DFG infobrief
Research Funding –
Facts and Figures

2.16

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Career Paths in the Emmy Noether Programme and the Heisenberg Fellowship

The Emmy Noether Programme and the Heisenberg Fellowship – one of the components of the Heisenberg Programme, along with the Heisenberg Professorship – are both designed to boost their funding recipients' academic careers. The Emmy Noether Programme is aimed at an early career phase and at paths to professorship beyond habilitation and junior professorship. The Heisenberg Fellowship, in contrast, is geared at established researchers who are eligible to be professors but for whom no appropriate vacancies are currently available. To examine the career effects of these and other programmes, a study was launched. This infobrief documents selected initial findings on more than 500 applicants to the two programmes from the years 2007 and 2008. The results show that both grant formats are highly effective in helping the funded researchers have successful academic careers.

1 Background and Methodology

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) has made it one of its main statutory objectives to promote early career researchers. DFG funding instruments are particularly designed to facilitate early independence. The research community's appreciation for the role of the DFG in early career support was evident in a survey conducted a few years ago by the Institute for Research Information and Quality Assurance (iFQ, today DZHW). Respondents ranked early career support the DFG's most important mission from a list of five (cf. Böhmer et al. 2011, p. 161).

With the Emmy Noether Programme and the Heisenberg Fellowship, the DFG has established two funding formats whose explicit objective is to support the research careers of their recipients. They are geared at different target groups. The Emmy Noether Programme was introduced in 1999 to promote researchers' early independence and to create alternative paths to professorship that do not involve habilitation. The Emmy Noether Programme is focused on the potentials of individuals and projects at an early career stage. Researchers who were awarded their doctorates two to four years prior to proposal submission but who have not yet obtained habilitation are eligible to apply. A key feature of the programme is that by providing comprehensive funding for staff and direct project costs, it enables grantees to head their own independent junior research group, usually for five years, and thereby qualify to be a full professor. The Heisenberg Programme, in contrast, is mainly designed for academics who already fulfil all the requirements for tenured professorships.

This infobrief focuses on the long-term career prospects of applicants in these two formats. The study examines the career data of more than 500 researchers whose proposals were decided upon in 2007 and 2008. For this

group of individuals – which will be referred to as "Cohort 07/08" – we will first examine which career steps they have taken up to the proposal decision and thereafter. In addition, their long-term career developments will be analysed. The observation period for all applicants in this cohort ends in the summer of 2015, when the data for this study were collected.

Comparisons will be made primarily between individuals whose proposals were accepted and those whose proposals were rejected. Table 1 describes the study population in terms of selected core features. The study took a document-based approach along the lines of Reimann & Wysocki (2015). Data on the stages of the studied individuals' professional lives were drawn from internal DFG sources as well as from publicly available sources, and prepared for analysis.

A major advantage of this so-called CV method is that it does not depend on the willingness of the study population to participate. On the one hand, it does not take up their time; on the other hand, it also avoids failures due to low response rates. In addition, career surveys are often systematically distorted because less successful individuals tend to be less willing to participate in them than successful ones. Use of the CV method to investigate the careers of researchers is therefore becoming increasingly widespread in science studies (Canibano and Bozeman 2009).

In total, current CV data could be retrieved for 98 percent of individuals. Cases with only sporadically missing data were nevertheless included in the analysis, as the doctoral graduation year and the current academic employment status could be determined for each individual. CV data for the period after 2007 and 2008 are missing for only 11 out of 577 individuals in the study sample.

2 Target Audience of the Programmes

As Figure 1 shows, Emmy Noether and Heisenberg Fellowships meet with demand in all 14 DFG research areas, albeit with significantly different emphases. The Emmy Noether Programme (ENP) attracts especially life and natural scientists. In these disciplines, and particularly in physics, incentives to apply include not only the promise of direct career support, but also the collaboration in research teams that is typical of "laboratory subjects". Relatively few applicants work in the humanities and social sciences; in the engineering sciences, demand for the programme is likewise muted. An exception, as with the Heisenberg Fellowship, is computer science, which the DFG classifies as part of the research area Computer Science, Electrical and Systems Engineering. In contrast to the ENP, the Heisenberg Fellowship is geared more at individual funding and

	Number of individuals	Proportion of women	Avg. age at funding decision	Avg. age in 2015	Avg. age at doctoral graduation
Emmy Noether Programme accepted	139	25.9%	33.3	41.3	29.5
Emmy Noether Programme rejected	194	24.2%	33.7	41.6	29.9
Heisenberg Fellowship accepted	108	22.2%	38.3	46.2	29.7
Heisenberg Fellowship rejected	136	34.6%	39.9	47.8	30.6
Total	577				

Table 1: Description of data set (Cohort 07/08)

