DFG infobrief
Research Funding –
Facts and Figures

1.21

Coronavirus, Gender and Research Funding

Proposal and review activity among female researchers during the first year of the coronavirus pandemic

For over a year now, the SARS-COV-2 virus has dominated social and professional life, and the academic world has not escaped the restrictions this has involved. In particular, the fear is that the pandemic will place greater demands on female researchers as compared to male researchers and leave less time for research. There is also a concern that this will create career barriers to women in the research system in the long term. At the same time, the pandemic has provided an unprecedented boost to research, especially in terms of projects related to the coronavirus. In order to inform this debate, this Infobrief presents descriptive statistics derived from the processing of proposals submitted to the DFG. The focus here is on the extent to which it is possible to identify gender-specific differences in DFG proposal and review activity during the period of the coronavirus pandemic.

1 Evidence base and research question

Since the World Health Organisation declared the coronavirus outbreak a pandemic in March 2020, the working conditions of large parts of society – including the research system – have changed profoundly. On the one hand, the sudden shift to home-based work combined with temporary closures of schools and daycare centres and the reorganisation of care responsibilities has confronted many workers with major challenges (Viglione, 2020). Since then, the allocation of extra work – in the form of increased care or domestic duties – has been part of the debate on gender equality (Staniscuaski et al., 2020). On the other hand, it was not possible to pursue certain research topics because international travel or laboratory capacity was limited by the pandemic situation.

At the same time, the coronavirus pandemic has given research a significant boost. Not only has the global community of researchers carried out investigations into possible vaccines, therapies and the effectiveness of current containment measures. Research output grew in other areas, too. In the early stages of the pandemic, for instance, many journals saw increasing numbers of articles submitted. According to an analysis by Squazzoni et al. (2020), between February and May 2020, for example, the number of articles submitted to all Elsevier journals increased by around 30 percent as compared to the same period in the previous year. For journals in the field of medicine, the increase was as much as 63 percent. Acceptance of review invitations also increased by almost 30 percent for all disciplines in the period under review.

With regard to research productivity, however, there were some early warning signs that

the coronavirus crisis was exacerbating the gender publication gap (e.g. Flaherty, 2020). Although there was an increase in total number of articles submitted in the initial phase of the pandemic, the proportion of articles submitted by women decreased in some cases (e.g. Fuchs-Schündeln, 2020; Wiegand et al., 2020). In the field of coronavirus research itself in particular, it was possible to observe a lower level of research productivity among female researchers (Andersen et al., 2020; Cevik et al., 2020). In general, the impact of the pandemic on the output of researchers is addressed across different fields and research topics. These include neuroimmunology (Ribarovska et al., 2021), economics (Fuchs-Schündeln, 2020), social sciences (Cui et al., 2020) and STEM subjects (science, technology, engineering and mathematics) (King & Frederickson, 2021). There is also evidence that women in the early stages of their academic careers have been particularly affected by the impact of the pandemic (Vincent-Lamarre et al., 2020).

The sudden shift to online teaching and the additional workload that this involves (development of online materials, emotional care work for students, etc.) particularly affects younger female faculty members, as they take on a relatively larger share of teaching and mentoring tasks (Viglione, 2020). In contrast, faculty members who hold high-ranking faculty positions have more time for research, since committee activities and involvement in hiring and curriculum committees take less time during a lockdown (cf. Kim, 2020).[1]

Initial research findings suggest that the pandemic reduces the productivity of female researchers more than that of male researchers: It is assumed that women face an increased workload as compared to men, leaving less time for research. This in turn is thought to have long-term consequences for academic careers.

Based on these assumptions and the initial empirical findings from the literature, which relate primarily to publication activity, descriptive statistics on DFG proposal and review activity among women and men are presented below. These shed light on the extent to which the pandemic is affecting the activity of researchers in research funding.

2. Data basis and operationalisation

The following analysis focuses on the proposals received in the area of individual funding.[2] It should be noted that the data basis and operationalisation of the analyses presented here deviate from the DFG's standard reporting. Firstly, the data basis includes not only new proposals but also renewal proposals, since the analysis aims to capture the totality of the burden caused by the pandemic in terms of time pressure and the potential effects this has had on proposal activity. Secondly, in contrast to the DFG's standard reporting, which focuses on proposal decisions and the ongoing funding within a year (e.g. in the annual report[3]), the focus here is on proposal submissions. In the context of the potential effects of the pandemic, proposal submissions better reflect the activity of researchers in connection with the DFG during the period in question than decisions based on past proposals.[4] For this reason, the data basis also includes proposals that were taken care of by other means over the course of time.[5] In addition, the focus of interest is the comparison of five 12-month periods defined not by the calendar but by the start of the pandemic in

1 According to Oleschuk (2020), gender differences in care duties can be accounted for by traditional gender roles and social norms.

