

Katharina Fuß

Doctoral Training Frameworks: A Comparison of Doctorates in the DFG's Research Training Groups and Collaborative Research Centres Programmes

Early career support is one of the core tasks of the DFG.¹ About 20,000 doctoral researchers work in DFG-funded projects and networks on current investigations. A survey conducted annually in the Collaborative Research Centres (CRC) and Research Training Groups (RTG) programmes provides a comprehensive information base on the personnel composition of the networks and on the structural impact delivered by the programmes. Detailed analyses of the surveys can be found in the reports "Monitoring des Förderprogramms Graduiertenkollegs" and "Monitoring des Förderprogramms Sonderforschungsbereiche"². This infobrief provides an overview of the findings as they relate to early career support.

1 Background and Data Base

In 2009, the DFG funded 257 Collaborative Research Centres, including the programme variations Transregio, Transfer Units and Cultural Studies Research Centres (2008: 279, 2007: 293). At 42 percent, CRCs in the life sciences account for the largest share by far of the total number of centres. The natural sciences make up 27 percent, the engineering sciences 21 percent, and the humanities and social sciences 10 percent of all CRCs. The number of Research Training Groups funded in 2009 was 258 (2008: 252, 2007: 267). At 15 percent, the engineering sciences claim a significantly

smaller portion of all RTGs than the other three disciplines (humanities / social sciences, life sciences, natural sciences), each with shares of around 28 percent.

For several years, the DFG has conducted annual surveys in its CRC and RTG grant programmes to obtain, among other insights, information on the situation of early-career researchers in these programmes.³ The CRCs' or RTGs' speakers are asked, in accordance with their reporting obligations towards funding bodies, to complete online questionnaires providing information about the projects and the people involved. Participation rates have been well over 95 percent.⁴ This monitoring there-

1 Cf. DFG Statutes § 1. In a survey of researchers conducted on behalf of the DFG, the majority of respondents rated early career support as the DFG's most important task (cf. Böhmer, S. et al., 2011, p. 161).

2 www.dfg.de/en/dfg_profile/evaluation_statistics/statistics/programme_related_statistics/statistical_reports/ (only available in German)

3 Other issues include stays abroad, spin-offs, and the mix of scientific disciplines in a programme.

4 Reporting obligations are waived for RTGs and CRCs on expiration funding.

fore allows the DFG to gain a timely and quality-data-driven understanding of the researchers currently working in RTGs and CRCs.

So what is the personnel makeup in these networks? In Collaborative Research Centres, over 10,000 people have worked in a scientific capacity per year, not including principal investigators and assistants (see Table 1).⁵

The total number of doctoral and postdoctoral researchers working in RTGs in 2009 was just over 6,000 (see Table 1).

In 2009, an average 38.5 people were employed in a scientific capacity per CRC (median). Thus the average number of employees remained stable compared to the previous year (39 people) and grew compared to 2007 (36 people). CRCs in the natural sciences had the most doctoral researchers per centre (see Figure 1).

| | CRCs | RTGs |
|--------------------------|--------|--------|
| | People | People |
| Doctoral researchers | 6,438 | 5,554 |
| Postdoctoral researchers | 3,103 | 524 |
| Other research personnel | 1,140 | - |
| Total | 10,681 | 6,078 |

Table 1
Research personnel in CRCs and RTGs in 2009

Figure 1). Conversely, CRCs in the humanities and social sciences employed the most postdoctoral researchers (median).

The average (median) RTG in 2009 employed 19 doctoral researchers⁶ (2008: 19, 2007: 17.5) and two postdocs. In contrast to CRCs, where centre-personnel composition differs widely across disciplines, there is little variation between the average staff sizes of RTGs (see Figure 1).