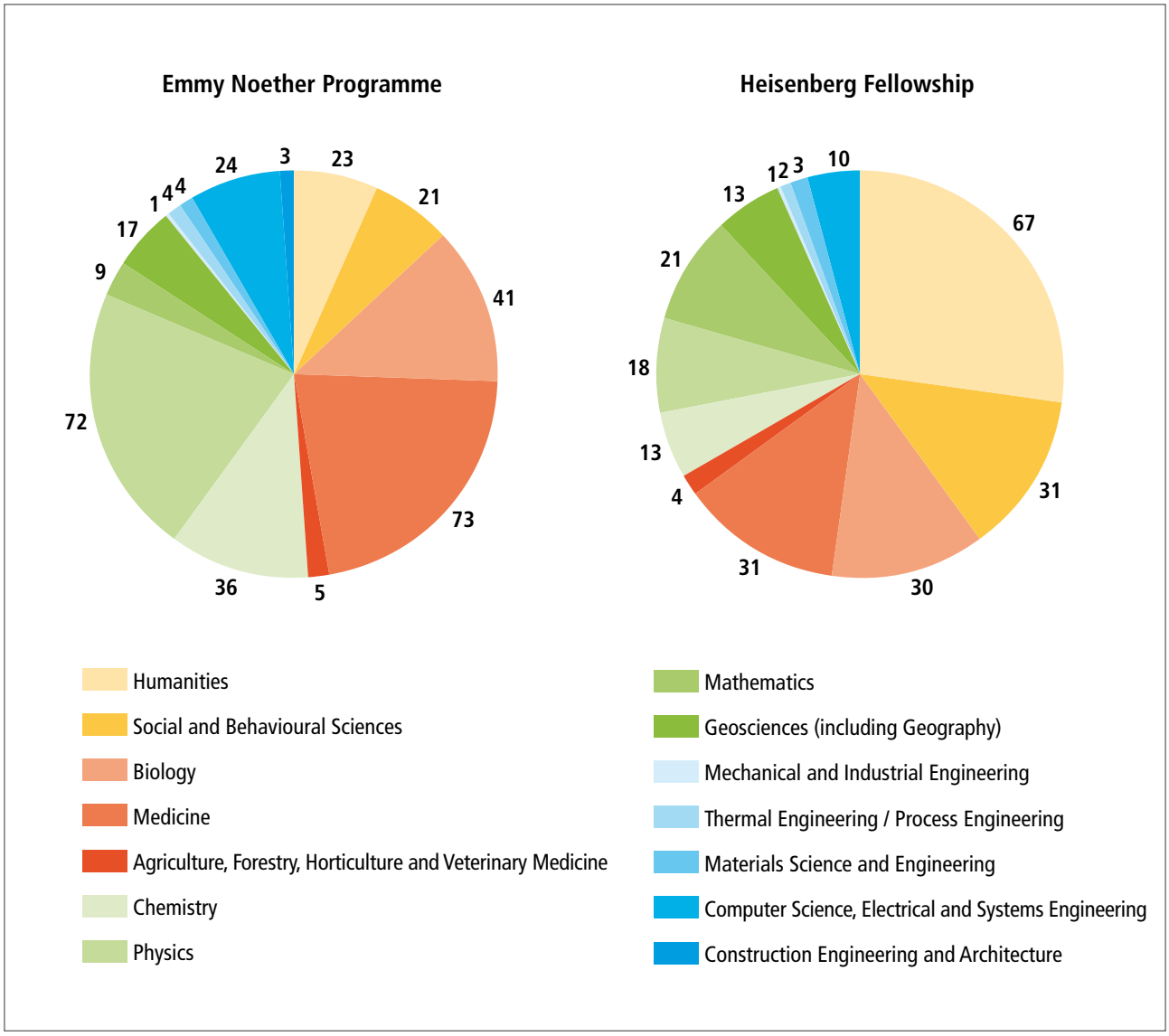

Figure 1: Number of new proposals from Cohort 07/08 decided upon by funding format and research area

consequently meets with more interest in the humanities and social sciences, although the life and natural sciences are also represented about equally.

In both formats, the recipients' average age at doctoral graduation – which is 29 years in the Emmy Noether Programme and 30 years for Heisenberg Fellowships (Table 1) – is below the German average of 33 years during the comparison year 2000 (BuWiN 2013, p. 162). For the Emmy Noether Programme, researchers generally have to apply within a time window of two to four years after they complete their doctorate. They tend to apply towards the end of this period. The subsequent career phase (funding decision approximately 6 to 13 years after doctoral graduation, Figure 2) is covered by the Heisenberg Fellowship. Distribution peaks at seven to nine years post-doctorate. A number of applicants, however, have obtained their doctorate much earlier. Each format covers a distinct career phase, which is in line with the programme objectives.

