

Is gender bias real? Headwinds and tailwinds

There is a growing body of evidence showing that women face unconscious and pervasive discrimination at many points along their scientific education and career. Women in science, for example, are graded more critically, receive fewer awards and grants, and are subconsciously viewed as natively less scientifically able than men (see columns below). Each incident of discrimination could be subtle or small in magnitude, but their accumulated influence over time acts as a headwind making women's advancement in science more difficult.

In stark contrast, men and women alike tend to assess the scientific competency of males more favorably than that of females across all aspects of academic and scientific practice. Male students, for example, get more encouragement in their studies, are picked more often for academic awards, are recommended more convincingly for jobs, and are ultimately judged more hireable. Each of these examples

and other similar patterns act as tailwinds, subtly supporting and promoting men in their scientific careers. It is important to think of the accumulated influence of bias when evaluating the metrics that finally make it to a candidate's CV.

Am I gender biased?

Our subconscious influences how we make sense of the world around us, and this can be extremely useful. However, sometimes the way our subconscious naturally processes information can result in faulty interpretations and biased decisions, which we are often not fully aware of and that may directly conflict with our consciously held views. A good exercise for understanding your own unconscious thought processes is the Implicit Association Test available at <https://implicit.harvard.edu>. The IAT measures how strongly you associate certain concepts (e.g., women, immigrants) and evaluations such as good or bad. Your results might surprise you, and this could very well be the best first step towards counteracting bias.

The pipeline not only leaks...

Unconscious bias acts as headwinds and tailwinds treating men and women differently as each progresses through his or her scientific



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Publications and citations

Studies analyzing decades of scientific publishing and hundreds of thousands of papers show significant differences in the patterns of women and men authors. New papers also show the value of gender diversity in the team of authors.

- Analysis of over 8 million papers from natural sciences, social sciences, and humanities reveals persistent, subtle gender inequality. For example, men predominate the prestigious first and last author positions, and women are significantly underrepresented as authors of single-author papers (West et al, 2013).
- Women scientists who collaborate and publish together with their husbands/partners are often described as taking a "partnership" advantage, while this is hardly the case vice versa (Ahlqvist et al, 2014).
- Male and female experiment participants rated publications purportedly from male authors as higher in scientific quality, especially if the topic was male-typed. Collaboration interest was highest for male authors working on male-typed topics. These are the results of an experiment in which 243 young communication scholars rated conference abstracts ostensibly authored by men or women, but in fact the author gender was randomly assigned Knobloch-Westerwick et al, 2013).
- Gender-heterogeneous working groups generally produce papers with higher perceived quality than other groups comprised of highly-performing members of the same gender (Campbell et al, 2013).

Networking and letters of recommendation

Women have less access to powerful networks, fewer powerful mentors, and less convincing letters of recommendation.

- Networking is complex and subconscious. The facts that men tend to form social bonds more easily with other men and that the majority of academics in senior positions are men means there are strong and informal networks in which men recommend and support each other, cite each other's works, and keep each other informed of job opportunities (van den Brink & Benschop, 2011).
- Women are under-represented in the world's science academies and research councils – worldwide, most are more than 80% male. Fewer of half of academies and councils have strategies or policies in place to address the issue (Gibney, 2016).
- High-achieving and elite male researchers in the life sciences train 10 - 40% fewer women than do their peers. The more decorated the male professor, the greater the skew. Women professors do not show this bias. A disproportionate number of assistant professors are trained in and recruited from such elite "gateway" labs, thus affecting the number of highly competitive women in faculty job searches (Sheltzer & Smith, 2014).
- Female postdocs are less likely than men to get a glowing reference. Men more often received superlative adjectives like "remarkable" or "outstanding," while women were often described as "hard-working." These were findings of an analysis of tone and length of over 1000 letters of recommendation (Skibba, 2016).
- A study of over 300 letters of recommendation for medical school showed letters for women were shorter, showed less conviction, and more often mentioned the women's personal lives. Women were more often described as students and teachers, while men were described as researchers and professionals (Trix & Psenka, 2003)

Hiring

Women walk a fine line when presenting themselves in hiring situations. Those who present themselves as highly confident and competent can be perceived as bossy, too ambitious, too aggressive. Those who adhere more closely to the social norms of their gender – warm, gentle and modest - are rated as less competent.