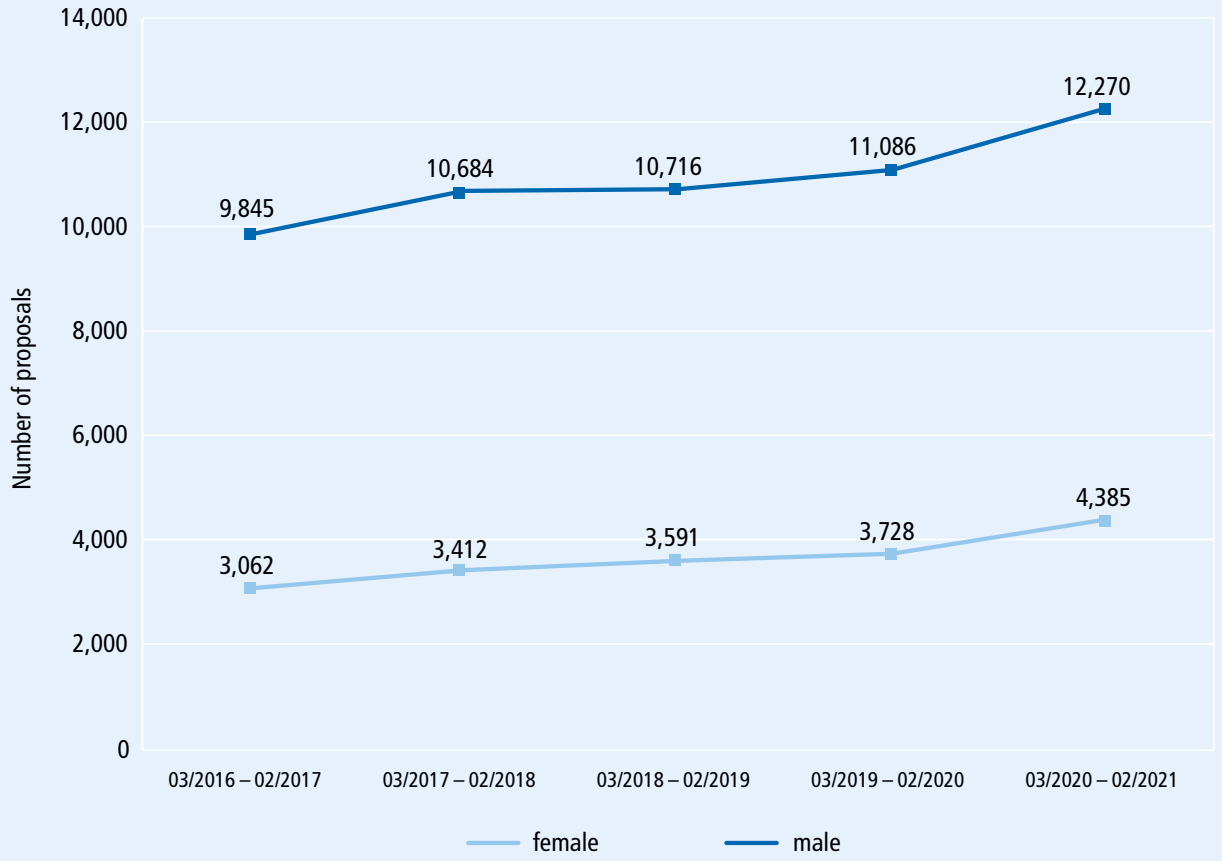
2 Joint proposals are included in the count per applicant.

3 www.dfg.de/en/dfg_profile/annual_report.

4 On average, the period from the receipt of a proposal to the final decision is about six to seven months, see www.dfg.de/en/dfg_profile/facts_figures/statistics/processing_times_success_rates.

5 At the time of publication of this Infobrief, not all proposals submitted during the "coronavirus year" had been decided on yet. For this reason, this Infobrief does not include any reporting on funding quotas.

Figure 1: Development of proposal submissions in individual funding by gender from 2016 to 2021 (from March to February of the following year in each case)



March 2020, with each period extending from March of one year to February of the following year. Due to these factors, the data reported in this analysis differs from that contained in other types of report.