The importance of habilitation varies by discipline. Currently, every second habilitation is earned in human medicine (BuWiN 2013, p. 165). The overall number of habilitations has continuously decreased since 2005. Under the higher education acts of many German states, habilitation is no longer a prerequisite for professorial appointments. Nevertheless, habilitation is still part of the typical career path of the

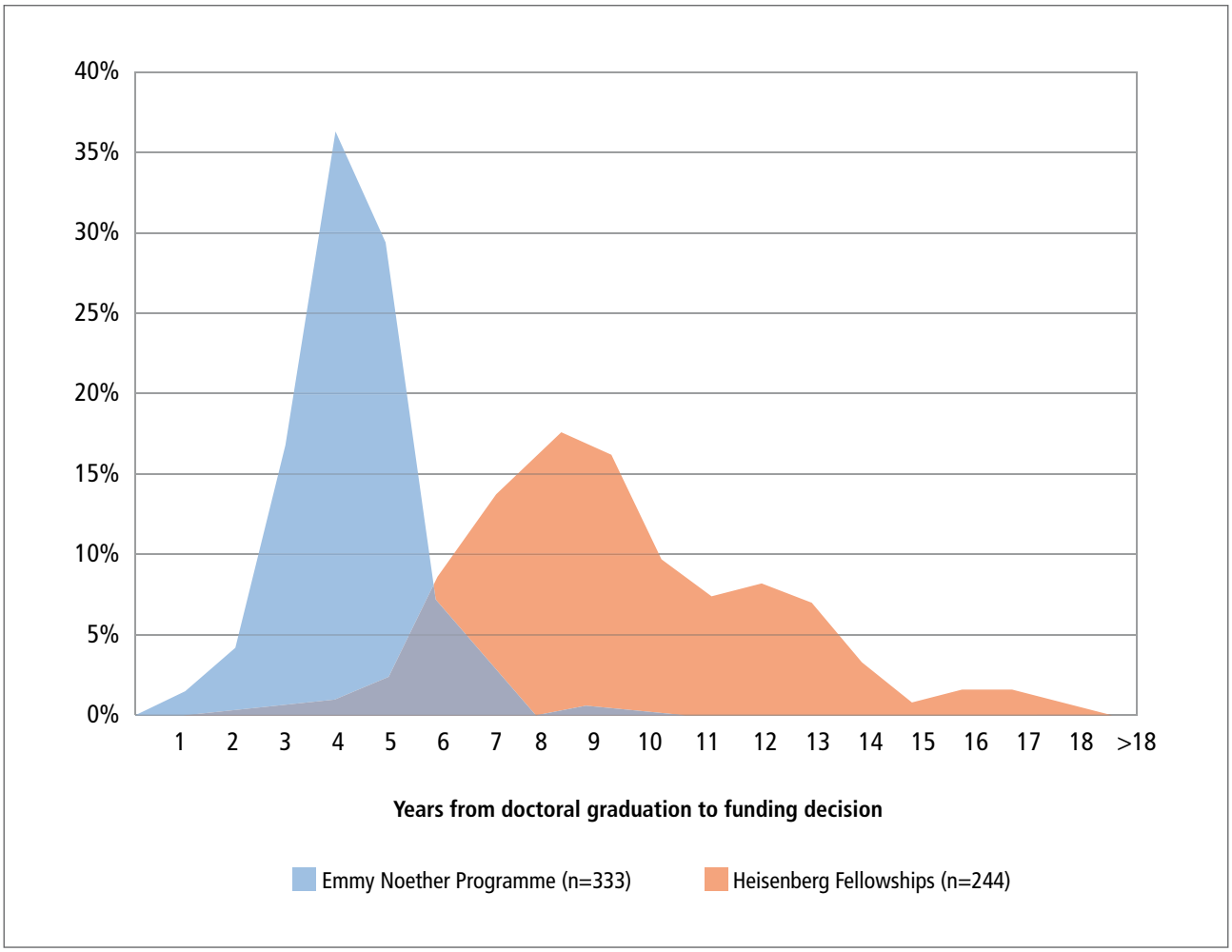

Figure 2: Time from year of doctoral graduation to year of funding decision by format (in years and proportion of all Cohort 07/08 applicants)

Heisenberg Fellowship's Cohort 07/08 (Figure 3). Almost all applicants had obtained their habilitation as of 2015, usually prior to the decision year. Among funding recipients, the proportion of those who had habilitated after the decision year is slightly higher.

One goal of the Emmy Noether Programme is to create career paths to professorship without habilitation. The Emmy Noether Programme asserts that by heading independent junior research groups and releasing publications, grantees demonstrate achievements that are equivalent to habilitation. A study on the ENP published in 2008 nonetheless found that 47 percent of Emmy Noether grantees had habilitated (Böhmer et al. 2008, p. 87). They named two main reasons for doing so: First, habilitation made it easier at some institutions to earn the right to award doctorates; second, many expected that it would increase their chances to be appointed to professorships (Böhmer et al. 2008, p. 62 and p. 88). Today, only around 30 percent obtain habilitation. The latest data thus show that the Emmy Noether Programme has made much headway towards one of its programme objectives.