- In a randomized, double-blind study involving 127 nearly identical applications for a lab tech position, which only differed by a randomly assigned male or female name, male and female science faculty members alike rated male applicants as more scientifically competent and more hireable. The study participants also offered the males a higher starting salary and more career mentoring. (Moss-Racusin et al, 2012)
- When symphony orchestras conduct "blind" auditions by using screens to conceal candidates' identities, the hiring of women increased. The inability to identify the gender of the musician enabled more impartiality and diminished the influence of common assumptions that female musicians produce "poorer sound" with "smaller techniques." Similar results occurred in blind auditions for programmers and engineers (Goldin & Rouse, 2000).
- Men were two times more likely than women to be hired for a job requiring math according to an experimental hiring situation in which candidates were asked to perform an arithmetic task that men and women can perform equally on average. When candidates were allowed to self-report their success on the task, women still are discriminated against, because employers do not fully account for men's tendency to boast about performance (Reuben et al, 2014)

Leadership and society

Gender biases stem "from repeated exposure to pervasive cultural stereotypes that portray women as less competent but simultaneously emphasize their warmth and likeability compared with men" (Moss-Racusin et al, 2012).

- Men are stereotypically judged to be stronger leaders than women. However, a randomized field experiment (of 927 group members and 70 group leaders at a large university in Western Europe) showed that when the team being led was comprised of approximately 40% women or more, evaluations of female leaders rose to levels on par with the evaluations of male leaders (Gloor et al, 2016).
- Pervasive cultural stereotypes portray women as wives and mothers. Woman scientists who have a partner who also works in science often have to adapt their career to the moves to the often somewhat older/scientifically more advanced partner.
- The "baby penalty" affects women with children, making them far less likely to receive tenure than childless women or men with or without children (Mason et al, 2013). Similarly, a "maybe baby" bias in hiring disadvantages women without children (Stöcklin, 2016).
- When women aren't present for senior-level decision making, organizations can fail to see the value of programs and initiatives that benefit the female half of the population.
- Even if an organizational culture explicitly promotes meritocracy, it nevertheless shows bias in favor of men over equally performing women when it comes to performance assessment, promotion, and monetary rewards. This "paradox of meritocracy" was shown in experiments involving 445 experienced managers performing staff evaluations in which the gender of the employee was manipulated (Castilla & Benard, 2010).

Examples of biases in academic settings:

Classroom, lab, and field

Women students in science face challenges in how they are perceived, graded, and treated.

- Professors might favor male students. Researchers sent identical letters, purportedly from students, to more than 6,500 professors at 259 top American universities asking to discuss research opportunities. Professors were more likely to respond to email from "Brad Anderson" than from other fictitious aspirants with names like "Claire Smith" or "Juan Gonzalez." (Milkman et al, 2015).
- Undergraduate students often prefer men both when rating their peers (Grunspan et al, 2016) and their professors (MacNell et al, 2015).
- Nearly two-thirds of field scientists reported in a survey that they had been sexually harassed in the field. 666 field scientists from 32 disciplines including biology and geology were surveyed. 3/4th were female. More than 20% reported sexual assault. (Clancy et al, 2014).
- Females physics students can be graded more harshly than their male peers. Experimental results show a significant gap between boys' and girls' scores for the exact same answer when graded by teachers with up to 10 years of experience (Hofer, 2015).

Awards and grants

Women often have to prove more evidence of competence than men in order to seem as equally competent.

- Women needed 2.5 times the publications of their male counterparts to mitigate the bias favoring males in the application process. This disadvantage was not found among those female candidates who knew someone on the panel. These were the conclusions of a groundbreaking study of postdoc fellowships awarded by Sweden's Medical Research (Wenneras & Wold, 1997).
- A strong CV can compensate for a weaker grant proposal, but only for men. An analysis of application and review materials (n= 2823) for a prestigious personal research grant in the Netherlands found evidence of gender bias favoring males. Men received significantly more competitive "quality of researcher" evaluations and had significantly higher application success rates despite receiving "quality of proposal" evaluations on par with women applicants (van der Lee & Ellemers, 2015).
- Females are underrepresented as recipients of scholarly and research awards and tend to receive awards at higher rates for teaching and service (AWIS, 2015). This is also evident here at the MNF where the odds of male PhD students getting a distinction are 1.76 times more than for females.

PhD's distinctions awarded by the Faculty of Science 2008-16

Graduations		Distinctions		OR	95% CI
m	f	m	f		
951	799	77	38	1.76	1.18 to 2.63

What are we doing now?

The MNF appoints its professors in accordance with federal and cantonal law, as well as university and faculty regulations. Moreover, the Swiss federal Constitution contains an anti-discrimination clause, which protects the characteristics of origin, race, gender, age, language, social position, way of life, religious, ideological or political convictions, and physical, mental or psychological disability (Article 8). The Constitution also specifically states that women and men have equal rights *both in law and in practice*.

For the MNF this means that the way we recruit must afford all applicants the same opportunity to convince us of their excellence. The following numbers raise some questions about how well the MNF is currently doing:

- The MNF appointed 67 professors in the decade ending 2016, 10 (15%) of these were women.
- In the same time period, the MNF professoriate grew from 93 (2007) to 110 (2016), an increase of 18%. However, the number of women MNF professors grew only from 14 in 2007 to 16 in 2016, which implies a stagnation in the percentage of women professors at 15%.

