

Gender Equality in DFG Research Funding – Facts and Assessment

Selected findings from a study of the funding proposal submissions by female scientists, women's chances of receiving funding and the functions they perform in the Deutsche Forschungsgemeinschaft's statutory bodies

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How often do female scientists submit funding proposals to the Deutsche Forschungsgemeinschaft (DFG - German Research Foundation), and what are their chances of success? Do women and men demonstrate different types of scientific career planning, and do their expectations in terms of their career opportunities differ? What is the situation when it comes to participation of male and female scientists in the DFG's review process? These are just a few of the questions looked into by a study commissioned by the DFG and performed at the University of Konstanz. This "Infobrief" presents some of the study's findings.

1 Initial situation, data basis and methodology employed for the study

Equal opportunities for scientists takes high priority in science policy, as well as having been one of the DFG's statutory objectives since 2002. If, and how, the DFG is fulfilling this statutory objective, has - up until now - only been partly answered. Although the DFG did already begin to collect and publish data on this topic some time ago¹, a comprehensive appraisal which looked at the question from various angles has not been available so far. In 2005 the DFG therefore decided to commission a study in order to collect

detailed information based on a broad dataset on various aspects of the way in which women receive research funding by the DFG. The study's authors are Professor Thomas Hinz, and Ina Findeisen and Katrin Auspurg from the Department of Empirical Social Studies at the University of Konstanz.

The key questions addressed by the study were:

- Is the participation by women in submission of research funding proposals to the DFG proportionate to their representation at Universities? Do women have the same opportunities as men when it comes to obtaining research funding?
- To what extent do young women take advantage of the DFG's programmes for young researchers?
- Are differences apparent between men and women in their own evaluation of the science system and their chances of pursuing a scientific career?
- In what manner are male and female scientists involved in the decision-making processes concerning research funding proposals, and what is the situation when it comes to their representation in the DFG's decision-making bodies?

The DFG provided the data on which the study was based. The main focus was on data generated in the process of processing funding proposals, which provide information on funding proposals and decisions for selected DFG funding programmes for a

1. For example online on www.dfg.de/en/research_careers/equal_opportunities/; Statistics on funding proposal submissions in the DFG's annual reports (since 2000); Surveys of people submitting research funding proposals on specific topics (1997, 2002).

period of 14 years (1991-2004). In addition to this, the team conducting the study was also granted access to the findings of surveys of people who submitted funding proposals to the DFG (1997 and 2002) as well as material from a study about former DFG fellows and their subsequent career development (cf. Enders/Mugabushaka 2004). Annual surveys of Research Training Group coordinators (1997-2004) and the DFG's databases containing data on Review Committee elections and Review Board elections complete the DFG-related material used for the study. Primarily in order to be able to have a comparative perspective on the participation of female scientists in the DFG, the team conducting the study was also provided with data by the Federal Statistical Office (Statistisches Bundesamt) that provided information on the proportion of women amongst research staff.

This issue of the DFG infobrief presents some of the key findings of the study. The full study is available online from http://www.dfg.de/dfg_im_profil/zahlen_und_fakten/gleichstellung2007.html (available in German).

2 Key findings

2.1 Project funding: Participation and proposal success rate

Approximately 35% of DFG funding is awarded as research grants in the "Individual Grants Programme". This thus makes it the most prevalent form of DFG funding. The Individual Grants Programme is open to scientists from every discipline for research on any topic. In principle, every scientist working in Germany or at a German research institution located abroad who is fully qualified (usually by having obtained a doctorate) is eligible to apply for a research grant under the Individual Grants Programme.

Between 1991 and 2004 the DFG approved almost 79,000 new proposals for funding under the Individual Grants Programme. The number rose from approximately 5,000 new proposals a year in the

early 1990s to over 7,000 by 2004. The period covered by this study thus saw a significant increase in the number of proposals - a clear sign of the general growth in the importance of third party research funding and of the increased competition for funding.

Almost 10% of these new proposals were submitted by women. A steady increase in the proportion of women submitting proposals can be observed over this period. In 1991, only about 6% of the grant proposals under the Individual Grants Programme were submitted by women, by 2000 they broke the 10% mark for the first time, and by the end of the period covered by the study (2004) it had risen to almost 14%.