3 Long-Term Research Career Success

The cohort method used here and its focus on the population that applied for DFG funding in the two relevant formats in 2007 and 2008 allows statements to be made from a 2015 perspective about long-term career positioning outside and inside of the academic research system, with the latter being the main point of

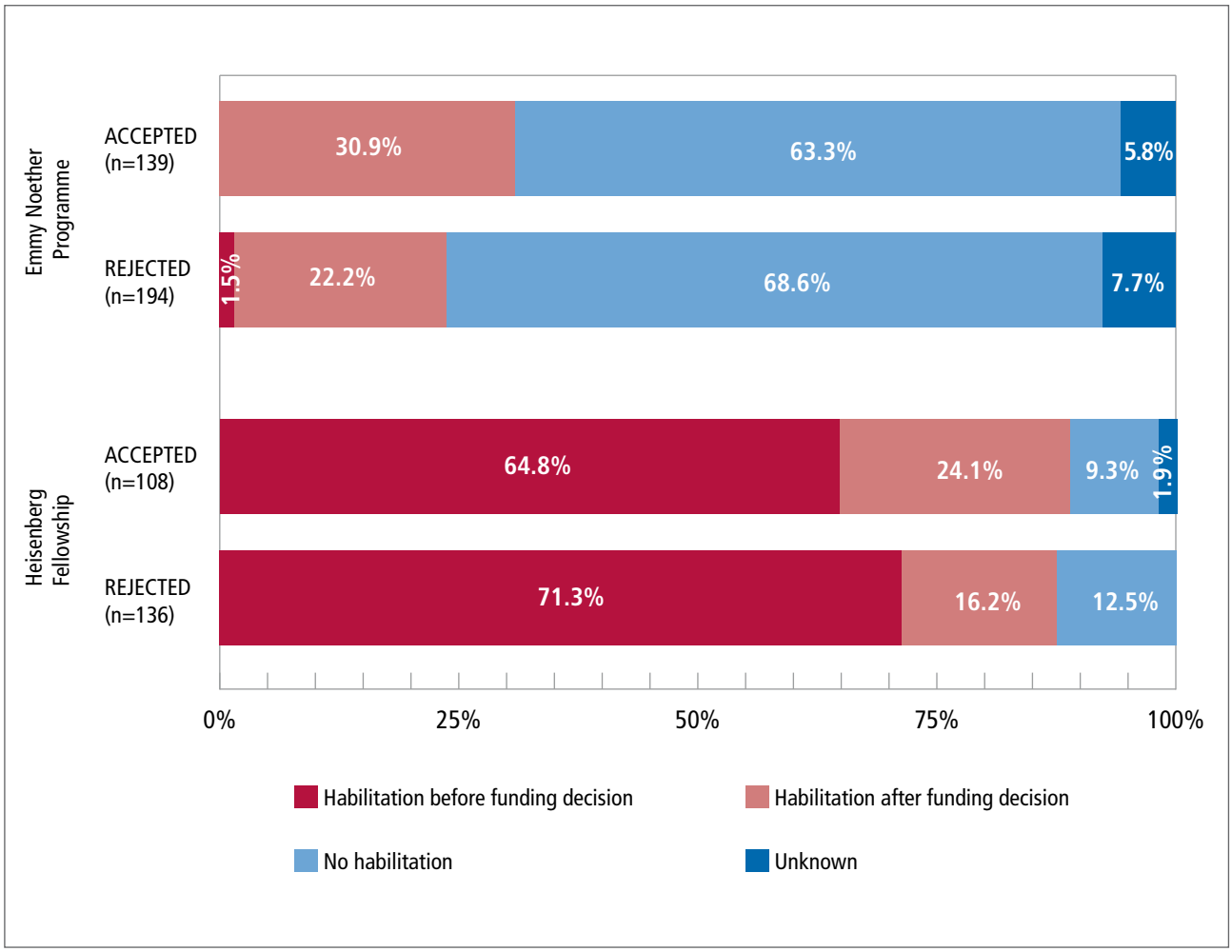

Figure 3: Habilitation by funding format and time before / after funding decision

interest. Assessment of career success is based on a typology of career stages that was formulated by the European Commission for the European Research Area (European Commission 2011). This typology was developed to make research careers comparable across countries and sectors. Its use in the present study thus enables stakeholders to position their findings within the international discourse on research careers and to compare them with other studies based on the same standard (e.g. Reimann & Wysocki 2015; Huber, Wegner & Neufeld 2015).

