

Anke Reinhardt

Progress on gender equality? Research proposals by female researchers to the DFG: submission and success

„Female scientists in the DFG 2005-2008“, a study by Katrin Auspurg and Thomas Hinz (with the assistance of Ina Findeisen) from the Department of Empirical Social Studies at the University of Constance, analyses the overall numbers and proposal success rates of female researchers submitting funding applications to the DFG. This new study builds on the findings of their previous work „Female scientists in the DFG 1991 – 2004“. The study takes an in-depth look at the proposal success rates of female researchers in the natural sciences and the effect of the Excellence Initiative on the success rate of applications to the Individual Grants Programme. The most important findings of the study are presented in this DFG Infobrief.

1 Initial situation, data basis and methodology

In 2006 the DFG commissioned researchers Thomas Hinz, Katrin Auspurg and Ina Findeisen of the University of Constance to perform a study on gender equality in the DFG. Drawing on data collected during the processing of research proposals, the study was the first systematic analysis of the participation of female and male researchers in the DFG's various funding programmes, and examined their proposal success rates, the disciplinary and topical focus of their research projects, their membership in the DFG's statutory bodies and assessment of the science system.

The study covered the period from 1991 to 2004, and led to the establishment of an internal DFG monitoring system. The DFG now publishes annual statistics on the participa-

tion of female applicants in the DFG funding proposal process and their success rates in the various Programmes and Scientific Disciplines (www.dfg.de/chancengleichheit). The participation of women in DFG statutory bodies is also reviewed through the internal monitoring system. When the DFG monitoring system revealed diverging trends in the proposal success rates of male and female researchers in 2007 and 2008, Professor Hinz and his team were commissioned to analyse key data covering the period from 2005 to 2008.

In this latest study, Katrin Auspurg and Thomas Hinz examined the participation and proposal success rates of female and male researchers under the Individual Grants Programme as related to the four scientific disciplines distinguished by the DFG (humanities and social sciences, life sciences, the natural sciences, and engineering sciences). Applica-

tions for individual grants are the most frequent form of funding application made to the DFG. The authors analysed data collected during the processing of approximately 27,000 new applications made to the DFG between 2005 and 2008. Auspurg and Hinz included several other funding programmes in their analysis, in particular the Excellence Initiative, and the study also reviews the funding of „Temporary Positions for Principal Investigators“. Official statistics on university personnel were also used to analyse the proportion of women within the science system as a whole.

2 Key findings of the analyses

2.1 Participation in the funding application process

The Individual Grants Programme enables researchers to conduct innovative projects across a diverse range of fields of inquiry. The Programme is open to researchers from every scientific discipline for research on any topic, and a range of funding options is available through this highly flexible instrument. Researchers holding a doctorate in Germany or at a German research institution located abroad are

eligible to apply for a research grant under this programme.

During the period covered by the study a total of 4,257 submissions were made to the programme by female researchers, comprising 15.8% of all applications under the Individual Grants Programme. Figure 1 traces the development of the proportion of female applicants relative to the total number of applications across the four scientific disciplines. The period covered by the study saw significant increases in the proportion of applications by female researchers in both the life sciences and the humanities and social sciences – increases which built on what was already a comparatively strong base. This trend reached a high of 27.1 % in the humanities and social sciences (an increase of approx. 4 percentage points since 2005) in 2008, and 21.5 % in the life sciences (from 18.6 % in 2005). The proportion of female researchers in the natural sciences fluctuated between 8.2 % and 10.8 % during the examination period. In the engineering sciences the proportion of female researchers ranged from 6.1 to 7.7 %.