3 Results from DFG proposal processing

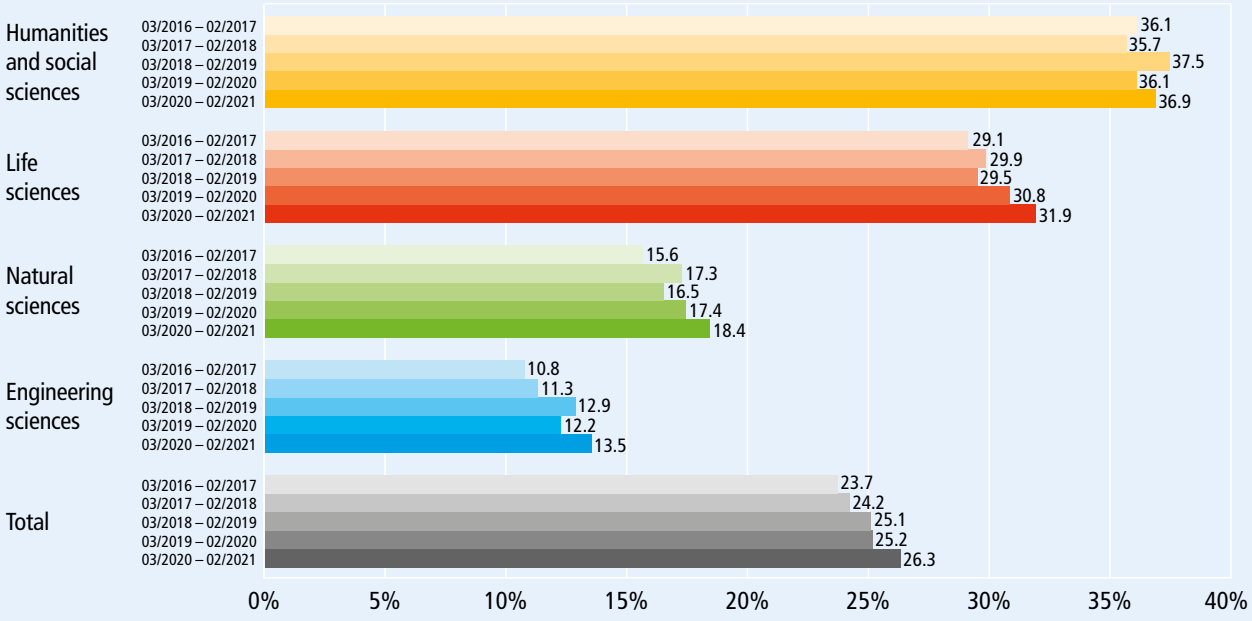
3.1 Proposal submissions for individual funding

Did female researchers submit fewer proposals to the DFG than male researchers during the coronavirus pandemic? In order to look at the development over time, the data basis of the present study includes proposals submitted in the period from March 2016 to February 2021.

Since March 2016, the number of proposals submitted by both men and women has steadily increased (see Figure 1). In the "coronavirus year" (i.e. March 2020 to February 2021), male applicants submitted a total of 1,184 more proposals than in the same period in the previous year (i.e. March 2019 to February 2020). This constitutes an increase of 10.7 percent. By way of comparison, the absolute increase in the number of proposals submitted by female applicants was lower at 657 proposals during the same period; however, the percentage increase was higher at 17.6 percent.

The comparatively high increase in proposals submitted by female researchers in the coronavirus year – albeit from a lower starting level as compared to that of men – had an impact on the proportion of women: all in all, the share of proposals submitted by women increased by 1.1 percentage points from 25.2 percent to

Figure 2: Women's share of proposal submissions in individual funding by research fields from 2016 to 2021 (from March to February of the following year in each case)