The model distinguishes four research career levels:

- First Stage Researchers (R1) have yet to complete their doctorate. This stage is not considered in this study because holding a doctorate is required to be eligible for the two DFG funding instruments examined here.
- Recognised Researchers (R2), according to this typology, hold at least one PhD, but have not yet established a significant degree of independence. They know their research field well, attend national and international conferences, are able to develop and implement a research design, collaborate and communicate effectively with other researchers, and are proactively advancing their career.
- Established Researchers (R3), in contrast, have attained a significant level of independence. They have a visible reputation in their field, promote their own research agenda, and take the lead in research projects.
- Leading Researchers (R4), finally, typically hold a permanent position, are highly recognised in their field, and have leadership responsibilities.

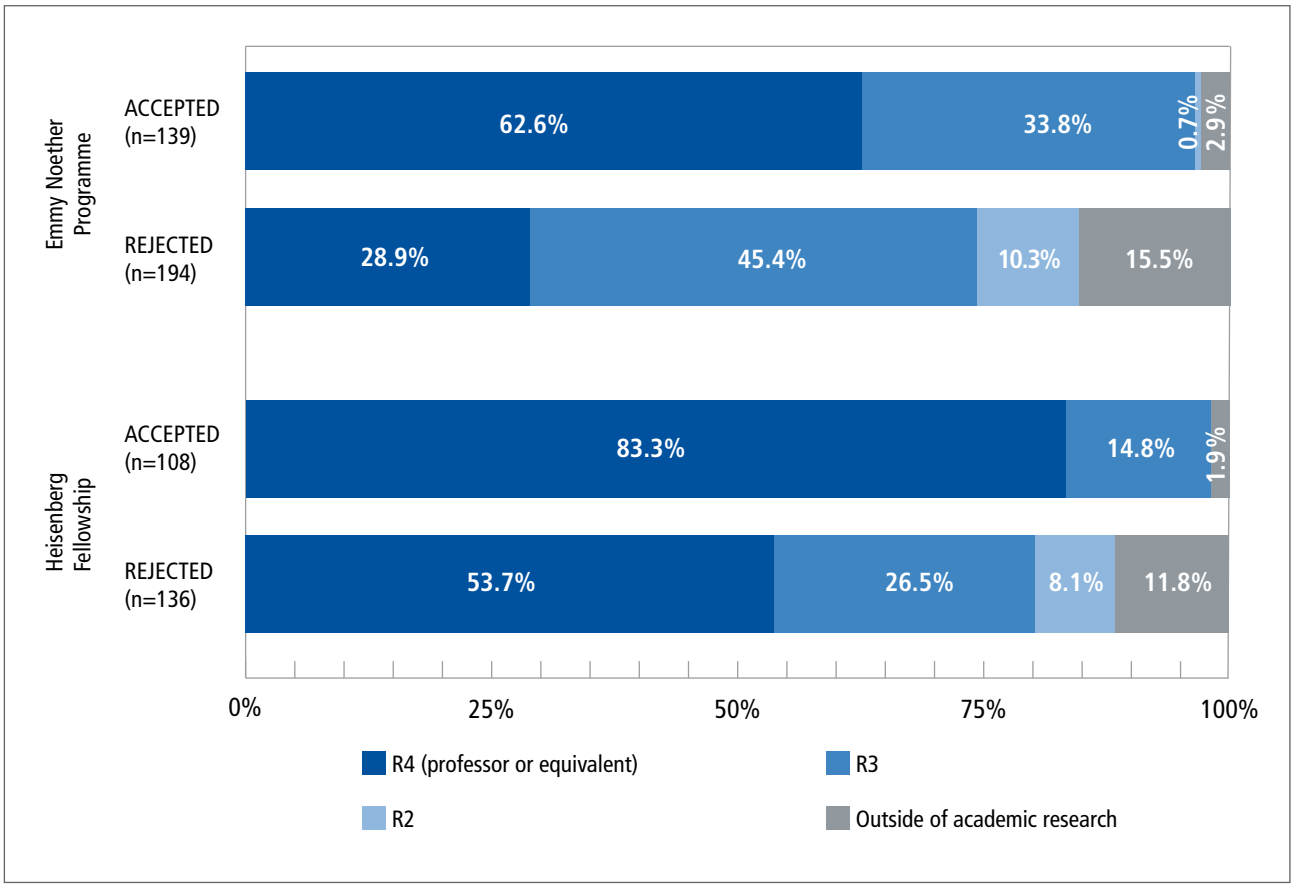

Figure 4: Career stages of Cohort 07/08 in 2015 by funding format and decision

The job titles extracted from the CV data were checked for their fit with one of the three relevant stages of this typology.[1] Stage R4 roles include W2 or W3 professorships (without junior professorships) in Germany, as well as associate and full professorships in other countries. Positions such as head of the institute, director or department head at a non-university research institution, and (frequently tenured) senior positions at universities in Germany (professor at a university of applied sciences, extraordinary professor, endowed professor) were also considered R4. The distinction between the second and third career stage required precise differentiation, for which aspects beyond those mentioned above were taken into account (e.g. leadership responsibilities, proposal experience, habilitation, etc.). Individuals who were no longer working at any research institution and who did not show any publication activity were categorised as working outside of academic research. As expected, both the Emmy Noether Programme and the Heisenberg Fellowship primarily address individuals focused on a career in academia. In both cases, the shares of those holding jobs categorised as R2, R3 or R4 add up to more than 95 percent in total (Figure 4). Among those whose proposal was rejected, the ratio of individuals who continued their career outside of academic research is much higher. But even here, about 85 percent of would-be Emmy Noether grantees and over 88 percent of (unsuccessful) applicants for a Heisenberg Fellowship found other ways to continue their research career over the long term.

A closer examination of Cohort 07/08 members who have remained in academic research shows that, in both formats, those who received a grant progressed in their academic career with greater success than those whose

1 Based on a concordance of common academic job titles according to the German, US, British and French model.

proposal was rejected. In the Emmy Noether Programme, 63 percent of grantees hold a professorship or equivalent position at career stage R4 as of 2015. The share is 29 percent for those who were not accepted into the programme. Among former Heisenberg fellows, 83 percent hold a professorship (or equivalent position) as of 2015, whereas only 54 percent of rejected Heisenberg applicants have reached career stage R4. However, when comparing the two formats, it should be noted that the Heisenberg fellows in question (who may already be professors) average 46 years of age in 2015 and are thus older than the average German professor at the time of his or her first appointment, which is 42 years for W3 professorships and 41 years for W2 professorships in 2015 (BuWin 2013, p. 178). Emmy Noether alumni, in contrast, are younger as of 2015, averaging only 41 years of age, and accordingly stand a good chance to be appointed as professors or advance to career stage R4 during the subsequent years. Almost without exception, grantees in both formats have reached at least career stage R3. Among applicants in the two formats whose proposals were rejected, a visible but small proportion is still employed at career stage R2 or has left the academic system, as described above.

The analysis shown in Figure 5 further breaks down the subsequent career success of the study population by gender. It shows that women and men benefit equally from the funding. The percentages of men and women who are at career stage R4 in 2015 are nearly equal. However, there are greater differences between the genders when it comes to rejected applicants in both programmes. In the Emmy Noether Programme, 19 percent of women whose proposal was turned down hold a professorship (or equivalent) today; among men, the proportion is much higher at