5 This breakdown includes CRC-funded staff as well as network members funded from other sources.

6 Including fellowships

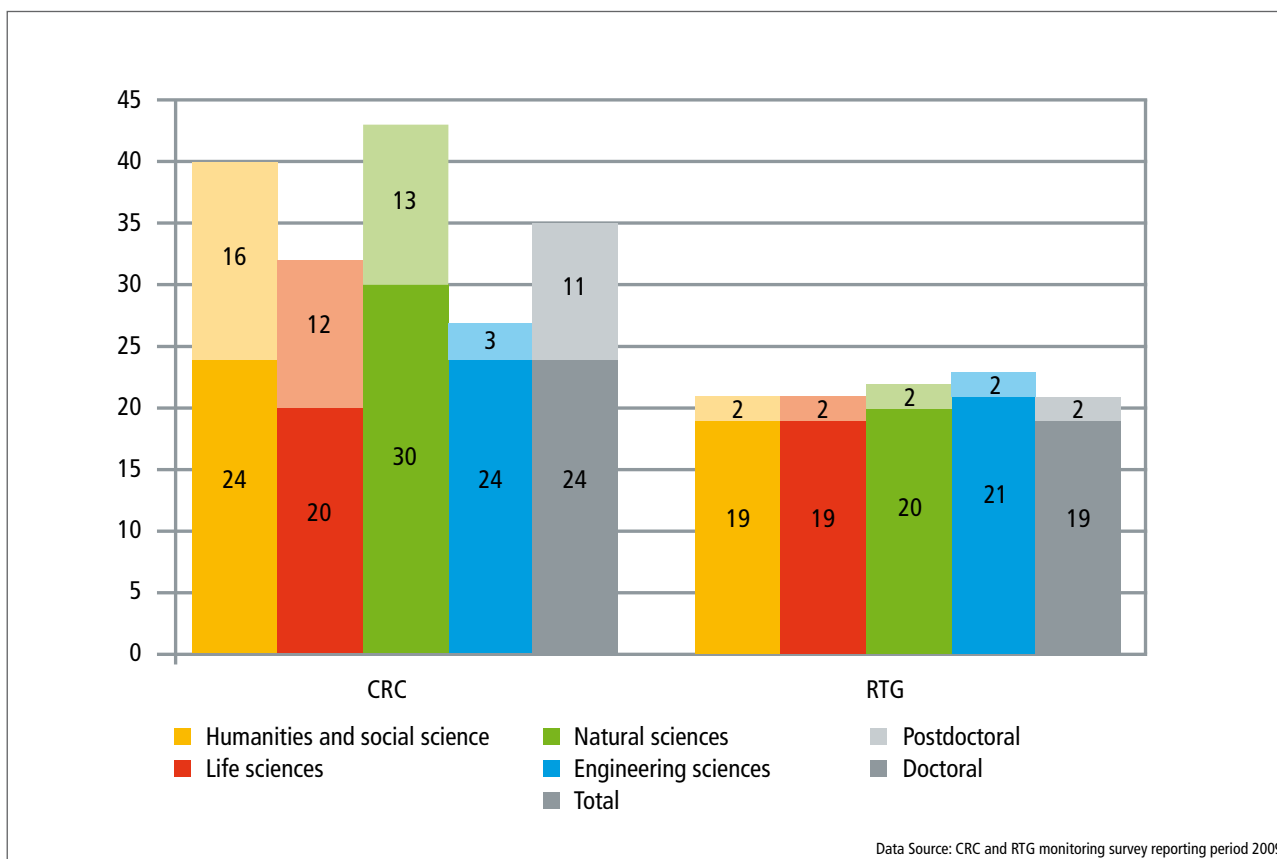


Figure 1
Average (median) number of doctoral and postdoctoral researchers in CRCs and RTGs

2 Doctorates in Collaborative Research Centres and Research Training Groups

Indicators for the success of early career support in the DFG’s Collaborative Research Centres and Research Training Groups programmes are the number of doctorates awarded and the time to degree completion. Thanks to monitoring, this information can now be captured and systematically analysed.

2.1 Number of completed doctorates

Based on the data collected in the annual monitoring, 1,134 doctorates were completed in 2009 in all CRCs and RTGs combined.⁷ This

roughly matches the number for 2008 (1,160 doctorates). According to the Federal Statistical Office, a total of 24,900 doctorates were awarded in 2008 by German universities. Thus about five percent of doctorates in Germany are completed within these two DFG programmes. Methodologically, however, it should be noted that the share of doctorates completed per year averages just under 10 percent when measured by the number of doctoral researchers in CRCs and RTGs. Assuming an average time-to-doctorate of three to four years, one would expect an average share of about 25 to 30 percent across all CRCs and RTGs. This difference can be explained by the fact that the monitoring captures only completed doctorates awarded to individuals who were members of a CRC or RTG during the reporting period. Degrees awarded after leaving a CRC or RTG have not

⁷ Completion of the doctorate here refers to the last oral examination.