The study shows that the four scientific disciplines fall into two categories: those with large and growing proportions of female researchers (the humanities and social sciences,

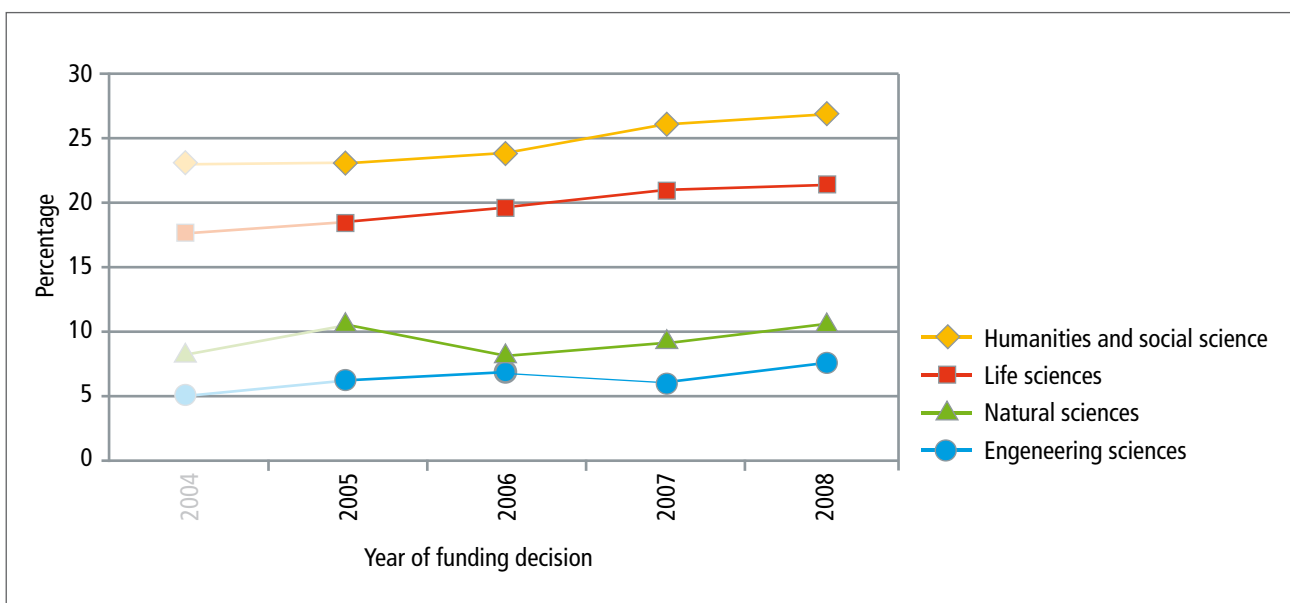


Figure 1: The proportion of female researchers applying to the Individual Grants Programme by scientific disciplines (2004-2008 in percent)

Source: DFG, calculations Auspurg/Hinz 2010

and the life sciences) and those with only a small proportion of female researchers and low growth rates (the natural and engineering sciences).

The number of female researchers actually submitting proposals to the DFG is significantly lower than the number of women eligible to do so. While the proportion of submissions by female researchers reflects the number of women holding professorships at German universities (and in fact exceeds that figure by 1-2 percentage points), a comparison of these figures with the number of researchers holding full-time positions at universities – an approximate value for the total number of eligible researchers (doctoral degree holders) – shows that women are clearly under-represented.

Analysis of the data for 2008 showed that women frequently apply for funding before they have gained a professorship. While 57 % of female applicants were not professors, this was true of just 34 % of their male counterparts. In total 38 % of all applicants (male and female) did not hold a professorship. According to the authors, this phenomenon may be due to the dependence of female applicants on third-party funding due to their precarious employment conditions. Female applicants are on average five years younger than their male peers, suggesting that they are forced to seek external funding at an earlier stage in their careers. The authors based this hypothesis on their evaluation of data drawn from funding applications for „Temporary Positions for Principal Investigators“. As part of the Individual Grants Programme, this funding category enables researchers to apply to have their position funded through the DFG. Applications under this category make up 7.7 % of all submissions to the Individual Grants Programme. While just 5.5 % of applications made by male researchers under the Individual Grants Programme fall under this category, 19.2 % of applications to this programme by female researchers are for funding of this type.

2.2 Proposal success rates

The DFG's mission is to promote excellence in science without regard to external factors. Ensuring that both male and female researchers enjoy equal opportunities is a cornerstone of the organisation's funding philosophy. An analysis of proposal success rates by gender, i.e. the number of successful submissions relative to the total number of applications, may reveal the extent to which the DFG has been successful in achieving this goal.

