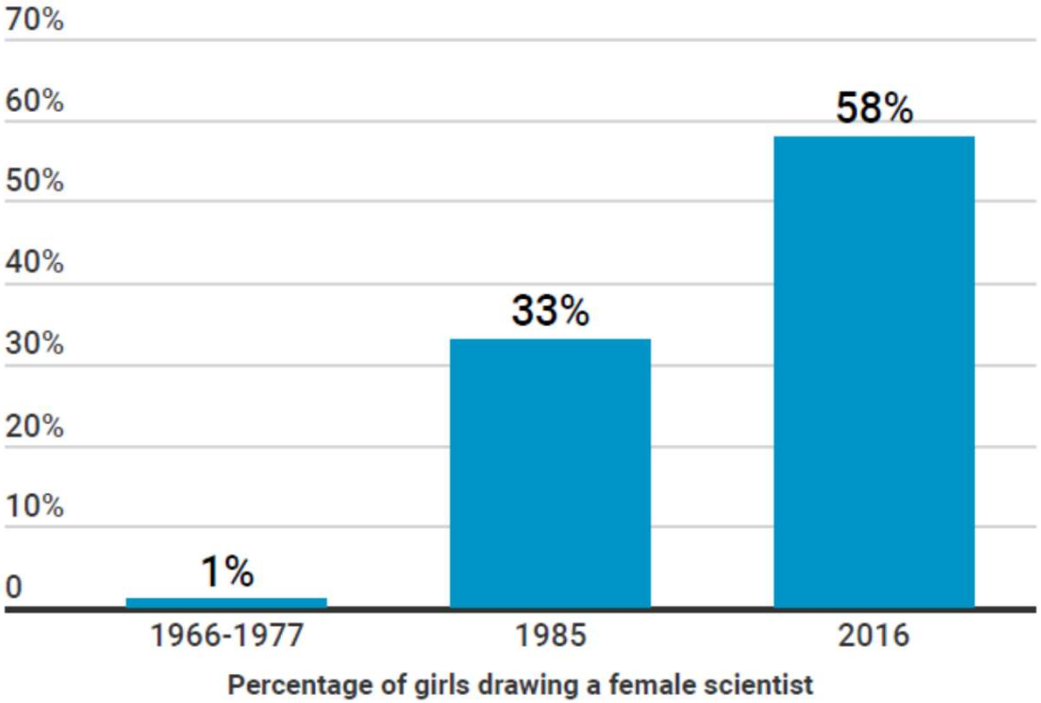
- Evidence suggesting biological sex differences in inherent aptitude for math and science are small or non-existent (Halpern et al. 2007, Hyde and Lynn 2006, Spelke 2005)

- Lifestyle choices (free or constrained) could contribute to gender imbalance

- Implicit or unconscious gender bias
  - Subtle biases still held by even the most egalitarian individuals and *are exhibited by both men and women* (Dovidio and Gaertner 2004, Nosek et al. 2002)

Unconscious Gender Bias in Science

- Public perception associating science with men much more than women (Miller et al. 2015, Smith and Nosek 2015)