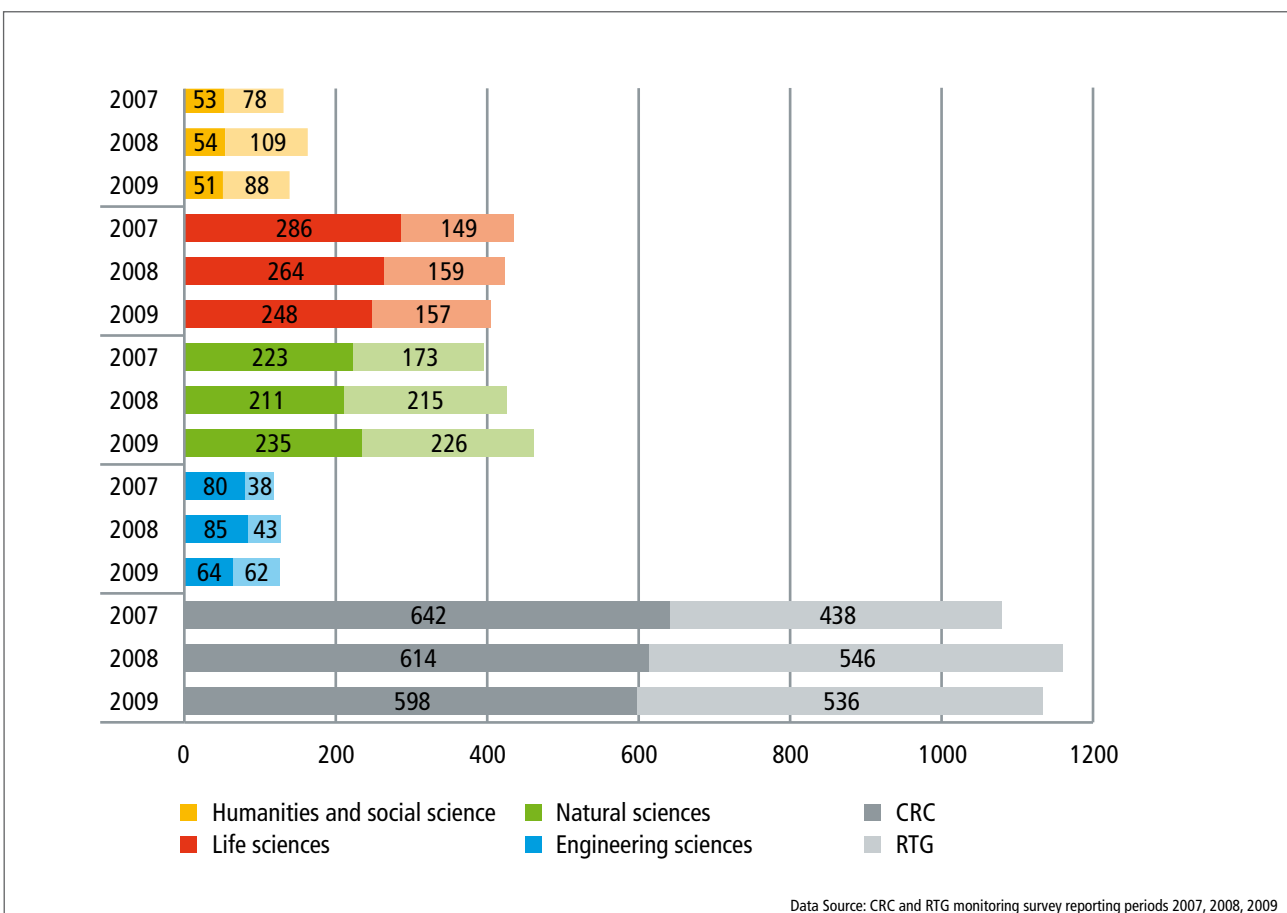


Figure 2
Number of doctorates completed per reporting period, by discipline

been included, even when dissertations were prepared predominantly under DFG funding.⁸

Figure 2 shows the number of completed doctorates in CRCs and RTGs broken down by scientific discipline. In the life sciences and natural sciences, the number of completed doctorates is significantly higher than in the other disciplines. On the one hand, this is due to the higher absolute number of doctoral candidates in these fields.⁹ On the other hand, dissertations in these disciplines tend to be prepared in shorter time periods, as will be explained in greater detail in section 2.2.