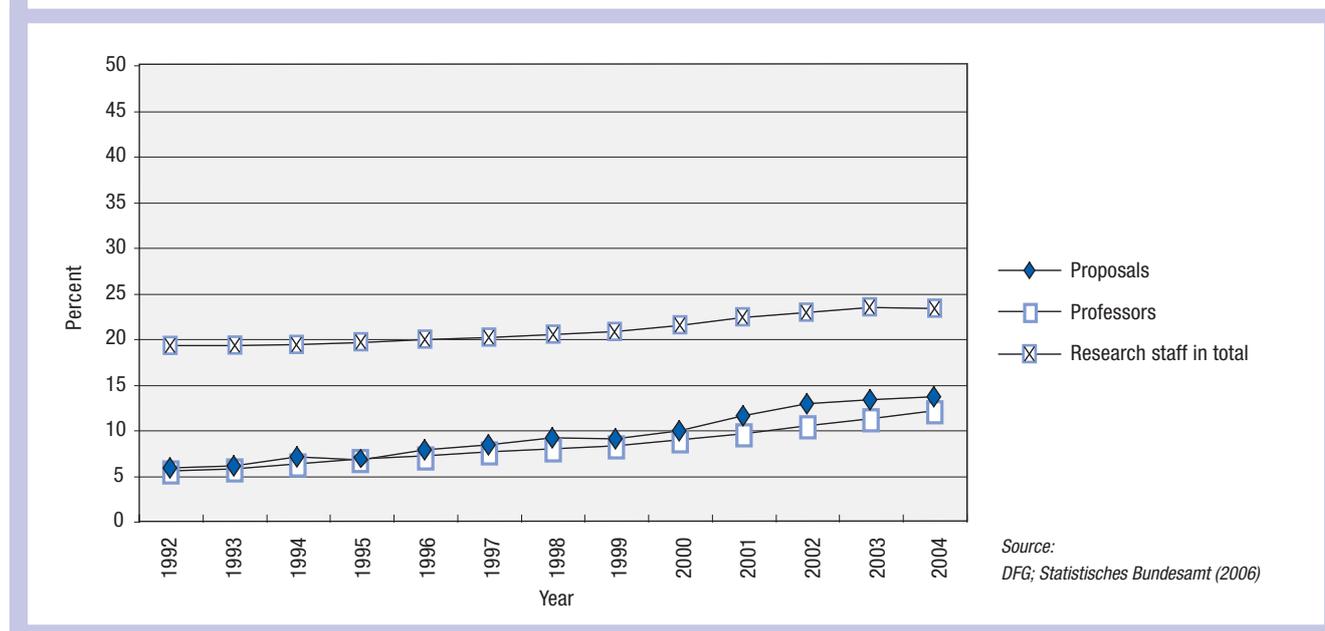
How well does this reflect the proportion of women at German universities? In order to even come close to answering this question, the study compares the proportion of women who submitted proposals² to the DFG to the proportion of women amongst all scientific staff at universities as well as the proportion of female professors. The result of this comparison is shown in Figure 1. The overall increase in the proportion of funding proposals received for the Individual Grants Programme from female researchers (only from universities) is in line with the increase in the total percentage of potential female applicants from universities.

In the 1990s the proportion of women funded under the Individual Grants Programme is more or less in line with the proportion of female professors. From 2000 onwards it is generally slightly higher.

Assuming that proposals submitted to the Individual Grants Programme are primarily submitted by professors, in the light of these figures it would seem logical to conclude that the proportion of women submitting new proposals to the DFG's Individual Grants Programme is, by and large, representative of the proportion of women at German universities, or even slightly higher in recent years. Due to data processing constraints, detailed analysis of the academic status of DFG applicants has only been possible since 2006. Surprisingly the result of the analysis

2. To ensure comparability, only proposals received from universities were taken into account in these figures.

Figure 1: Proportion of women who submitted proposals under the Individual Grants Programme, of professors and of research staff in total (1992-2004 in percent, only for universities)