Miller et al. 2018

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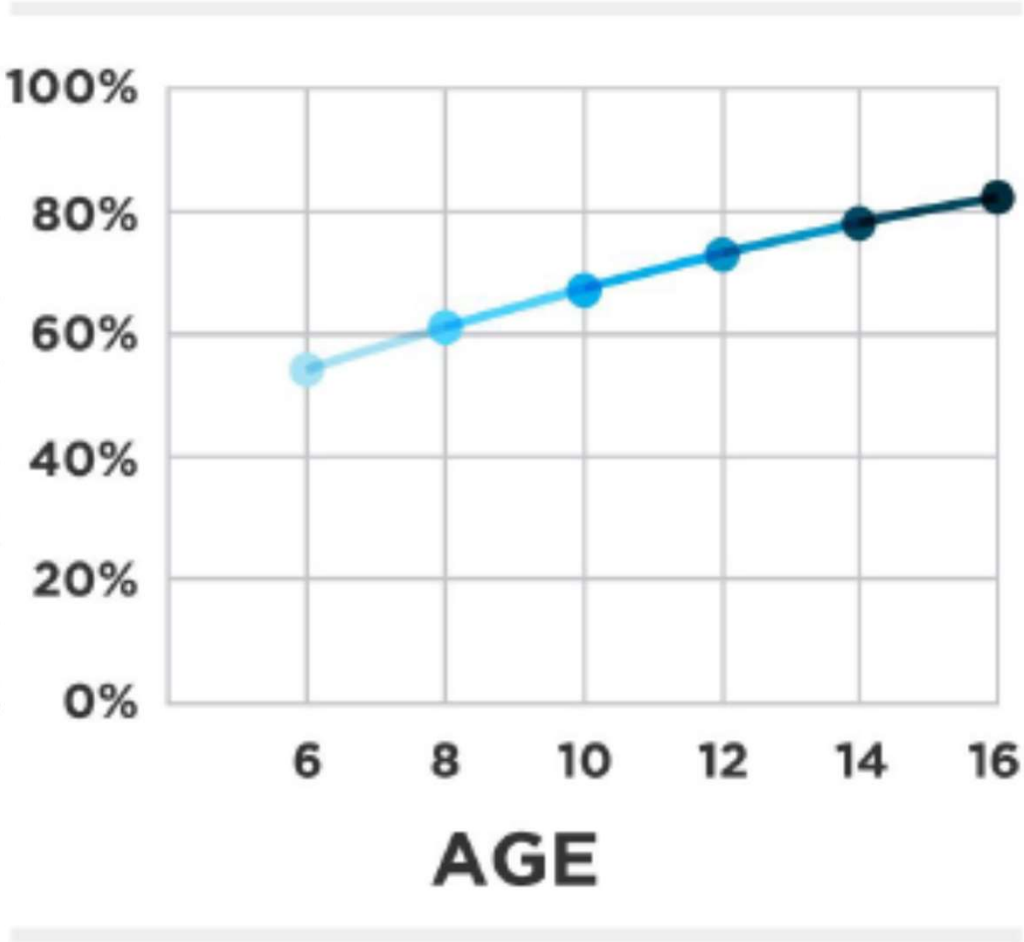
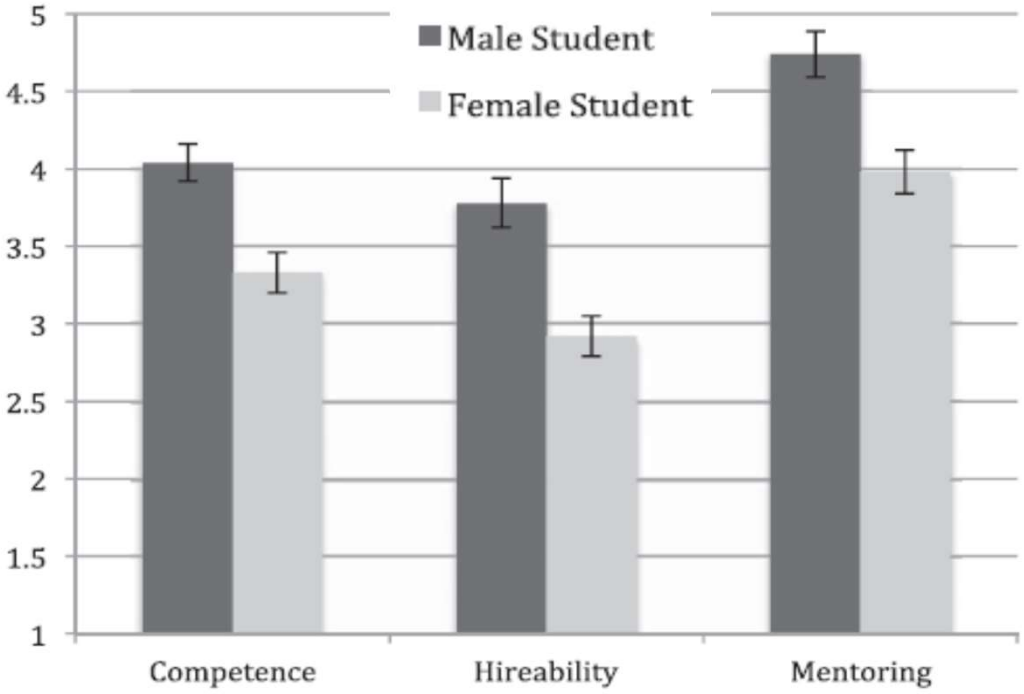


Miller et al. 2018

Unconscious Gender Bias in Science

Among scientists*, unconscious gender bias observed in:

- Hiring decisions for faculty and lab managers
- Evaluation of conference abstracts
- Postdoctoral employment
- Research citations
- Symposia speaker invitations



Moss-Rascusin et al. 2012

*Observed in both male and female scientists

Recognizing Unconscious Gender Bias

Ginger Rogers did everything Fred Astaire did but she did it backwards while wearing high heels

Recognizing Unconscious Gender Bias

She did everything he did,
but she did it . . . . . .