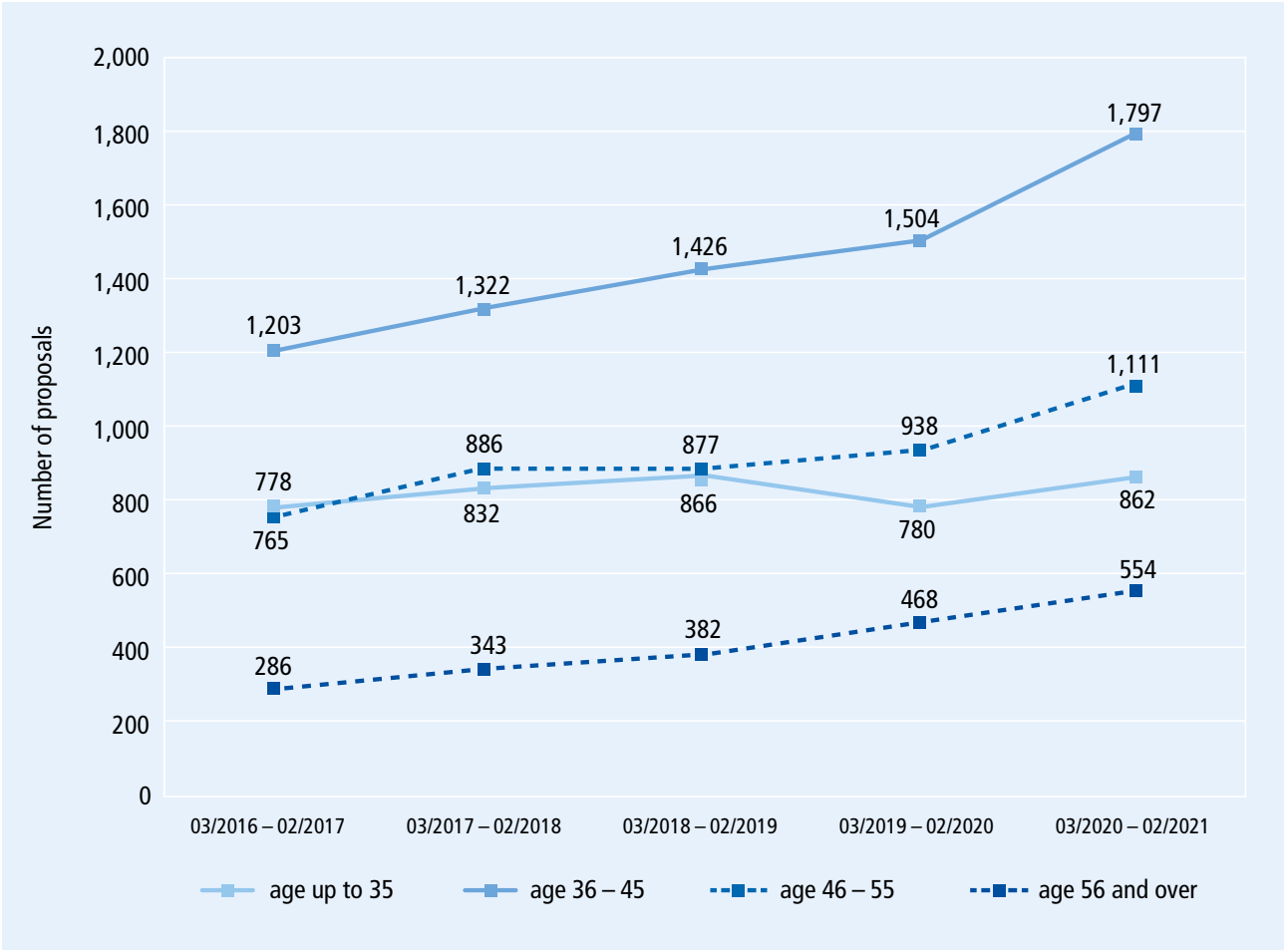
26.3 percent (see Figure 2). This means that the trend of the four previous years continued in the coronavirus year.

It is conceivable that the pandemic might affect researchers from different disciplines to varying degrees. For example, it can be assumed that researchers who are dependent on laboratory work and field research would feel the negative effects of the pandemic more than those whose research activities can largely be carried out working from home (cf. SNSF, 2021). A gender-specific approach to this question involves looking at the proportion of women in the four research disciplines distinguished by the DFG. As Figure 2 shows, the proportion of female applicants in the coronavirus year increased slightly as compared to the same period in the previous year (March 2019 to February 2020) in all four research fields. The increases range from 0.8 percentage points (humanities and social sciences) to 1.3 percentage points (engineering sciences). So far, this analysis does not indicate any factors that systematically have a negative influence on proposals submitted by women.

It can also be assumed that not all academics are restricted in the same way by the coronavirus pandemic. Different life phases and situations have an important role to play here. For example, it is conceivable that childless female researchers have fewer family commitments than researchers with (young) children (cf. Oleschuk, 2020). Due to the fact that the marital status of applicants and the number of their children are not recorded in the DFG proposal process, it is not possible to differentiate between the number of proposals received from women based on the number of (small) children they have. Instead, the age of female applicants is used in the following, as this correlates – at least approximately – with the probability of them having small children in their household and being at an early stage of their career.

Since March 2016, the number of proposals submitted by women in almost all age groups has risen continuously (see Figure 3). The highest increases are recorded among female researchers in the age group between 36 and 45: during the coronavirus year, 293 more proposals were submitted in this age group than in the same period in the previous year. This increase in proposals is followed by that of the 46–55 age group (173 more proposals in the coronavirus year as

Figure 3: Development of proposals submitted by women in individual funding by age group from 2016 to 2021 (from March to February of the following year in each case)



compared to March 2019 to February 2020). It is noticeable that the number of proposals among the up to 35-year-olds has not increased continuously over time. It is difficult to interpret this as an effect of the pandemic, however: the sharpest decline took place one year before the start of the "coronavirus year", while between March 2020 and February 2021 the number of proposals received increased again. As such, the distinction by age group does not indicate any clear shift in proposal activity among women which might be interpreted as coronavirus-related.

