

The inside track from academia and industry

Bias cut

Women, it seems, often get a raw deal in science — so how can discrimination be tackled?



Lutz Bornmann

When it comes to applying for grants, women seem to be at a disadvantage — they are potentially less likely to succeed than their male counterparts. So suggests a meta-analysis of 21 studies conducted by my colleagues Rüdiger Mutz and Hans-Dieter Daniel and I (see <http://arxiv.org/abs/math.ST/0701537>). The cause of this discrepancy is unknown. It could be that fewer women principal investigators apply for grants. Gender bias — whether implicit or explicit — could come into play. Or the explanation could be institutional; there are more men than women in high-ranking positions, meaning fewer women have a chance to make decisions.

There has been widespread acknowledgement of how gender affects scientific careers.

A comprehensive review of the literature on gender differences in the careers of academic scientists by the US National Science Foundation (NSF),

concludes: “Taken as a whole, the body of literature we reviewed provides evidence that women in academic careers are disadvantaged compared with men in similar careers. Women faculty earn less, are promoted less

frequently to senior academic ranks, and publish less frequently than their male counterparts.”

But the NSF doesn't address peer review as a component of this discrepancy. Conventionally, peer review is regarded as a sure guarantee of good science. It reassures us about the quality of scientific work and that taxpayers' money is well spent. Our meta-analysis suggests that there are robust gender differences in grant peer-review procedures, and our results line up with the NSF's broader conclusion on gender differences in the careers of academic scientists.

Whatever the cause, our paper

also reports some ways to rule out gender bias — whether intentional or unintentional. One possible way to avoid bias in the grant peer-review process is to mask applicants' gender. In journal peer review, masking authors' gender has proved to be a satisfactory precaution against bias. But masking is not equally suitable for all types of submission. It is impossible to pass valid judgment on a short-communication manuscript without some personal knowledge of the author.

It is questionable, as well, whether the gender of the applicant in grant peer review should be masked. Apart from assessment of the proposed research, decisions are also based on the applicant's track record. The European Molecular Biology Organization (EMBO) in Heidelberg, Germany, is planning an experiment in which the committee in the research-fellowship selection process will be totally gender-blinded, according to EMBO's programme manager, Gerlind Wallon.

The first step to identify bias and tackle its potential sources is a continuous, professional evaluation of the selection process and its outcomes. A few years ago, our team analysed the peer-review selection process for the Boehringer Ingelheim Fund (BIF) fellowships (see *Nature* **430**, 591; 2004). Although the selection process proved highly valid in identifying the most promising junior scientists, and there was no gender difference at postdoctoral level, we did find a slight gender bias in the selection of PhD students. The results were thoroughly discussed by the review committee and the foundation continued to monitor its selection process closely. This allowed the BIF to see a considerable increase in female applicants and scholars in the next few years, with nearly 50% of the 2006 PhD scholarships awarded to women. But according to

Hermann Fröhlich, managing director of the BIF, the growing number of young women participating and succeeding in one of the most competitive selection processes for scholarships may be due to social change. And as the BIF evaluates young researchers and their projects at the earliest possible phase in the scientific career, its figures may indicate that large numbers of women have started to reach for the top in science.

The Pioneer Award for innovative research given by the US National Institutes of Health (NIH) shows that there are other effective measures against gender bias. In 2004 there were no women among the 9 scientists chosen, but in 2005, 6 of the 13 winners were women, and in 2006, 4 of 13. After the first round, the NIH specifically encouraged women to apply, accepted only self-nominations rather than institutional submissions and spent more time training its reviewers.

Changes such as widening submission policies, 'masking' fellowship applicants and regularly evaluating the peer-review process have started closing the gender gap in grant success. Other moves will help women rise to higher levels of leadership in science and erase unintentional gender bias. The Committee on Science, Engineering, and Public Policy of the US National Academies proposes setting up programmes to provide women with mentoring and support. It also aims to restructure hiring and promotion procedures to reduce bias and encourage diversity. This will include training search committees and heads of department to recognize bias, and to reduce it. ■

Lutz Bornmann is a researcher at the Professorship for Social Psychology and Research on Higher Education at the Swiss Federal Institute of Technology, Zurich.

“Women did very much better when only self-nominations were accepted, not institutional submissions.”