8 Future monitoring will also include individuals who have already left the network or group but not yet completed their doctorate.

9 These findings agree with the numbers on completed doctorates in Germany that the German Council of Science and Humanities reported in its 2011 position paper on quality assurance requirements for doctorates. Next to medicine, the most doctorates in 2007 and 2009 were awarded in the field of mathematics and natural sciences. This is also the group of subjects where doctorates are most prevalent (cf. Wissenschaftsrat, 2010, p. 31).

2.2 Time-to-doctorate

DFG-funded Collaborative Research Centres and Research Training Groups are designed to provide opportunities for doctoral researchers to work with focus and at a high qualitative level on current scientific topics, by offering them intensive mentoring, a curricular programme (e.g. methodology training), and integration into a research project. Research Training Groups also aim to shorten the time to doctorate completion. So how long do doctoral researchers work on their theses under these funding programmes? When considering and comparing the duration of the doctoral period, we must first define its beginning and end. Several possible definitions exist for both dates. The beginning of the doctoral period can be taken as:

- the date on which the degree is awarded that grants admission to doctoral training,

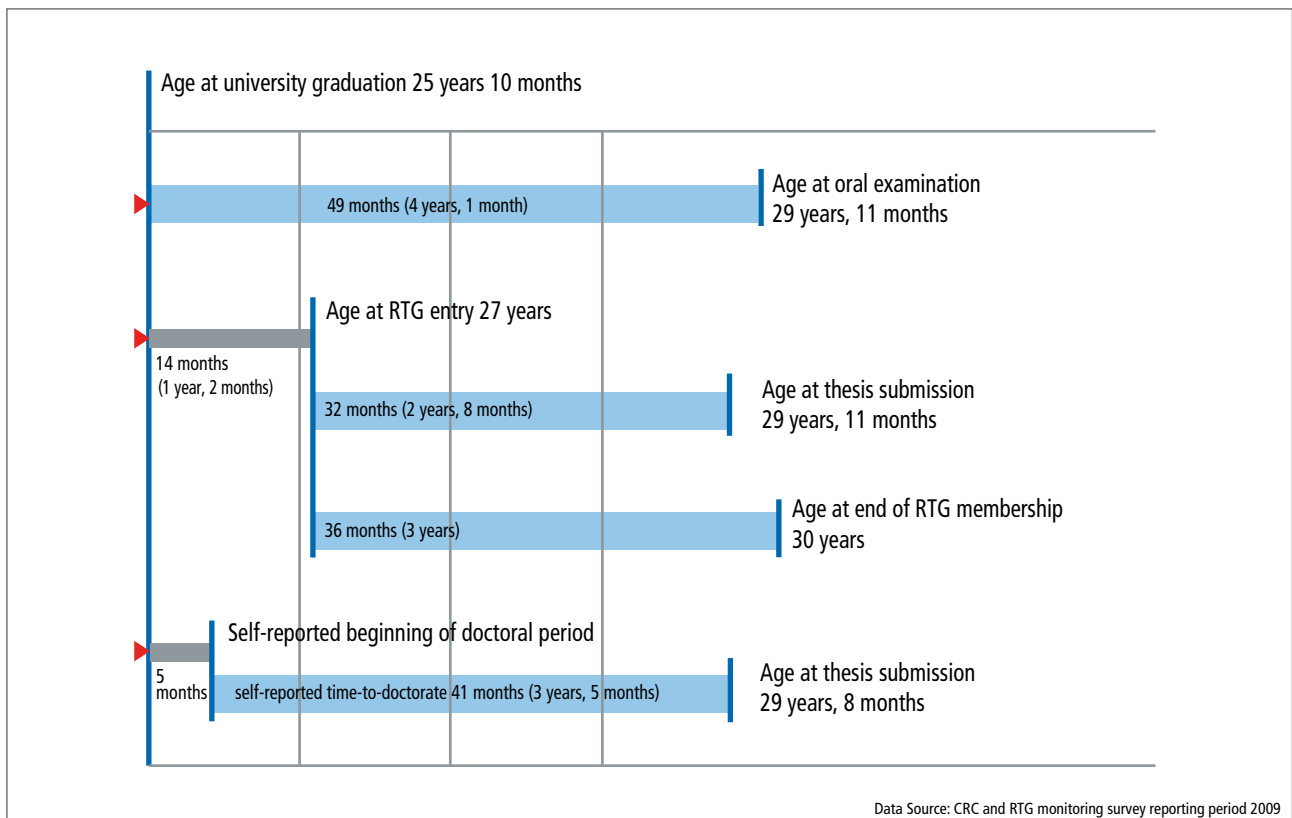


Figure 3

Prototypical timetable from graduation to doctorate in an RTG
 N=536 researchers who completed their doctorates as RTG members
 Average value: median