The success rates for new proposals submitted between 2005 and 2008 ranged from 43.3 % in 2008 to 45 % in 2007. On average 44 % of all new proposals were approved. Funding rates varied strongly between the scientific disciplines. While the funding rate in the humanities and social sciences lay at 40.2 % during this period, the funding rate in the life sciences was 42.9 %, while the natural and engineering sciences weighed in at 48.2 and 44.9 % respectively.

The authors' analysis also showed that while the proposal success rates of male applicants remained relatively constant throughout this period, those of female researchers have fallen since 2006, dropping below those of their male peers. (cf. Figure 2). This gap has widened from an initial 1.3 percentage points in 2005 to 6.3 percentage points in 2008.

The authors analysed the effect of gender and other factors on proposal success rates using multivariate logistic regression models. By isolating the impacts of these factors in their analyses, the authors were able to pinpoint their individual significance independent of other factors. As this information is not available in a suitable form, other criteria such as the quality of proposals and applicants' preliminary research cannot be included in these analyses, thus limiting their validity.

A disparity of 3.5 percentage points in proposal success rates (without applying any key variables) forms the baseline for the following

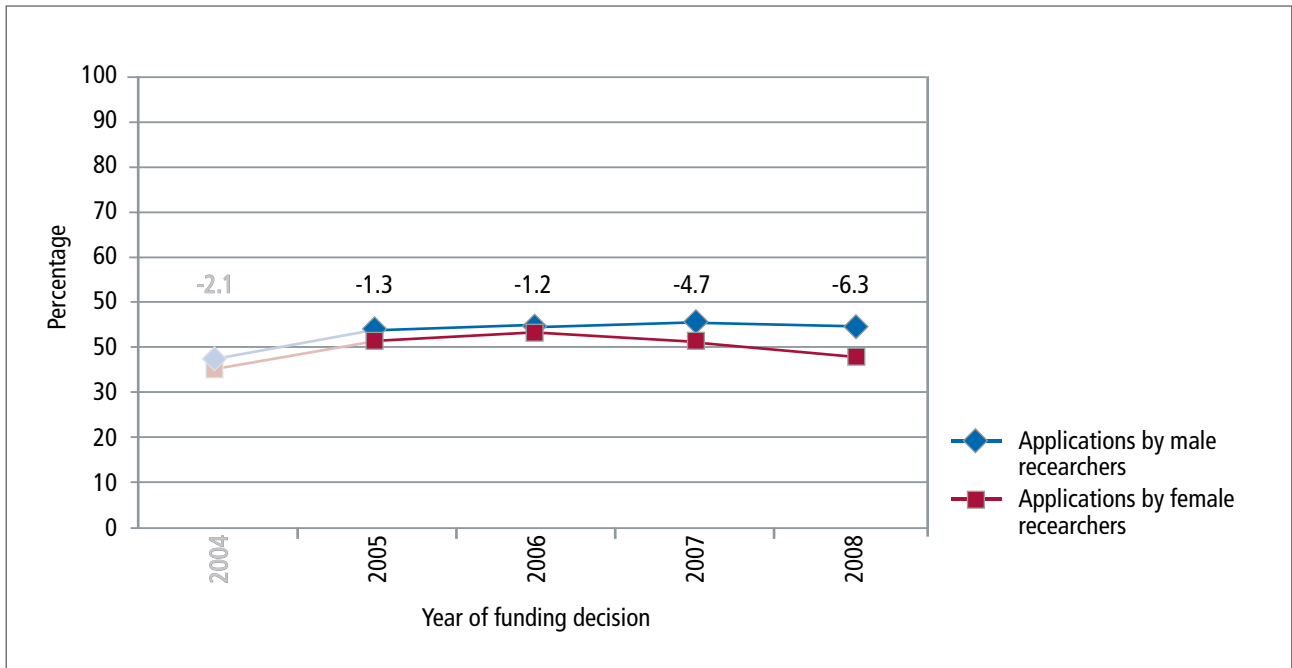


Figure 2: Proposal success rates under the Individual Grants Programme by gender (2005–2008 in %; showing the percentage difference)

Source: DFG, calculations Auspurg/Hinz 2010

analyses. Figure 3 details the effect of the various factors on this disparity.