. . . . concurrently and with inadequate parental leave

. . . . ‘amiably’, so as not to appear ‘aggressive’

. . . . competently but still making $0.79 to the dollar

. . . . nervously, while trolled on social media

Novey 2016

Unconscious Gender Bias

Hypothesis: Unconscious gender bias can act as a ‘transmitter effect’ by hindering the performance and retention of women in the waterfowl profession

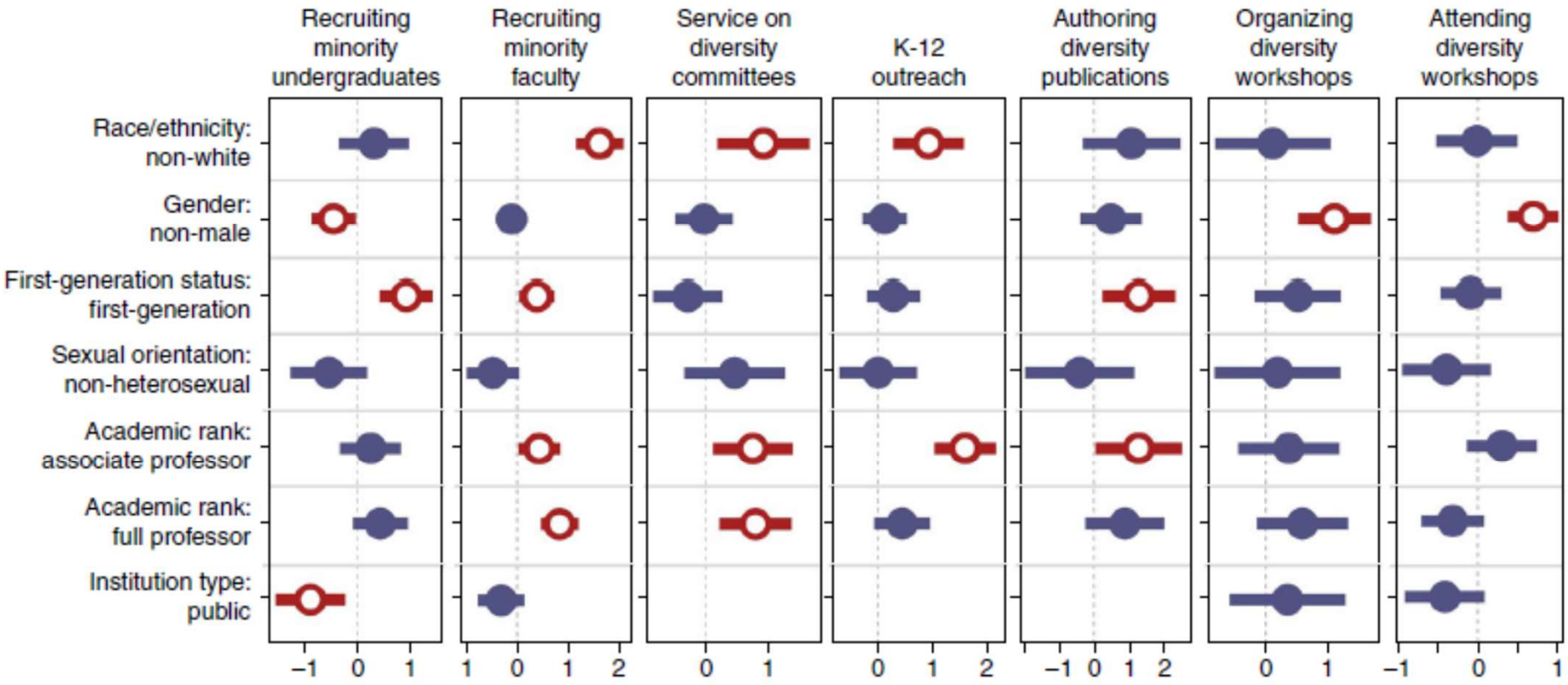
Steps to Address Unconscious Gender Bias in Science

- Acknowledge the issue - be aware of our own potential biases and work to address them
- Identify unconscious bias training opportunities – encourage people making hiring and assessment decisions to participate
- Offer unconscious bias training at society meetings and to journal editors/reviewers, scholarship panels

Steps to Address Unconscious Gender Bias in Science

- Ask if the opportunities your department/college/organization offer match up with the proportion of women in the field
- Establish objective and transparent hiring and evaluation criteria to guard against tendency to unintentionally use different standards for women
- Promote and participate in activities focused on increasing diversity and inclusion