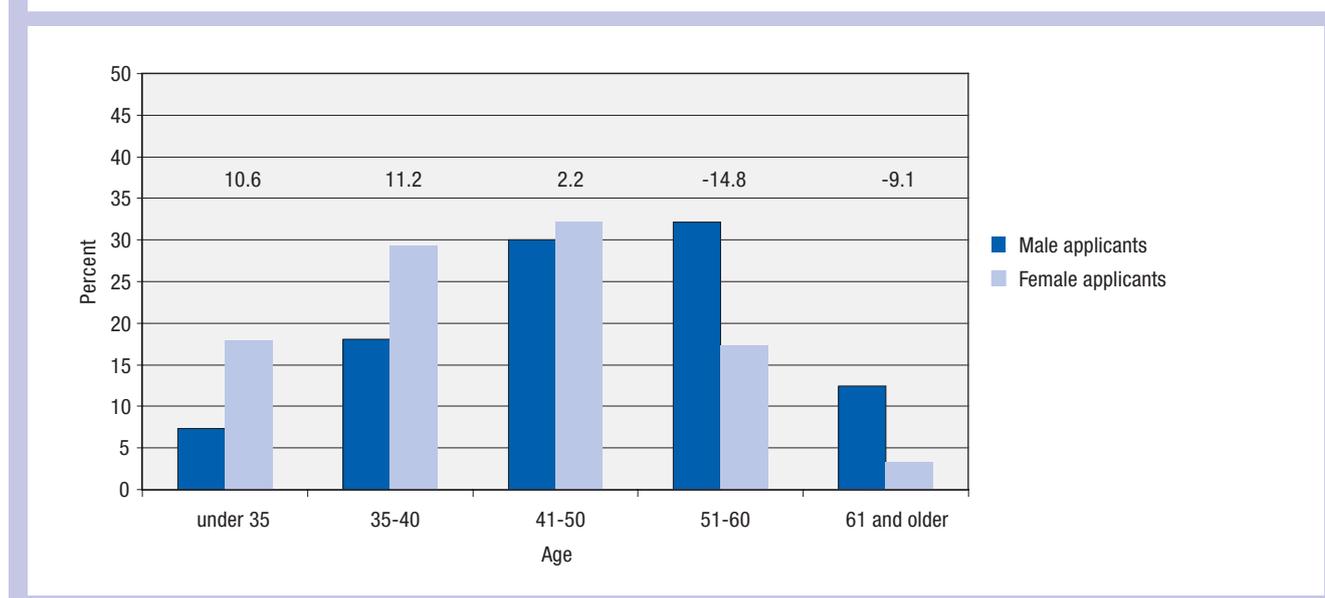


contradicts this conclusion. Whereas 61% of the proposals submitted by men were from professors, the proportion of professors amongst women who submitted proposals was just 37%. Women thus submit proposals to the DFG at an earlier stage of their research career significantly more frequently than their male peers. Against this backdrop, Figure 1 can be taken as

an indicator of the underrepresentation of women amongst applicants.

Another indicator of the differences in the "proposal demographics" of women and men is the average age of the two groups. Whereas women were, on average, 42.8 years old when they submitted proposals, in the period covered by the study, the

Figure 2: Age distribution of applicants who submitted proposals under the Individual Grants Programme (proportion per age group; 1991-2004 in total, stating the percentage point differences)



average age of male applicants was almost six years higher, at 48.5. The age distribution of male and female applicants also varied significantly (see Fig. 2).

What is the difference in the success rate of proposals submitted by men and women? Before answering this question, it is first necessary to look at the general trend over the period covered by the study. Between 1991 and 2004 there was a significant change in the chances of obtaining funding approval. Whereas more than 60% of all new funding proposals were granted in the early 1990s, this figure had dropped to just 38% by 2004 due to the increased competition mentioned above.

Figure 3 shows how the proposal success rate for men and women varied over this period. In the 14 years under consideration here, the success rate was lower for women than for men, with the exception of two years (1991 and 1995). The difference is generally minor, however. In nine of the 14 years the difference was of a statistically barely significant magnitude of between 0.1 and 2 percentage points. However, there were also years when the difference exceeded three percentage points (with the greatest difference being 4.8 percentage points in 1999).