The disparity in success rates climbs to 4 percentage points when the age of the applicants is factored into the analysis. As the proposals

of young male applicants enjoy a disproportionately high success rate, and female applicants are on average younger than their male counterparts, this disparity is increased when the age of the applicants is „neutralised“ in the

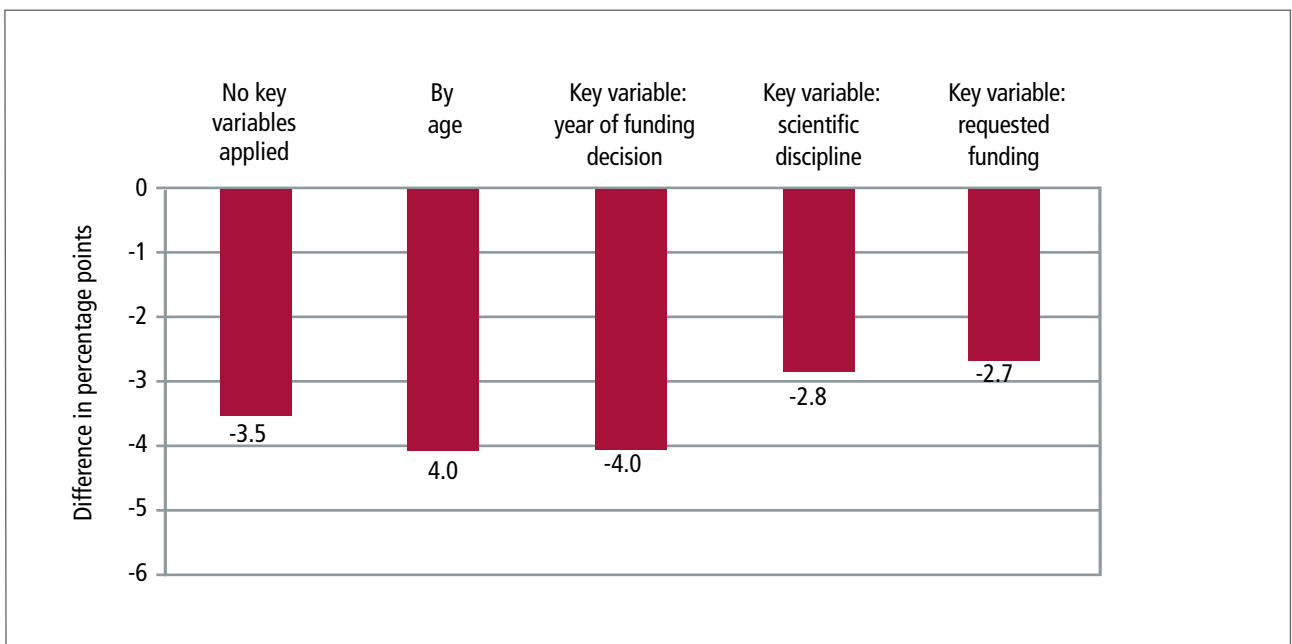


Figure 3: Gender disparities in proposal success rates for submissions to the Individual Grants Programme by key factors (2005–2008 total; percentage difference in proposal success rates of female and male researchers)

Source: DFG, calculations Auspurg/Hinz 2010

statistical calculation. Factoring in the year in which a funding decision is taken does not alter the disparity in proposal success rates, as overall success rates have remained relatively constant throughout the period.

Analysing the data by scientific discipline does, however, result in significant differences. As noted above, proposal success rates vary strongly between the scientific disciplines. When this factor is included in the analysis (i.e. in effect by comparing only applicants from one and the same scientific discipline) the disparity in the proposal success rates of male and female researchers slumps to 2.8 percentage points. In other words, this disparity is significantly influenced by the numeric predominance of male researchers in scientific disciplines with relatively strong proposal success rates (i.e. the natural and engineering sciences). The level of funding requested appeared, however, to have little impact on the proposal success rates of male and female researchers.