The Faculty of Science has taken steps to unpack the professorial recruitment process. Data for 2007 – 2016 show that:¹

- Women submitted 14% of all applications (444 of 3136 applicants were women)
- Women constituted 21% of job talk invitees (48 of 227 invitees were women)
- Women made up 17% of primo loco-placed candidates after the job talks (6 of 35 primo-loco ranked applicants were women)
- Women were 17% of new professorial appointments (6 of 35 new appointments were women)

Women constitute a fifth or less of the potential appointees throughout the process. This is not enough to increase the number of MNF women professors substantially. Why do not more women scientists apply at MNF? A larger pool of applications by women would enable the Faculty to also increase the percentages of women in the subsequent states of the recruitment process. On a positive note, all primo-loco placed women candidates did eventually become professors at the MNF.

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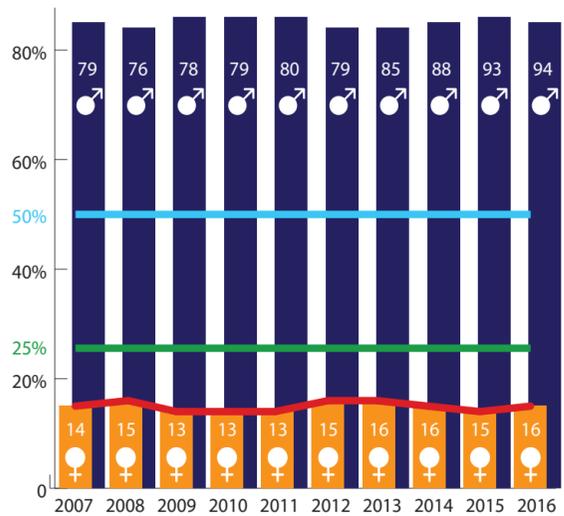
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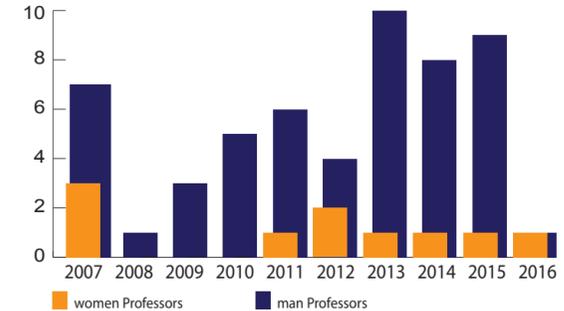
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Man and women professors at the MNF 2007 to 2016



Number of man and woman new appointments at the MNF 2007 to 2016



¹ The data on applications refer to 33 recruitment processes; the data on job talks refer to 35 recruitment processes; the data on rankings refer to 35 recruitment processes; the data on appointments refer to 35 recruitment processes. This is due to missing data.

How to counteract unconscious gender biases in professorial appointments

Be aware of cognitive biases

- People generally have a bias in favor of the status quo. Change creates discomfort.
- Confirmation bias influences us to selectively search for and interpret evidence that verifies our preconceptions or expectations. For example: grant reviewers favor proposals for projects that confirm their own views (Ernst et al, 1992)
- Attribution error is our tendency to make assumptions, for example, that high performing males achieved success by their own merit, while high performing females had a good team of support (Pern Kandola, 2014)

Gender balanced structure and search committees

- Include at least two female professors from MNF in committees preparing the Statements on Professorial Positions and in hiring committees.
- Determine the selection criteria and their relative weight prior to advertisement of the position and apply them consistently to all applicants.

Note:

- The lower the percentage of women on selection committees and the less transparent the criteria for selection, the less likely women are to be appointed (EC, 2009; Zinovyeva & Bagues, 2010).
- The less transparent the definition of "hirable" is in searches for academic leaders, the more likely men are chosen over women (LERU, 2012).
- With unclear criteria committee members may tend to judge using criteria that favor candidates from well-represented demographic groups (Biernat & Fiegen, 2001; Uhlmann & Cohen, 2005)

Advertising the job

- Define the position in the widest possible terms consistent with the needs of the university/department. Make sure the position description does not unintentionally exclude female applicants by focusing too narrowly on subfields in which few specialize.
- Include only those qualifications that are vital. Research shows that women apply for jobs if they meet 7 of 10 listed qualifications; men apply if they meet 4 of 10 (Pearn Kandola, 2014).
- Use gender neutral vocabulary. Be aware that men are typically described with individual and authoritative words whereas women are often described with communal words.