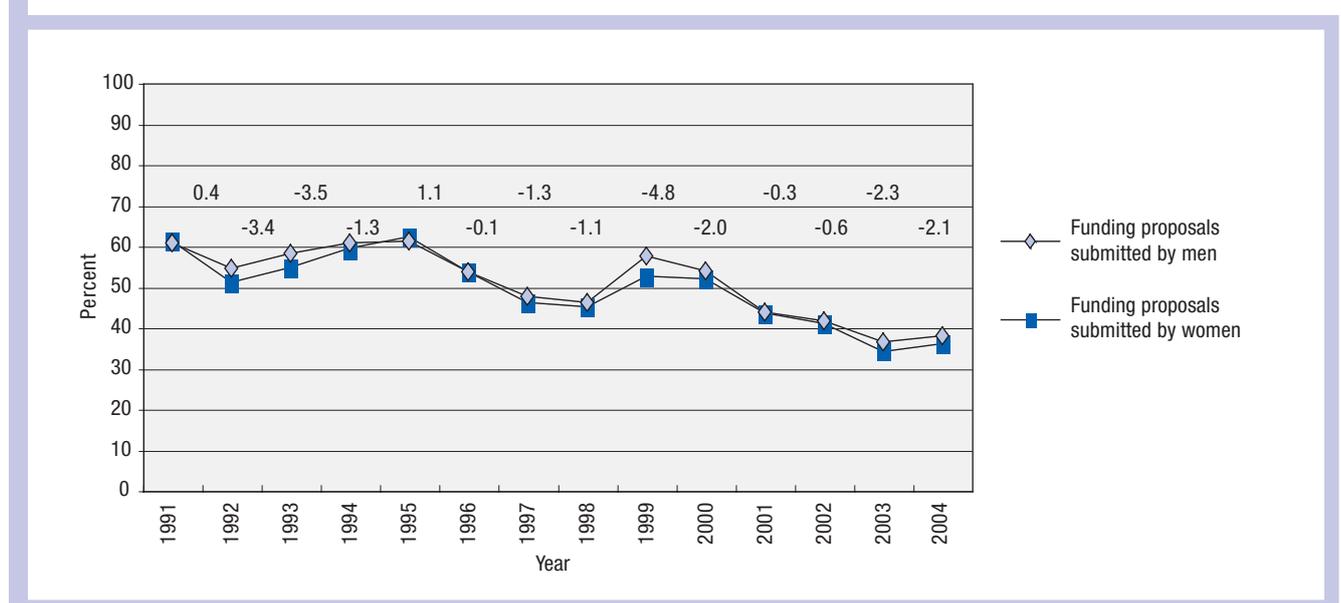
In the light of these figures, it seems obvious that the minimally, but consistently, lower success rate of

proposals submitted by women which the detailed study reveals applies to all disciplines across the board, could be due to the fact that female applicants are, on average, younger and therefore less experienced in submitting research funding proposals than their male peers. According to this assumption, it should, theoretically, be possible to demonstrate that younger applicants of both sexes receive more rejections to funding proposals than older (and thus, in general, more experienced) applicants.

This assumption is not confirmed, however. The data on funding rates actually reveals that both younger and more senior applicants (of both genders) achieve a slightly higher success rate than their middle aged peers. The chances of being granted funding, taken over the entire period covered by the study, were greater than 50% for applicants under 40 as well as for applicants over 60, whereas it is less than 50% for applicants between 41 and 50 and between 51 and 60.

The study also looked at the effect of other key variables (such as the scientific discipline). On the basis of the data used for the study, it was almost, although not completely, possible to explain the gender-specific differences in the success rates of funding proposals.

Figure 3: Trends in success rates of funding proposals under the Individual Grants Programme by gender (1991-2004 in percent)



2.2 Promoting young researchers

The selection and promotion of young researchers is one of the key ways of directing long-term change of the gender-specific opportunities in academia. Participation in DFG-funded research projects offers young scientists a start to a research career (so-called "indirect promotion of young researchers"). In addition to this, the DFG also offers programmes that it describes as "direct promotion of young researchers". These include, first and foremost, Research Fellowships, the Emmy Noether Programme, the "Temporary Positions for Principal Investigators" as part of the Individual Grants Programme, and Research Training Groups - the latter aiming, in particular, to organise the training of young researchers in groups in order to promote interaction between funding recipients and the lecturers responsible for supervising the groups.

This study devotes particular attention to the topic of young researchers. Here again, it used data from the processing of research funding proposals (1991-2004) as well as the findings of various surveys conducted by the DFG. These are especially interesting since they provide an insight into the differences and similarities in the opinion men and women have of the scientific system and their expectations for their own career.

Trends in the proportion of women participating in Research Training Groups

In comparison to the proportion of women submitting applications for grants in the Individual Grants Programme dealt with above, the figures for the DFG's programmes for promoting young researchers, which are aimed at a significantly younger target group, are considerably higher. For example, in 1997, the first year in which this data was recorded, in the Research Training Groups programme, the proportion of women relative to the total number of grant reci-

ipients in the programme as a whole, already accounted for some 32%. Seven years later (2004) the proportion of women had risen to some 41% (source: Annual Survey of Research Training Groups). There is thus a relatively high proportion of women amongst those receiving doctoral funding.