Statistically, none of these factors has significant explanatory power. Taking these factors into account, the proposal success rate of female researchers is 2.7 percentage points below that of their male peers. While an analysis of these factors revealed a difference in success rates of 2.4 percentage points during the previous review period (1991-2004), these results suggest that the aforementioned factors (age, requested funding, scientific discipline, year) now contribute less to the explanation of the disparity in the proposal success rates of male and female researchers.

2.3 Variations in proposal success rates by scientific discipline

As the analyses show, proposal success rates of male and female researchers vary strongly across the scientific disciplines. While the proposal success rates of female researchers are slightly lower than those of their male peers in most years, this is not always the case, and the

opposite may also apply in particular years or in specific disciplines. In 2005, for example, the proposal success rates of female researchers in the life sciences topped that of male researchers by 1.2 percentage points. In 2006, the success rate for submissions by female researchers in the humanities and social sciences was 3.6 percentage points above that of their male peers. In the same year the success rate for female researchers in the engineering sciences trumped that of their male colleagues by 12.5 percentage points. In 2008, however, the proposal success rates of female researchers were at least 3 percentage points below that of male researchers in all of the scientific disciplines. Moreover, the proposal success rates of female researchers in the natural sciences were significantly below those of their male counterparts throughout the period covered by the study. This disparity reached a high of almost 12 percentage points in 2008.

While the proposal success rates of female researchers in the humanities, social sciences and life sciences were only slightly behind those of their male peers throughout the period covered by the study (0.7 and 2.4 percentage points respectively), the disparity in the natural sciences (8.1 percentage points) is readily apparent. The picture is different again in the engineering sciences, where female researchers led their male peers by 2.4 percentage points (excluding other factors). Auspurg and Hinz conclude: „This marks a reversal in the funding situation. On average the proposal success rates of female researchers trailed those of male applicants across all of the scientific disciplines from 1991 through to 2004.“ (29)

Are these proposal success rates indicative of discrimination against female researchers? The answer is not simple. As noted above, information on the quality of proposals – a key factor in the decision to provide or withhold funding – cannot be included in the analysis. A number of conclusions can, however, be drawn from the information available. There is, for

example, a correlation between the proportion of female applicants and the proposal success rate in a given research area (see Figure 4).

As shown by the diagonal line in Figure 4, research areas with large proportions of female researchers tend to display lower proposal success rates. Both male and female applicants are affected by this phenomenon however. While the social sciences have the second highest level of female participation, this research area has the lowest proposal success rate. On the other hand, while the proportion of female researchers in natural science disciplines such as mathematics, physics and chemistry is extremely low, the proposal success rates in these disciplines are above average. The existence of a causal relation, as posited by „devaluation theories“ (according to which disciplines with high proportions of female researchers are, by default, worse off), cannot be established on the basis of the available information. It is evi-

dent, however, that the high proportion of female researchers in areas marked by low proposal success rates contributes significantly to the low overall proposal success rates of female applicants.

The authors also studied the proposal success rates of female researchers specialising in research areas with minimal female participation (and where women, on occasion, have a „special role“). They found that while women were affected by low proposal success rates in some areas, there was no evidence of a systematic connection. In some research areas with low proportions of female participation women enjoyed higher proposal success rates than their male peers, while in other research areas the opposite applied. Male and female researchers are equally affected by the low proposal success rates in research areas with high levels of female participation. In light of these findings, Auspurg and Hinz concluded: „the low