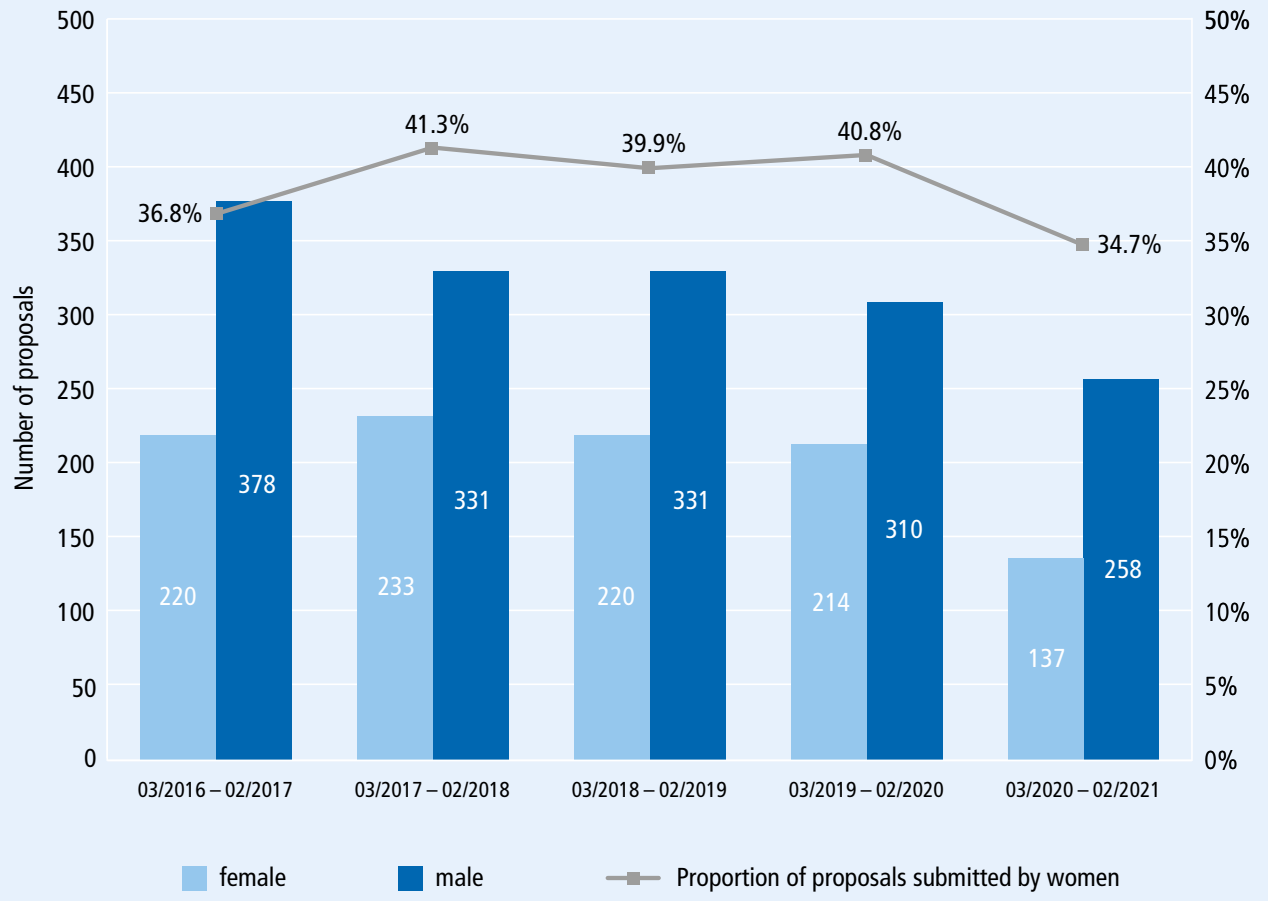
Another negative effect of the pandemic is the danger of a so-called "lost generation" (Lewis, 2020). This can manifest itself in the form of cancelled or postponed study and research projects abroad, thereby impairing an individual's international mobility in the academic sphere. Whether such pandemic effects are also reflected in DFG proposal activity among early career researchers and whether there are gender-specific differences can be examined in more detail based on fellowships abroad. These include the "Research Fellowships" and the foreign module of the Walter Benjamin Programme (WBP).[6]

In fact, proposals for fellowships abroad from both female and male early career researchers decreased during the coronavirus year as compared to the same period in the previous year (03/2019–02/2020) (see Figure 4).[7] The

6 Since November 2019, it has only been possible to submit continuation and return fellowship proposals under the "Research Fellowships" programme. The WBP was introduced in July 2019 and is gradually replacing the research fellowships that are coming to an end. Moreover, in contrast to the "Research Fellowships" programme, which exclusively subsidises research projects abroad, the WBP also includes a domestic module (so-called "positions") in addition to a foreign module ("fellowships"). Due to the nature of the question, the following analysis based on the WBP is limited to the foreign module ("fellowships").