There are considerable differences between the four scientific disciplines, however. Whereas in the final year covered by the study in the humanities and in the life sciences more than half of the grant recipients were women (humanities: 53%, life sciences 52%), there are comparatively few women in the natural sciences (2004: 27%) and in particular in engineering (2004: 16%)³.

Career planning, opinion of the quality of scientific supervision, fairness of the peer review system

In addition to the raw factual data generated by analysis of the DFG's funding data, the study was also able to refer to data collected by the DFG by conducting surveys of research funding applicants. It is particularly revealing, in this respect, to compare the expectations that young DFG funding recipients have of their own career and how these expectations vary between men and women.

Almost a third of the people employed as project staff on DFG-funded projects have a doctorate. When asked if they hoped to continue up the academic career ladder to qualify as a university lecturer (known in Germany as Habilitation) 40% of the male respondents who already had a doctorate said they did, in comparison to just 26% of the female respondents⁴. There were similar differences between the answers given when asked about career ambitions (see Table 1). For instance, 24% of male project staff employed in DFG-funded projects questioned for the survey (with or without a doctorate), but only 16% of female project staff, said that they hoped to become university lecturers or professors. Female respondents more often

3. For the Individual Grants Programme discussed above, the following proportions of women were recorded in 2004: humanities and social sciences: 23%, life sciences: 18%, natural sciences: 9%, engineering: 5%.

4. When asked if they hoped to qualify as a university lecturer, 35% of the male respondents and 36% of the female respondents said that they were "undecided". Of the project staff questioned in the survey 2.2% of the male respondents and 0.9% of the female respondents had already qualified as university lecturers.

Table 1: Career goal by gender (in percent)

	<i>Men</i>	<i>Women</i>	<i>Total</i>
A career as a university lecturer/professor	23.8	15.7	21.0
Another scientific career	29.9	37.9	32.7
A non-scientific career	9.3	4.9	7.8
As yet undecided	36.9	41.6	38.5
Total	100.0	100.0	100.0
Number	(815)	(428)	(1,243)

Question: What is your main career goal?

Source: DFG survey of research funding applicants 2002

have ambitions of pursuing a research career outside academia (38% in comparison to 30%). The number of respondents who were undecided was surprisingly high in both groups. Despite having decided to pursue qualification for a subsequent research career by participating in a DFG-funded project, two fifths of project staff (male: 37%, female: 42%) were as yet undecided when asked about their medium term career plans. The DFG's surveys of research funding applicants also show that female project staff express a wish to establish themselves in the scientific community by means of publications, participation in scientific conferences, and contact to other researchers and scientists slightly

more often than their male counterparts. Their chances of actually being able to do so are perceived less optimistically by women, as is revealed by their responses to the questions asked on this topic (see Table 2).

Even though the differences between men and women in relation to the questions listed in Table 2 are fairly minor, the overall outcome for women is a consistently greater discrepancy between the priority given to certain aspects of further scientific qualification and the chances of doing so than is the case for men.

Another study conducted by the DFG that looked at the subsequent career development of former DFG fellows who had participated in postdoctoral pro-

Table 2: Aspects of further scientific qualification by gender (Answer categories 5 and 6, in percent)

		<i>Men</i>	<i>Women</i>	<i>Total</i>
Publication of the (interim) results of my research work	Importance	85.3	87.2	85.9
	Chances of achieving	77.2	70.3	74.8
Participation in scientific conferences	Importance	70.3	79.1	73.3
	Chances of achieving	62.5	55.5	60.1
Contact to researchers and scientists from other universities or research institutes	Importance	75.4	82.7	77.9
	Chances of achieving	64.0	57.3	61.7
Total		(809)	(421)	(1,230)

Question: About the importance: How important are the following activities in terms of their relevance to your scientific work on this research project to you personally? (On a scale of 1 = unimportant to 6 = very important)

Question: On achieving these goals: Does your scientific work on this research project give you the opportunity to achieve these activities? (On a scale of 1 = not at all to 6 = very much)

Source: DFG survey of research funding applicants 2002

grammes (cf. Enders/Mugabushaka 2004), included an analysis of the prevalence of certain opinions regarding the peer review process.