- the date which the individual considers the beginning of his/her doctoral period, or
- the date on which the individual enters a doctoral programme.

The end of the doctoral period can be taken as:

- the date on which the thesis is submitted,
- the date of the oral examination, or
- the date on which the PhD certificate is awarded and from which on the doctoral title may be used.

The different definitions of the beginning and end of the doctoral period each have their advantages and drawbacks, which are described in detail in the RTG monitoring report.¹⁰

A closer look at the different key events for doctorates reveals the following prototypical timetable (see Figure 3). Our sample consists of researchers who completed their PhDs in 2009 while being part of an RTG (n = 536).

They graduated from university at an average (median) age of 25 years and 10 months. Between their graduation and entry into the RTG, an average 14 months went by. Towards the end of this period, i.e. about 9 months before joining the RTG, they already begin working on their doctorates, according to self-reports. At an average age of 27, they join the RTG. They submit their doctoral thesis after 2 years and 8 months, but their self-estimated doctoral period lasts 3 years and 5 months – longer than their RTG membership, which generally ends after 3 years.

A comparison of the time-to-doctorate in RTGs and CRCs (here defined as the period between graduate degree and PhD oral examination; sample includes only individuals who completed their doctorates as RTG or CRC members) reveals that doctoral researchers in RTGs, across reporting periods, finish their degrees three to five months faster