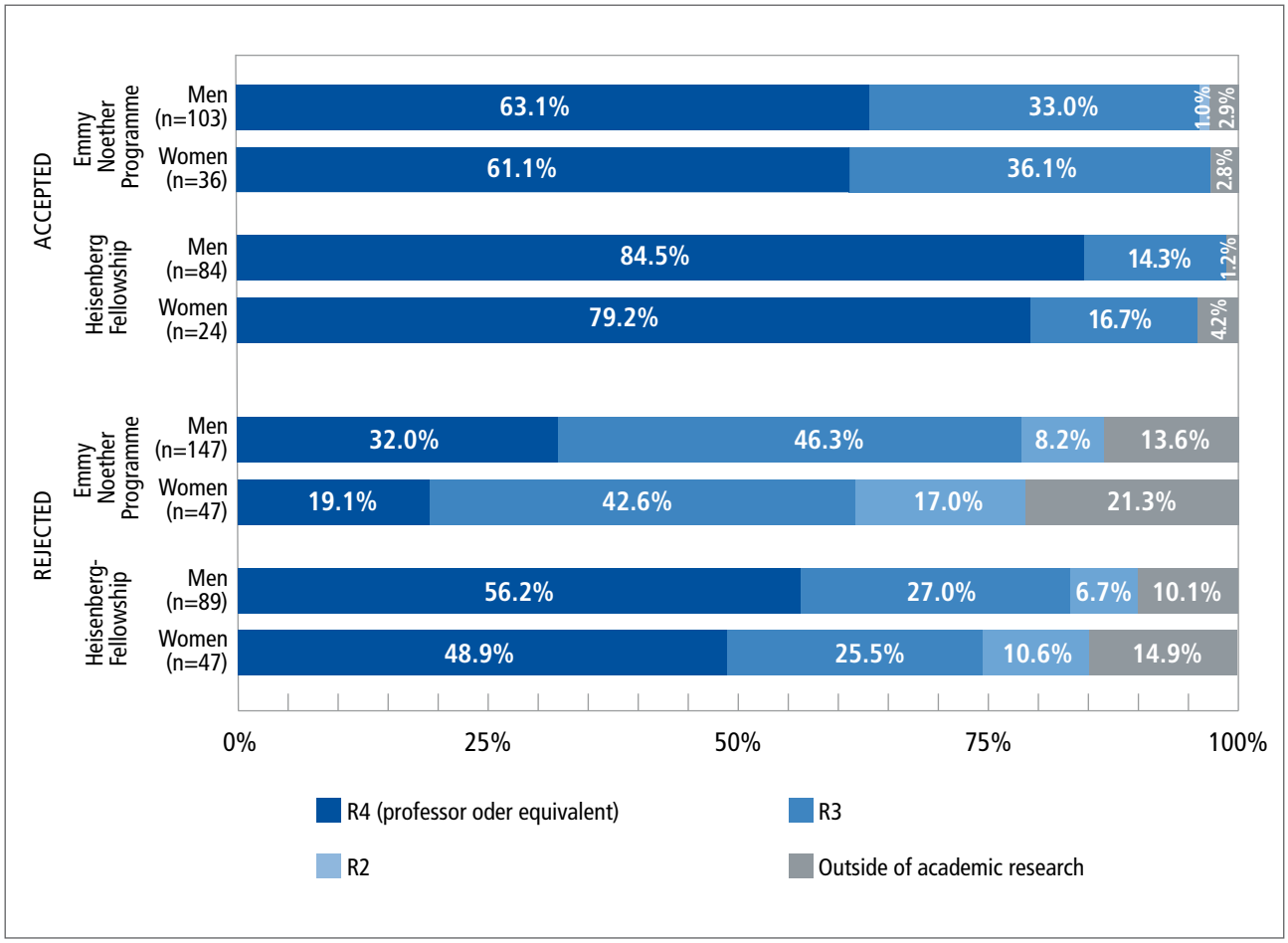

Figure 5: Career stages of Cohort 07/08 in 2015 by programme, funding decision and gender