Comparing the answers given by male and female respondents, we once again see that the women are generally less optimistic, in particular when it comes to the question of whether women and men are treated equally by the peer reviewers. Former female DFG fellows are far more sceptical, on this point, than their male counterparts (see Table 3). This increased level of scepticism is also observed, albeit less strongly, in connection with the question of whether the peer review process guarantees equal opportunities for young and established scientists, the selection of the best funding proposals, the objectivity and neutrality of the peer reviewers and the openness to unconventional ideas.

2.3 Participation in the peer review process of proposals submitted to the DFG

The DFG's peer review system consists primarily of two levels. Firstly, peer reviewers selected to review a proposal by the DFG's Head Office on account of their specific technical or subject-specific expertise evaluate the scientific quality of the proposal - generally by

way of a written review⁵. Elected, honorary Review Boards meet on a quarterly basis to arrive at a funding decision on the basis of these reviews. This is intended to ensure a clear separation of the peer review and the evaluation of this review (quality assurance).

Even before the introduction of the Review Board system in 2003, there were already a large number of so called special reviewers involved in evaluating funding proposals, in addition to the elected Review Committee members - who were also selected by the appropriate departmental section at the DFG's Head Office.

This study takes a detailed look at the involvement of women in the DFG's peer review system. Here we shall only look at one of the study's findings on the representation of women amongst people who have provided written reviews to the DFG in recent years. The DFG Funding Ranking gives an impression of the order of magnitude involved. For example, between 1999 and 2001, almost 10,000 researchers and scientists wrote written reviews for the DFG, between 2002 and 2004 this rose to almost 11,000 (cf. DFG 2003, 2006).

The peer reviewers selected by the DFG's Head Office are generally scientists with many years of

Table 3: Opinion of the peer review process by gender (Answer categories 1 and 2, in percent)

	Men	Women	Total
Men and women are treated equally by peer reviewers	72.1	38.2	65.1
Younger and established researchers and scientists are treated equally by peer reviewers	22.7	13.5	20.8
There are mechanisms in place to ensure that the best funding proposals are granted	24.7	18.3	23.3
The peer reviewers are open to unconventional ideas	14.0	8.7	12.9
The peer reviewers are objective and neutral in spite of the competitive situation	39.5	27.9	37.1
Number	(397)	(104)	(501)

Question: What is your opinion of the fairness of the 'peer review process' (On a scale of 1 = agree completely to 5 = disagree completely)
Based on a survey of applicants who had been granted research funding.

Source: Enders/Mugabushaka 2004

5. In addition to this, the process also allows for groups of peer reviewers for the coordinated programmes, which arrive at an agreed decision on the funding proposal at joint meetings. More detailed information on the DFG's peer review system is provided by Koch, 2004 and on www.dfg.de/en/dfg_profile/structure/statutory_bodies/review_boards/.

experience - in the majority of cases professors⁶. Figure 4 therefore compares the trend in the proportion of women relative to the total number of DFG peer reviewers to the trend in the proportion of female professors at German universities. Data on the use of (special) reviewers has been collected by the DFG's Head Office since 1999. The time series here is therefore limited to the 6 year period commencing in 1999.

As was already discussed above, we know that the proportion of women professors has steadily increased over time. This trend is mirrored by the proportion of women amongst peer reviewers - although it does not reach the same level as that of university professors. Whereas the proportion of women amongst DFG peer reviewers had reached 9% by 2004, the figure for the reference group in the same year was 13.6%. Judged on this basis, women are underrepresented amongst DFG peer reviewers.