7 Due to the aforementioned programme change, only the proposals received for the "Research Fellowships" are included in the first three periods (i.e. 03/2016–02/2017, 03/2017–02/2018 and 03/2018–02/2019). The last two periods (03/2019–02/2020 and 03/2020–02/2021) include proposals received for both programmes.

Figure 4: Proposal submissions in fellowships abroad by gender from 2016 to 2021
(from March to February of the following year in each case)



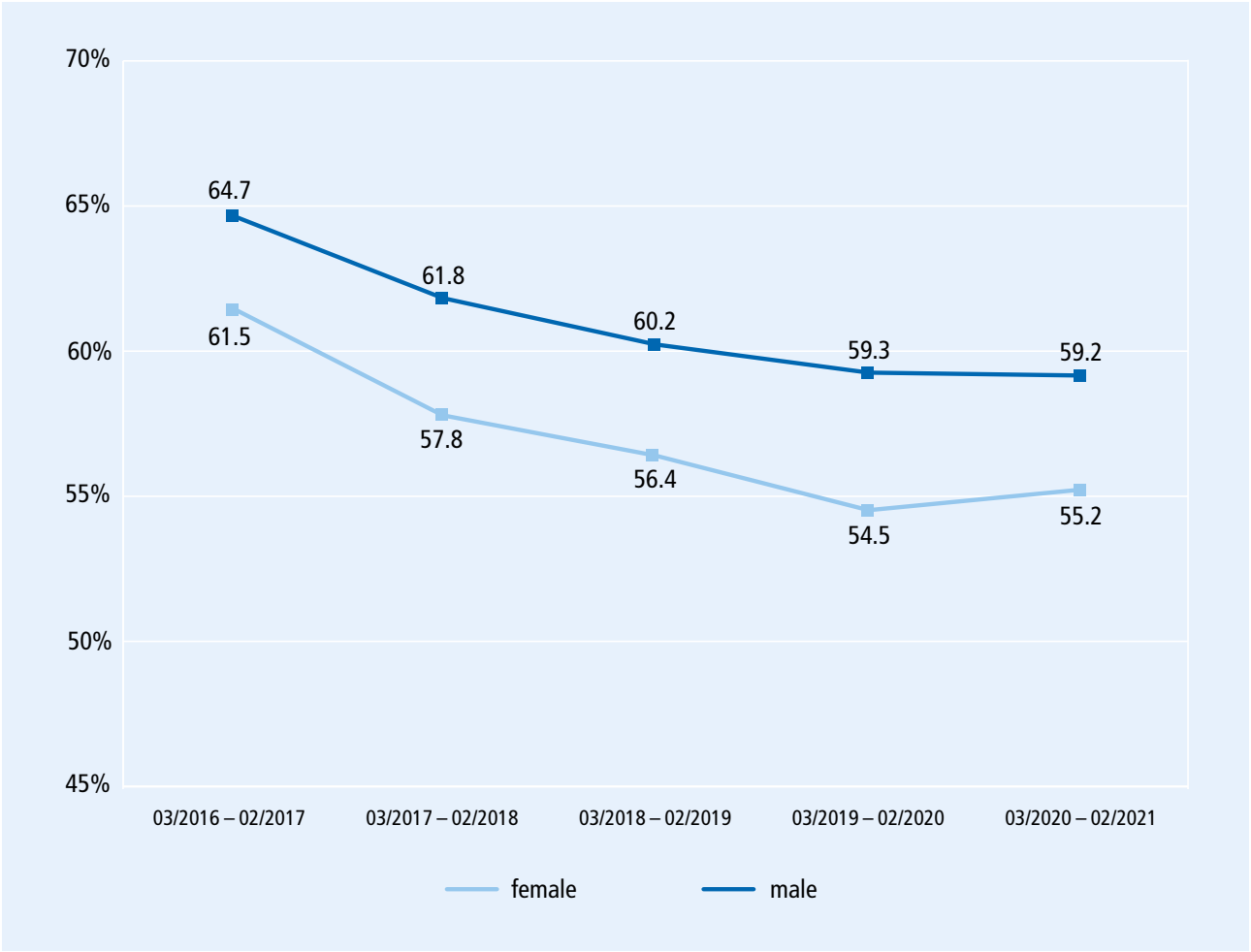
drop among men was approximately 17 percent (258 proposals as compared to 310 proposals), while among women it was as high as 36 percent (from 214 proposals to 137 proposals). Overall, the decrease in fellowships abroad was almost 25 percent (from 524 proposals in 03/2019 – 02/2020 to 395 proposals in 03/2020 – 02/2021). This suggests that the global pandemic made it considerably more difficult for early career researchers to plan research projects abroad in the coronavirus year. The sharper drop in female researchers also affects the proportion of proposals submitted by women, which decreased by 6.1 percentage points over the coronavirus period (from 40.8 percent to 34.7 percent). It seems that early career female researchers were more likely to refrain from applying for research stays abroad as compared to their male colleagues during the coronavirus year.