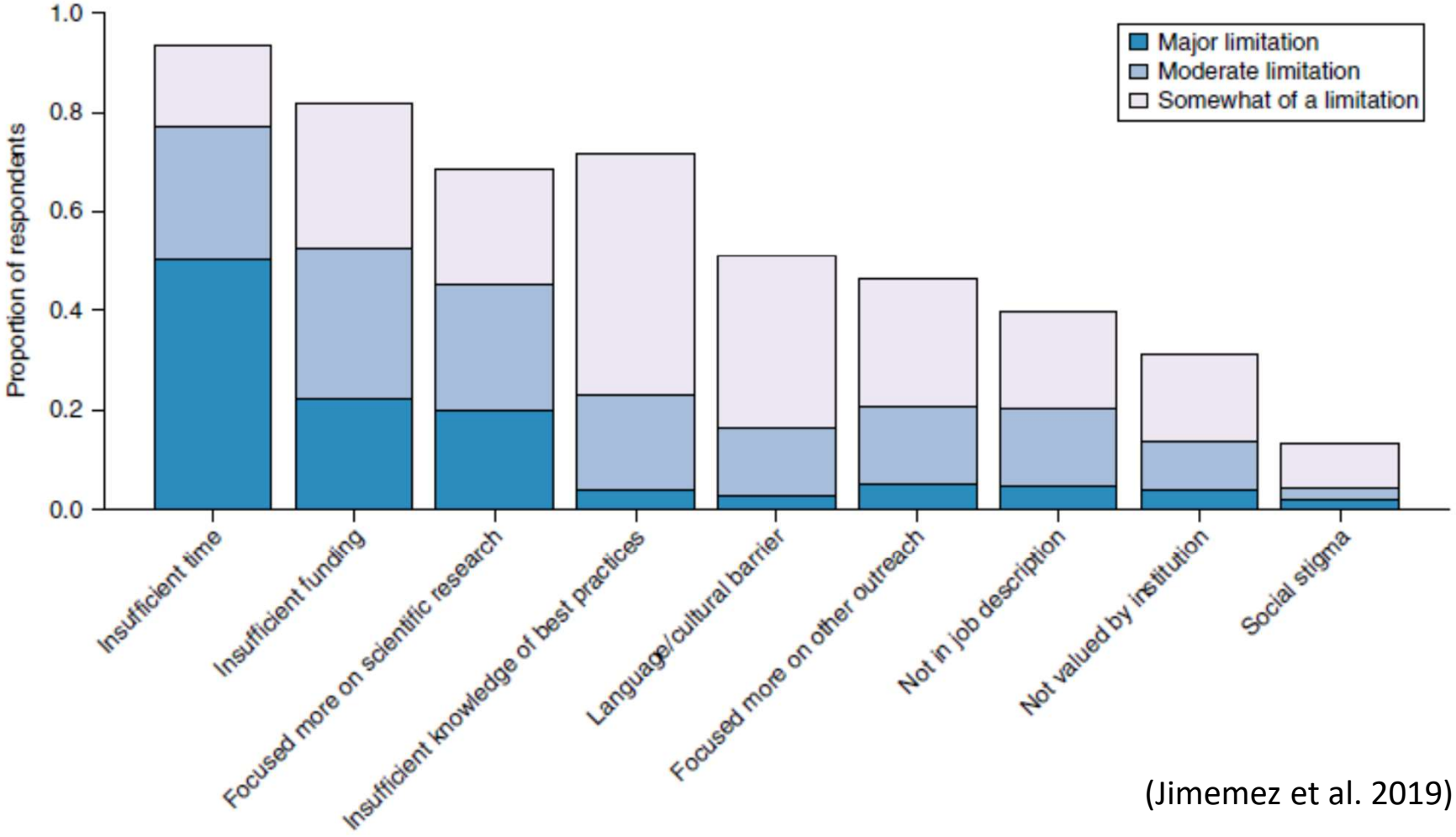
Characteristics of Faculty Participating in Diversity & Inclusion Activities



Although diversity and inclusion widely reported as valued by institutions, individuals did not feel it contributed to tenure decisions

(Jimemez et al. 2019)

Factors Limiting Participation in Activities Related to Diversity & Inclusion



(Jimemez et al. 2019)

We need to start thinking about diversity as an investment in good science

Resources

Website	Description
http://www.eigenfactor.org/gender/	Explore the gender of authors by authorship position in your field
http://www.raiseproject.org/	Explore the gender representation of award recipients in various STEM organizations
http://benschmidt.org/profGender/	In-depth visualization of how gender affects word choice in student evaluations
https://www.tomforth.co.uk/genderbias/	Calculate the gender bias of your choice in letters of recommendation
https://diversity.nih.gov/	Resources and research from the NIH Scientific Workforce Diversity Office
https://www.stemwomen.net/	Resources on gender inequality and potential solutions
http://diversityinacademia.strikingly.com/	Resources on racial inequality and potential solutions
https://nationalseedproject.org/	Peer-led professional development organization that provides training on engaging in conversations about diversity and equity
http://blogs.lse.ac.uk/impactofsocialsciences/2016/03/08/gender-bias-in-academe-an-annotated-bibliography/	Annotated bibliography of studies on gender bias in academia
https://fairplaygame.org/	Online role-playing, true to life simulation of the complex social world for a minority graduate student in academia

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