10 Cf. Deutsche Forschungsgemeinschaft, 2011b, p. 38ff.

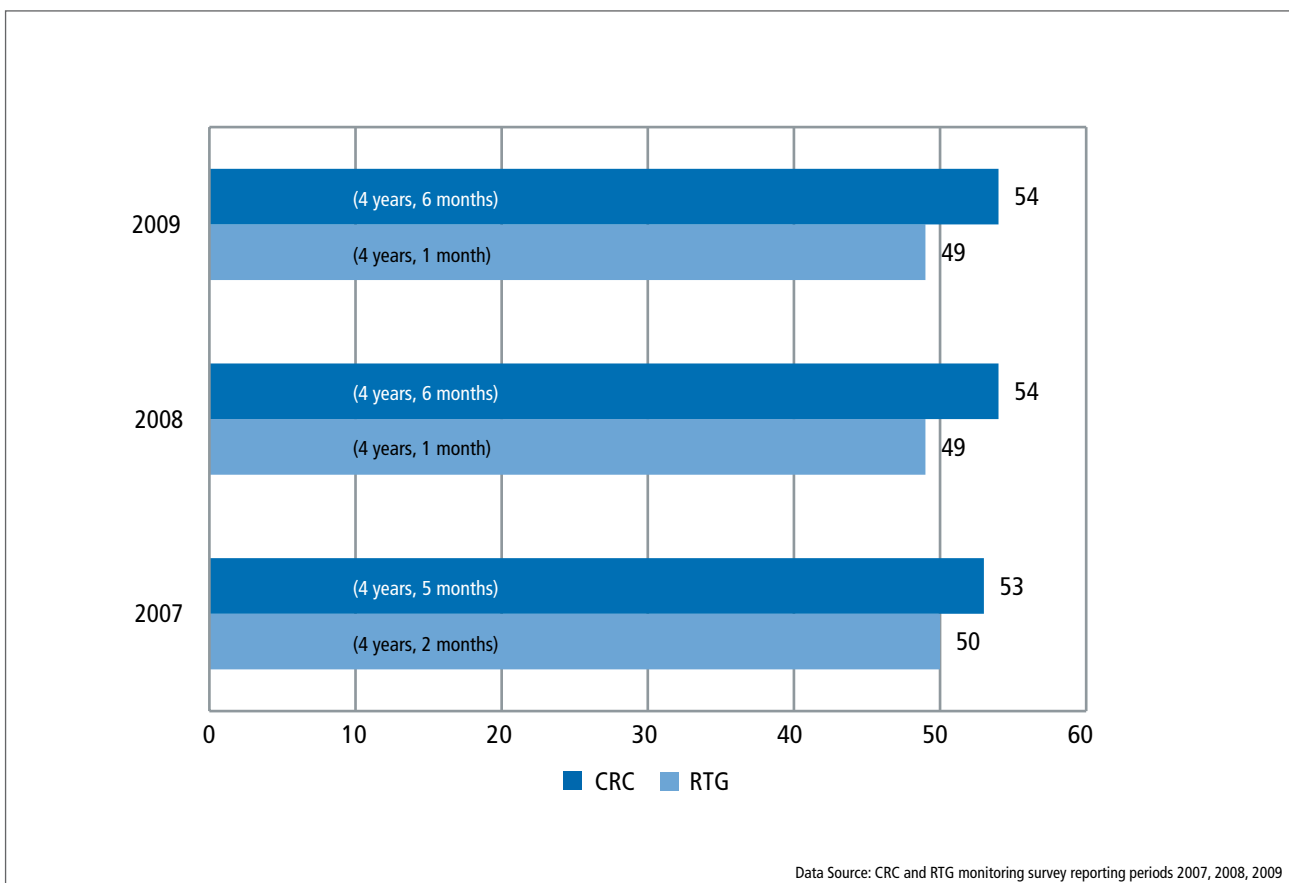


Figure 4
Average (median) time-to-doctorate in months – defined as period from graduate degree to PhD oral exam – in CRCs and RTGs

(see Figure 4). In 2009, the average time-to-doctorate, according to this definition, was 4 years and 6 months in CRCs versus 4 years and 1 month in RTGs.¹¹ In what is so far the only study on the length of doctoral periods, Enders and Bornmann give the average time from graduate degree to PhD oral examination as 5.7 years (Enders and Bornmann, 2001).

When comparing the time-to-doctorate in CRCs and RTGs by discipline, we see that PhDs in the humanities / social sciences and engineering sciences are the most time-consuming. Doctorates in engineering CRCs take 18 months longer than those in RTGs in the same field. One reason could be that in CRCs, doctoral training for engineers consists not only of thesis writing but also entails comprehensive project management responsibilities. In contrast, the focus in RTGs is on speedy degree completion.

However, the differences between the disciplines level out when the self-reported time-to-doctorate¹² for RTG members is considered. In this case, the doctoral period for all disciplines ranges from 39 to 41 months, with humanities scholars actually at the low end of the range. Thus the time it takes to prepare a PhD thesis is about 3 years and 4 months, regardless of the scientific discipline. The part of doctoral training where discipline-specific characteristics appear to be more influential is thus the period before the actual thesis work begins. It is possible that doctoral researchers in the humanities / social sciences and in the engineering sciences undergo a longer period of orientation during which they define their topics.

The aim of speedy degree completion in RTGs is also reflected in the maximum indi-

11 Note the aforementioned methodological limitation regarding the non-inclusion of doctorates completed post-membership.

12 Self-reported time-to-doctorate = Time from the self-reported beginning of the doctoral period to the thesis submission date. Data on the self-reported beginning of the doctoral period are available only for RTGs, but not for CRCs.