3.2 Written reviews

Review activity on the part of researchers can be used as a further indicator of DFG-related academic activity. If one assumes that the pandemic leads to an increased workload, then it is reasonable to assume that, in the context of priority decisions to be made, requests for DFG reviews would be rejected more frequently than in years not affected by the pandemic.[8] As Figure 5 shows, the re-

8 The participation date of reviewers was taken as the basis on which to analyse any possible gender-specific effects of COVID-19 on review activity. As such, the statistics in this section are not comparable to other reported DFG review statistics, which generally look at reviews based on the year of the decision for approved proposals.

Figure 5: Development of the response rate by gender from 2016 to 2021 (from March to February of the following year in each case)



Basis: systematically recorded requests for written reviews; according to the participation date of the reviewer.

sponse rates – i.e. the number of successful reviewer requests as compared to the total number of reviewer requests – have declined overall for written review requests since 2016: whereas five years ago 61.5 percent of requests to women resulted in a commitment, in the last period under observation the figure was only 55.2 percent. A comparable decline can also be observed among men (from 64.7 percent to 59.2 percent). Despite this trend, response rates seem to be tending to stabilise: over the past two years, the response rate for men has been at around 59 percent, while for women researchers it actually increased slightly (by 0.7 percentage points) during the coronavirus year.

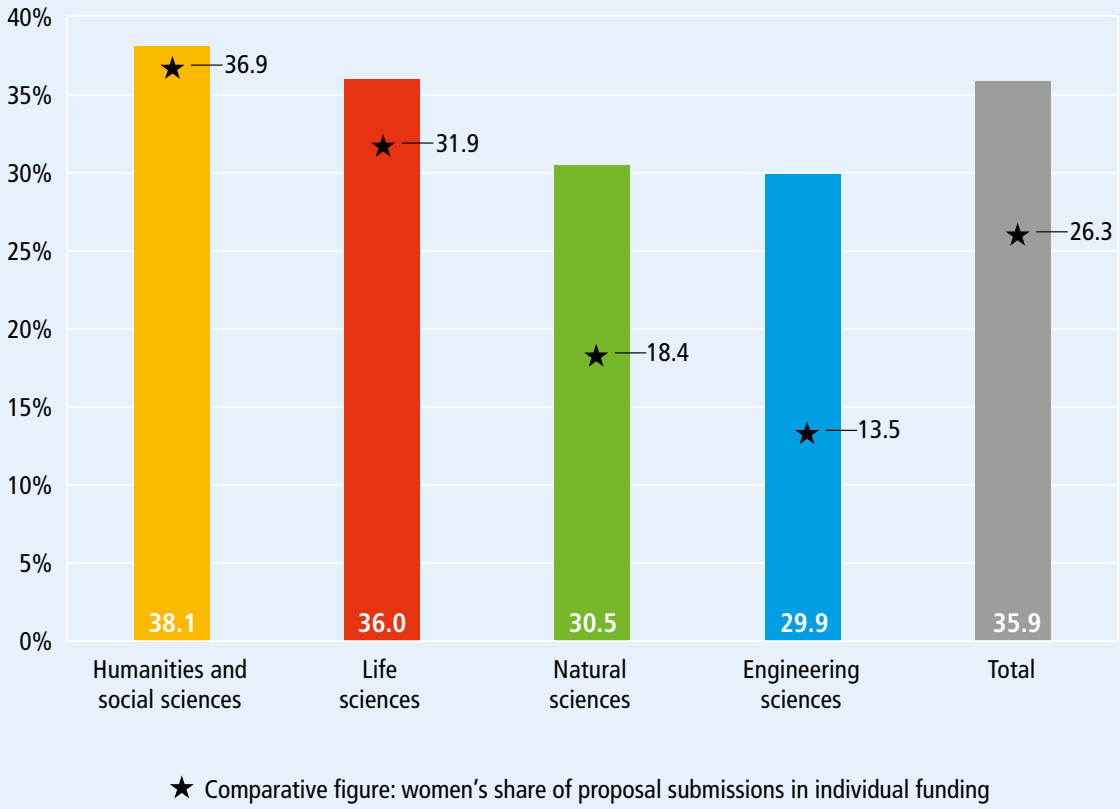
The assumption that researchers are refusing more review requests due to the strain of the coronavirus pandemic has therefore not been confirmed, at least not to date.