Individual, authoritative words	Communal words
... determined and independent student committed and responsible student ...
... analytical work style conscientious work style ...
Determined, autonomous, competencies, champion, promising success, leadership position, aggressive, analytical, courage, and outspoken	Committed, responsible, talents, helpful, support, responsibility for employees, conscientious, trustworthy, collaborative, and sociable

- Include proactive language which indicates a commitment to diversity:
 - "The University of Zurich is an equal opportunities employer."
 - "The University is especially interested in qualified candidates who can contribute, through their research, teaching, and/or service to the diversity and excellence of the academic community." (from the University of Michigan)

Selecting the short list

- Evaluate both the full CV and the 1-page CV. The 1-page CV is a form submitted by the applicant which provides information on periods of

time in which the applicant was not engaged in an academic activity on a full-time basis (possibly due to family commitments, time spent working in industry, long periods of illness, etc.) and can be used to estimate the "academic age" in a fair way.

- Select at least one female referee for writing a review letter for each candidate of the final selection. If comparative review letters are required, at least one must be from a female referee.
- Statements on Professorial Positions are to contain gender-balanced lists (50/50) of academics that the structure committee considers to be possible candidates for the position. The Dean rejects structure reports until they comply. The search committee contacts all listed individuals.

Note:

- The University of Michigan introduced a set of measures addressing the way applications are judged (criterion-specific instead of global judgments) and has increased the proportion of appointments of female professors from 9% in 2001-2 to 31% in 2002-08.

Organize talks, interviews, and site visit

- Write a set of core questions before the interviews to be used with every candidate. The more structured the interview, the more comparable the result.
- Do not ask about family issues related to a potential move to Zurich during the interviews.
- Avoid solo status, if at all possible. Research shows that if there is only one candidate who differs from the others in some aspect such as gender, ethnicity, or age, chances to be hired decrease for this candidate.

Note:

- The odds of hiring a woman were 80 times greater if there were at least two women in the finalist pool (regardless of the size of the finalist pool.) And there was statistically NO chance of hiring a woman when she was the sole female in the finalist pool. These were the conclusions from an empirical study that looked at a university's hiring decisions involving 598 job finalists for 174 positions over 3 years (Johnson et al, 2016).



- Gender stereotypes are likely to negatively influence evaluation of women when they represent a small proportion (less than 25%) of the pool of candidates. In other words, seeming different from the group makes a candidate's gender difference the most salient point in her evaluation. Focusing on a candidate as female instead of the candidate as a scientist leads to inferences of incompetence. (Heilman, 1980).

Selection of new professors

- The selection of new professors is an imperfect process. Important reasons for this are that academic excellence is not inherently a gender-neutral standard of merit and the criteria developed in a hiring process are different from those actually applied, often due to constraints on time. Focus is instead upon the "suitable" candidate.



Faculty of Science

Recruiting for Excellence

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Dear Colleagues,

Hiring, retaining, and promoting exceptional academic colleagues is one of the most important activities we do as faculty, and I thank you for your continued energy and commitment to finding and selecting the best candidates. However, our efforts to recruit, retain, and promote women have produced uneven results. In the ten years from 2007 to 2016, the percentage of women professors in our science faculty has remained stagnant at around 15%, even though we added 19 new professorships in this time period. Recognizing this, we implemented in 2014 new measures in the professorial hiring process designed to increase the number of highly competitive women involved. We are confident these measures will lead to a very different result in the coming decade.

The focus upon women is part of a larger commitment to fair and self-critical recruitment and hiring processes. We have a collective responsibility to question our evaluation criteria to define and assess "quality," "excellence," and "expertise" in science. Is there a gap between measurable-impact and perceived-impact when using popular metrics such as the H index to evaluate candidates? We signed the San Francisco Declaration on Research Assessment (DORA) confirming that scientific output is measured accurately and evaluated wisely. And if "excellence in science" is more than a singular quantitative indicator of publications, what does this mean for the other key factors such as impact in one's field?

We need to be introspective about our current practices at both personal and institutional levels. Men and women alike unwittingly allow unconscious thoughts and experiences to

unintentionally influence what they believe to be objective decisions. Many studies show that merely changing the gender identity of an applicant radically and consistently alters the way others judge the quality of that person's work. We need to have the courage to enact the measures necessary to prevent unintended discrimination. With this brochure, we want to make you, serving as committee members in professorial appointments and mentoring our excellent scientists, aware of the growing body of knowledge showing the pervasiveness of gender bias in academia.

The selection of new professors has far-reaching consequences, some of which can reduce gender bias. All students need formal and informal role models. The relative lack of female professors in our faculty creates a conscious and subconscious sense in our female students of not belonging. Furthermore, the gender diversity of the MNF professoriate has important implications upon the equitable representation of women in decision-making, and we have strong evidence that a gender-balanced faculty increases the creativity, innovation, and productivity of an institution. All of which would increase our competitive advantage on the short, medium, and long term.

I thank you all for contributing to our faculty being a mirror of society, both in terms of topics covered and in gender diversity.

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