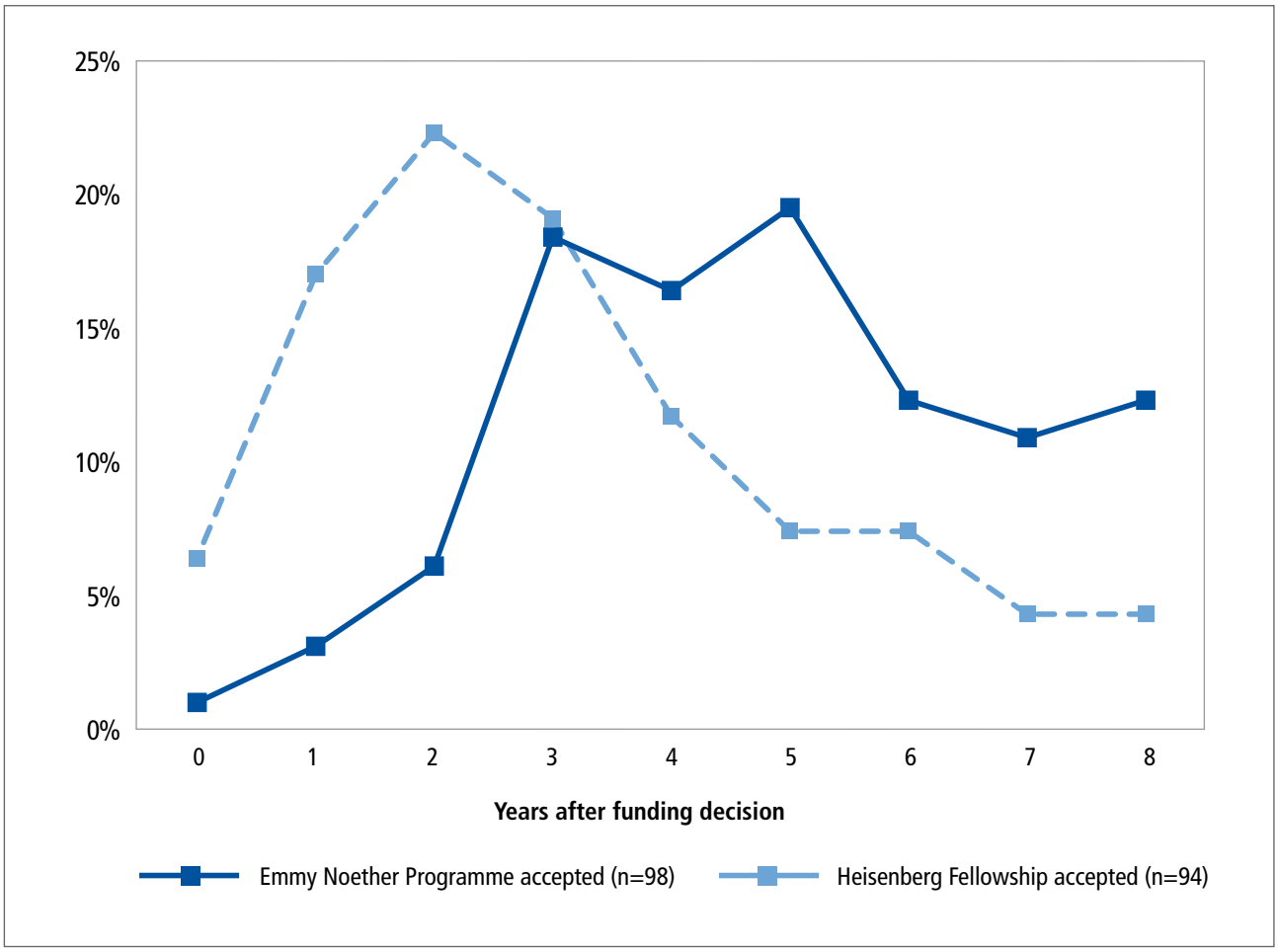

Figure 6: Time between grant and professorial appointment/advancement to R4 in years by funding format (as a percentage of all R4 researchers, imputed for years 7 and 8)

32 percent. In addition, the share of individuals who are still at career stage R2 or have left the academic system is higher among women than men. A similar picture emerges for the Heisenberg Fellowship. In light of the research on the "leaky pipeline" (Blome et al. 2013), these results substantiate the hypothesis that women have a harder time compensating for any setbacks in their research career. They are more likely than men to quit academia.

For successful applicants to the Emmy Noether Programme and the Heisenberg Fellowship, the year of professorial appointment and of advancement to R4 was analysed as well (Figure 6). The differences between the formats in time-to-appointment reflect the different programme rationales. For Emmy Noether grantees, who receive the grant very early in their careers, the appointment or advancement to R4 typically occurs no earlier than three years after the proposal decision. Their junior research group is in full swing by this time. Appointments tend to occur between the third and fifth year of funding, such that 45 percent of recipients progress to career stage R4 within the official funding period of five years. Once funding expires after five to six years (or later), the frequency of appointments decreases slightly.

Prospects to attain professorship in the subsequent years are also very good for the remaining 37 percent of Emmy Noether alumni. The indications can be found in another data source: The DFG database shows the title ("Prof.", "Priv.-Doz.", "None" other than doctoral degree) for all persons currently in contact with the DFG, e.g. researchers who have submitted new proposals or have been requested to participate in reviews. Because titles are recorded only in this case, these data may not

be up to date for all individuals. Nonetheless, a comparison of the titles recorded in the DFG database with the titles of the Cohort 07/08 researchers according to their CVs shows a high correlation.

If we trace this information base back to the year 2001, we find out that even more funding recipients attain professorships over time. More than eight out of ten Emmy Noether grantees from the beginning of 2000 are professors in 2015, according to the DFG database. This finding supports the claim that Cohort 07/08 has not yet reached the final career stage and that these researchers are very likely to be appointed professors after 2015 – and it underscores the remarkable career success of this programme. This is also suggested by the fact that Emmy Noether grantees are still relatively young when their funding expires, i.e. below the average appointment age in Germany.