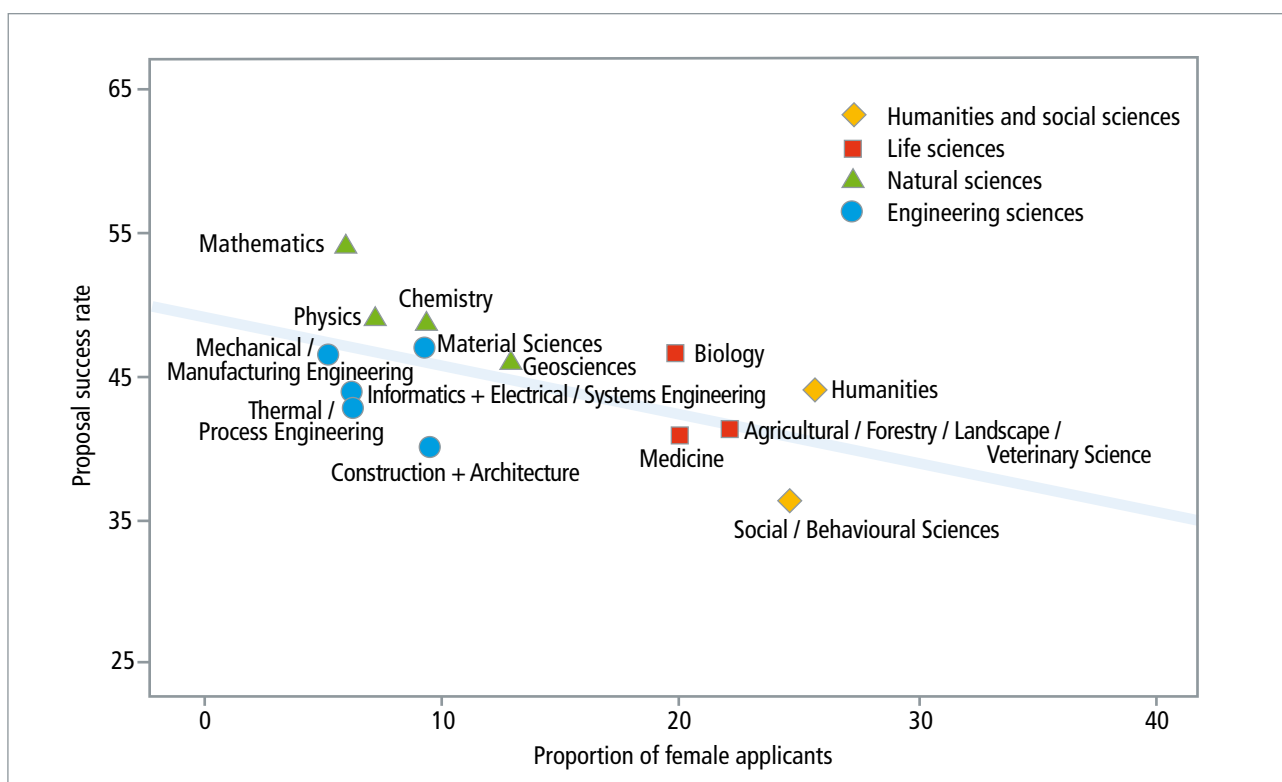


Figure 4: Proposal success rates¹⁾ under the Individual Grants Programme and the proportion of female applicants by research area (2005–2008 in %)

Source: DFG, calculations Auspurg/Hinz 2010

¹⁾ This analysis is restricted to new proposals (this applies throughout the report). The proposal success rates detailed here are accordingly lower than those noted in other DFG reports, which include funding renewal submissions.

prospect of success in these areas has a (proportionally) larger impact on female researchers as a whole rather than as individuals (42).“

Of all the scientific disciplines, the proposal success rates of female researchers in the natural sciences are by far the lowest and special analyses revealed that the key factors noted above have a similar impact here. The disparity in the proposal success rates of male and female researchers in the natural sciences grows when the ages of the applicants are taken into account; while an analysis by research areas reduces this disparity slightly (down to 7.7 percentage points). However, restricting the sample to applications submitted by researchers with positions at universities has a much stronger effect here than in other scientific disciplines; in this case the disparity in male / female proposal success rates climbs back up to 9.2 percentage points.

3 Conclusion and perspectives

Two major conclusions can be drawn from these analyses of the applications of female researchers to the DFG's Individual Grants Programme and their chances of success between 2005 and 2008. On the one hand, the proportion of women applying to the Programme is still below average. Furthermore, those female researchers who do apply for funding do so at a younger age than their male peers. On the other hand, the disparity in the proposal success rates of male and female researchers has grown. The concentration of funding proposals submitted by female researchers in research areas with generally lower proposal success rates (e.g. the humanities and social sciences) is a major contributing factor in this trend. This is compounded by a drop in proposal success rates in the natural sciences, which has particularly affected female researchers in recent years. A rise in the proposal success rate of female researchers in the engineering sciences, where women have achieved an above average

success rate, has failed to offset these effects as female participation in this area of research remains relatively low. Even a more differentiated analysis by scientific discipline and other factors such as age, the level of funding requested, and the year of the ruling – averaged across all disciplines – revealed a gap of 2.5 percentage points in the proposal success rates of male and female applicants.