3.3 COVID-19 research

A lower level of research output among female researchers as compared to male researchers can be observed, especially in the area of research into the coronavirus itself (e.g. Andersen et al., 2020; Cevik et al., 2020).[9] On the one hand, this could be due to the fact that women researchers were exposed to an increased workload, especially at the beginning

9 For example, Cevik et al. (2020) show that more than two-thirds of researchers leading clinical trials related to COVID-19 are men. Andersen et al. (2020) note that the proportion of articles on COVID-19 with a woman as first author was 19 percent lower in the first two months after the pandemic outbreak than for articles published in the same journals in 2019.

Figure 6: Proportion of proposals submitted by women under COVID-19 calls for proposals by research discipline in the period March 2020 to February 2021



of the pandemic outbreak. On the other hand, women researchers may also have a tendency to prioritise research that is already underway over new topics such as COVID-19 research (cf. e.g. Amano-Patiño et al., 2020).

The DFG published a "Call for Proposals for Multidisciplinary Research into Epidemics and Pandemics" and five calls for coronavirus-specific "Focus Funding" for the period March 2020 to February 2021.[10] Out of a total of 1,049 proposals, 377 were submitted by women – a share of 35.9 percent (see Figure 6). Differentiated by discipline, it can be seen that the proportion of women in COVID-19 calls are higher overall and also in each individual research discipline than in the comparative group of proposals in individual funding (for comparison, see also Figure 2): The share of women involved in COVID-19 calls is around 9.6 percentage points higher than the share of women involved in proposals received in the area of individual funding, which is 26.3 percent overall. In the engineering sciences, the difference is particularly striking. Here, the proportion of female applicants in the calls for proposals is 29.9 percent, while in individual funding it is 13.5 percent.[11]

For COVID-19 research, therefore, it is not possible to discern a lower level of demand for DFG third-party funding among women as compared to the number of proposals received for individual funding. On the contrary, an above-average number of proposals in this area came from female researchers.

10 These include the Focus Funding areas: "Immunity, host susceptibility and pathomechanisms of SARS-CoV-2 infection", "Infection prevention", "SARS-COV-2 sequencing procets", "Impact of the coronavirus pandemic in the Global South: health systems and society" and "Aerosol particles and their distribution".

11 Most COVID-19 proposals come from the life sciences (49 percent) and from the humanities and social sciences (37 percent).

4 Conclusion

The COVID-19 pandemic and the accompanying containment measures have led to profound changes in the working conditions of large sections of society. As far as the research system is concerned, the working situation of women researchers came to the forefront of the discussion early on. The long-term effects on the academic careers of early career researchers were also the subject of intense debate.

In the context of DFG proposal processing, no decline in the proportion of proposals submitted by women was observed for the past coronavirus year. On the contrary, women's participation in proposals actually increased more than men's. Furthermore, the comparison of age groups and the differentiation according to four research fields do not indicate any specific caesuras. Also, during the period under review, neither male nor female researchers rejected DFG requests for reviews more frequently than before. And in terms of calls for proposals in the area of research specifically into COVID-19, women are even proportionately more strongly represented than in individual funding overall. Of the correlations examined here, only with regard to fellowships abroad is there any indication that the pandemic has had any restraining impact: the number of proposals here decreased in the coronavirus year for both men and women. The latter even refrained more frequently from submitting a proposal in this area – which is why women's share of fellowship proposals decreased.

The results based on the DFG's funding operations are largely consistent with the findings most recently published by the Swiss National Science Foundation (SNSF). Likewise based on funding proposals submitted, the SNSF also notes no unusual fluctuations – with the exception of a one-off slump in the humanities and social sciences in the area of project funding (SNSF, 2021). The European Research Council (ERC) also received more proposals overall under the Advanced Grant Call in August 2020 (ERC, 2020) and the Starting Grant Call in April 2021 (ERC, 2021) than in the preceding calls. The proportion of proposals from female researchers increased under both programmes. Similarly, the French Agence Nationale de la Recherche (ANR) reports an increase in the participation of women in 2020, both in terms of absolute proposal numbers and as a proportion of all proposals (ANR, 2021).

Based on the findings presented, it has not been possible to identify any gender-specific effects of the pandemic on DFG activity to date. In fact the findings suggest that more time is available or has been spent on work planning in connection with applying for third-party funding and writing reviews: limited laboratory times, a reduction in the number of meetings and conferences and fewer international business trips may have freed up time for writing project proposals and reviews. The data analysed in this Infobrief applies to the entirety of the data, however: the evaluations are based on purely quantitative statistics relating to DFG research funding, so far referring only to the first "coronavirus year". It will be up to later studies to analyse the long-term effects in more depth.

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