For Heisenberg fellows, who, at 38 years, are already older when they receive funding, the grant seems to have a signal effect. Garnering the fellowship demonstrates appointability as well as excellence, and often leads to a professorship within the first three years. Seventy-three percent of fellows become professors or advance to R4 within the five-year funding period.

4 Conclusion and Outlook

To support early career researchers, the DFG established the Heisenberg Fellowship in 1978 and the Emmy Noether Programme in 1999. In order to investigate the career placement success of these formats, more than 500 CVs were analysed. The strength of this analysis is that its almost gap-free data base makes it possible to measure career success without distortion, whereas commonly used survey-based methods have limited significance due to low response rates from unsuccessful applicants.

The aim of the Emmy Noether Programme, which is to help funding recipients have a successful long-term career in research, is being accomplished. Almost two-thirds of grantees became professors within seven to eight years of the funding decision. Among rejected applicants, the share was only half as large. The DFG promotes early independence on the way to professorship by supporting junior research groups with comprehensive financial resources. Emmy Noether grantees tend to earn their doctorate at a very early stage and apply to the programme at the beginning of their research career. The programme has thus successfully established itself as a career path next to habilitation and junior professorship.

The Heisenberg Fellowship gives excellent researchers who are qualified to be professors, but for whom no relevant openings are currently available, a crucial career boost. Once accepted into the programme, Heisenberg fellows are frequently appointed to permanent professorships within just a few years. This format thus makes an important contribution to research-career support as well.

The final report on this study, set to be released in 2017, will examine additional programmes relevant to early career researchers and analyse over 1,000 CVs. It will take a more in-depth look at the topic of career success and explore additional topics, such as institutional, sectoral and international mobility, the inclination to apply for grants, and the success of cohort groups in other DFG programmes.

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