Auspurg and Hinz have also explored the possible effects of the initial phase of the DFG Excellence Initiative, which coincided with the period covered by the study (2005-2008). As shown above, the proposal success rates of female researchers are lowest in the natural sciences. This disadvantage has a strong impact at university level, and the authors have analysed data drawn from natural science departments to discover whether and how the establishment of a cluster of excellence impacts on the success rate of proposals submitted to the Individual Grants Programme. Their findings suggest that the chances of receiving funding for individual projects are slightly lower for researchers (of either sex) based at university departments associated with clusters of excellence, than for those based at other departments (46.7 to 49.4 % respectively). Does this mean that the association with a cluster of excellence leads to a situation in which only „weaker“ researchers apply for individual funding? Or do reviewers alter their evaluation criteria? A number of methodological and conceptual hurdles have yet to be taken before these questions can be answered conclusively.

Future analyses will no doubt focus on the two scientific disciplines where gender-specific success rates have seen the largest changes – the natural and engineering sciences – in order to identify factors which enhance or diminish the proposal success rates of female applicants. Auspurg and Hinz recommend that previous work by applicants (publications) be analysed along with reviews, and that sequential analyses of the DFG's review process be conducted

in order to better distinguish between the impacts of reviews and review boards.

The latest report from the DFG's equal opportunities monitoring programme shows that the gender gap in proposal success rates closed significantly in 2009 (http://www.dfg.de/en/research_funding/principles_funding/equal_opportunities/index.html). The DFG will, however, continue to monitor proposal success rates. Information on the participation of female researchers in the application funding process will also be published by the DFG in its Funding Ranking report. Further research currently underway promises to answer a number of questions raised by the authors. The DFG has commissioned a literature review of international studies on gender effects in research funding. The study is expected to offer valuable insights into the underlying causes of differences in funding application behaviour and success, and will assist the DFG in developing new measures to address gender disparity. The DFG has also commissioned the Institute for Research Information and Quality Assurance (iFQ) to survey university professors on their application motivation, the importance of third-party funded projects in day-to-day research practice, and the recruitment of early career researchers. In another project the iFQ will also be examining various aspects of the peer review process in coordinated programmes (Collaborative Research Centres). This study is also expected to offer insights into the processes affecting the success rates and numbers of applications by male and female researchers. Finally, the second evaluation phase of the Excellence Initiative is to examine the consequences, both intended and incidental, of this high-profile funding programme.

The DFG will be taking concrete steps to improve the situation and career opportunities of female researchers in the science system through the implementation of its Research Oriented Standards on Gender Equality. A commission evaluated the first reports on their

implementation in 2010, and its findings were communicated to the participating universities. The DFG will continue to build on its current monitoring programme as it moves to improve gender equality in the research community.

4 Literature

Auspurg, Katrin und Thomas Hinz (2010): Antragsaktivitäten und Förderchancen von Wissenschaftlerinnen bei Einzelanträgen auf DFG-Einzelförderung im Zeitraum 2005-2008.

Bovelet, Daniel und Jürgen Güdler (2009): Förder-Ranking 2009. Weinheim, Wiley-VCH.

Hinz, Thomas, Findeisen, Ina und Katrin Auspurg (2008): Wissenschaftlerinnen in der DFG. Antragsaktivitäten, Förderchancen und Funktionen (1991-2004), Weinheim, Wiley-VCH.

DFG infobrief

Imprint

Issue 1.10

The DFG infobrief is published by the Information Management Section of the German Research Foundation (DFG), Bonn.

Contact

Dr. Jürgen Güdler
Kennedyallee 40, 53175 Bonn
juergen.guedler@dfg.de
Phone: +49 228 885-2649

Download:

http://www.dfg.de/en/dfg_profile/evaluation_statistics/programme_evaluation/info_briefe/index.html

Basic layout: besscom, Berlin; Tim Wübben, DFG
Design: Designbureau Pi Heinz, Cologne