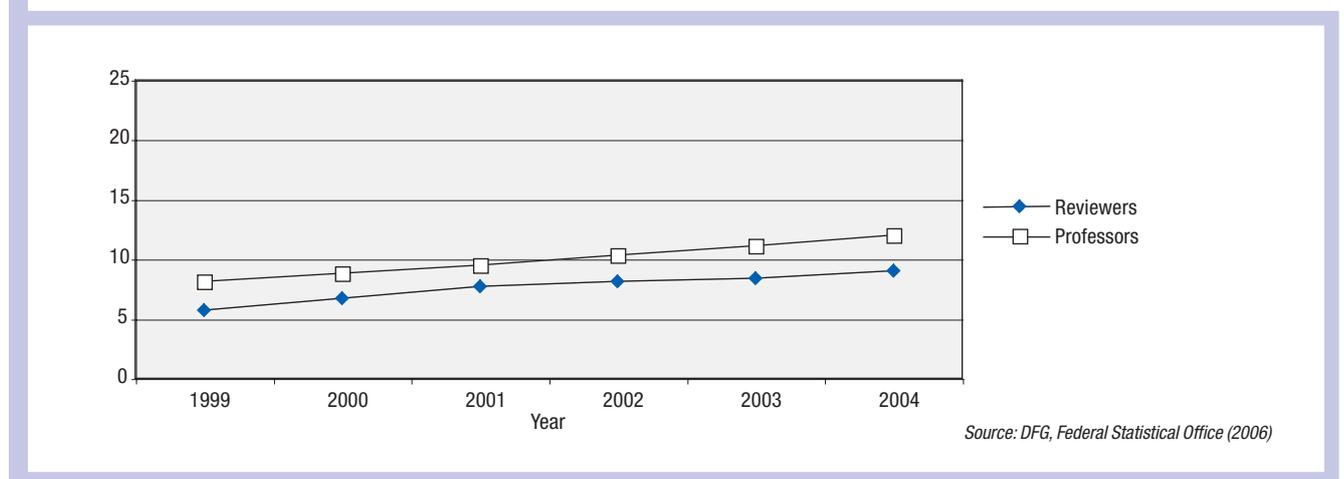
3 Conclusion and perspectives

This infobrief presents a selection of the findings of a study conducted by a research group at the University of Konstanz under Thomas Hinz, which was commissioned by the DFG to study the question of equal opportunities for men and women in the context of the DFG's research funding activities. The study was ba-

sed on a broad set of quantitative data on questions about the research funding proposal process and the success rate of funding proposals, on participation in selected research funding programmes, the participation of women in the (written) review process of DFG funding proposals and on their integration in the DFG's main decision-making bodies.

The primary goal of the study was to present an empirically well-founded factual report on these topics. This goal was achieved in particular by the fact that the study was not restricted to simply documenting the differences in opinion about the DFG proposal process or the relative success at obtaining research funding by male and female applicants. Rather, the study presents a comprehensive report that is over a hundred pages in length (plus extensive appendix containing tables) containing numerous detailed analyses, which look at the developments over time, amongst other things, as well as studying the subject-specific research activities of women. It is particularly this appraisal of the situation in the various research areas funded by the DFG that makes this study particularly worthwhile, since this opens up opportunities to take further action - for instance by giving focussed support to women in subjects where the situation of female researchers is found to be especially difficult.

Figure 4: The trend in the proportion of women amongst special reviewers in the Individual Grants Programme and amongst professors (1999-2004, in percent)



6. According to the DFG's own analyses this applies to over 90% of all peer reviewers at the time of performing the review. For this and other statistical information cf. DFG 2003, 2006.

This study represents an important milestone for the DFG. Up to now there has been little or no information on the participation of women in the DFG's research funding activities. Now, however, one of the key requirements, that of ensuring transparency and openness "at a glance" has been fulfilled. This is a prerequisite in order to be able to progress further. Firstly, this study offers important suggestions for establishing an equal opportunities monitoring system, which the DFG's Head Office will be able to utilise to continue the most important threads of the study and supplement with future analyses. There is a need for further, more thorough studies, in particular in areas where the findings are now known, but their causes are as yet unclear. One example that is particularly worthwhile mentioning are the differences between the opinions held by men and women of their career prospects in the scientific community. If women at an early stage in their careers report subjective experiences, or even just a subjective feeling, of being at a disadvantage compared to their male counterparts, then this is an alarm signal that demands further investigation. Studies such as this one, which are primarily descriptive and report on statistics, offer the opportunity to assess the potential scope of such phenomena. Other instruments are required in order to determine the causes, however. It is now possible to initiate a discussion of the consequences of these findings, which will benefit from the ability to focus much more clearly on facts instead of speculation than was previously possible. In this discussion, it will be particularly important to find ways and means of facilitating the early stages of young women's research careers. This study provides key background information for a Commission on equal opportunities called into being by the DFG Senate in mid-2006, as well as for the DFG's decision-making bodies and others involved in science policy. An initial outlook of the perspectives is offered by a statement by the DFG on this study (cf. Brennecke-Schröder/Koch 2007).

4 Literature

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