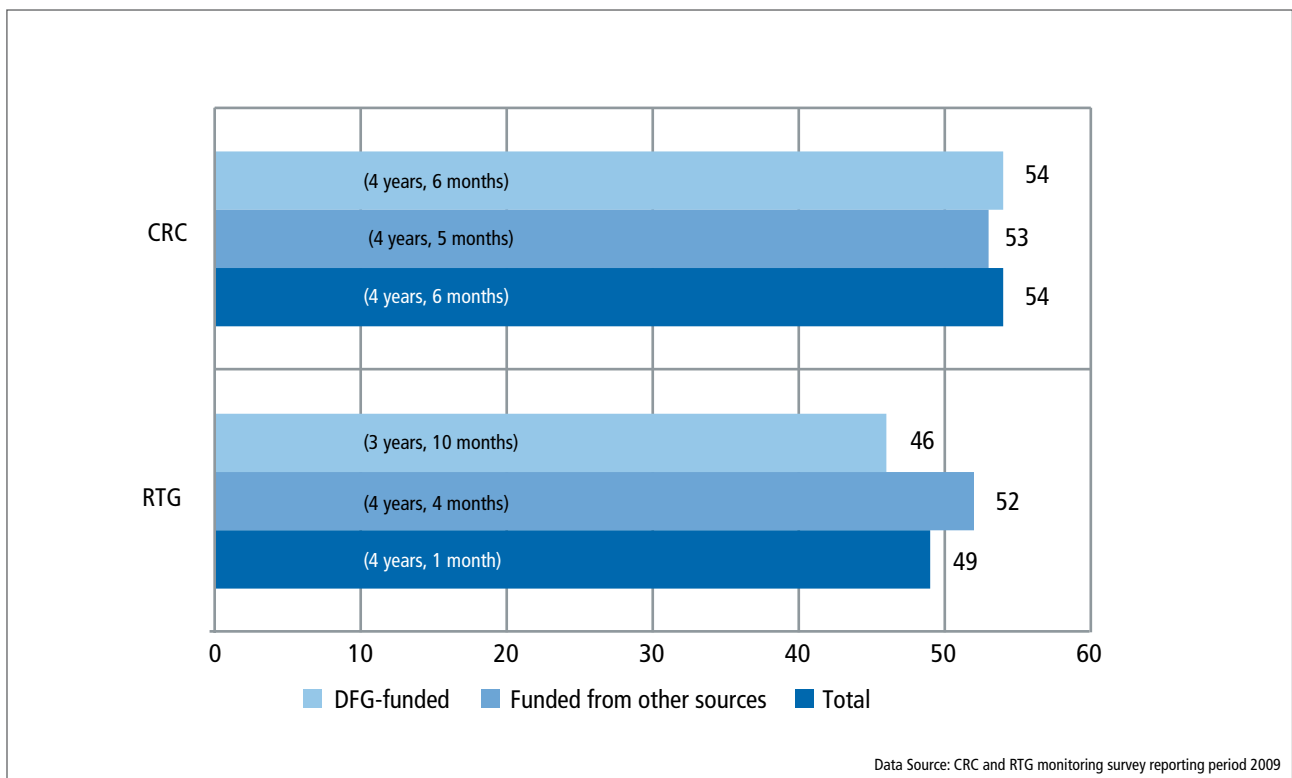


Figure 5

Average (median) time-to-doctorate in months – defined as period from graduate degree to PhD oral exam – in CRCs and RTGs, by funding source

vidual funding period of 36 months. Only a quarter of all doctorate holders report a time-to-degree of three years or less, and only 17 percent of those trained in engineering RTGs managed to complete their doctorates within three years.

2.3. Funding of doctoral researchers

Doctoral researchers who participate in a Research Training Group or Collaborative Research Centre may be funded out of the budget of these entities or from other sources (exclusively or predominantly). Regular monitoring for the first time captures information on doctoral researchers funded from other sources, who are not included in reports to the DFG for the purpose of reviewing proposals or the use of funds. Yet this cohort too is relevant in assessing the effect of DFG-funded groups and networks on early career support. There is a sizeable number of people who benefit from these institutions not monetarily but rather through the topics they investigate, the structures they create, and the curricular programmes they offer. The portion of doctoral researchers funded exclusively or predominantly from other sources is about 30 percent in RTGs and 25 percent in CRCs.

When comparing time-to-doctorate (defined as the period between graduate degree and PhD oral examination) by funding source (see Figure 5), there is no significant difference when it comes to CRCs. In RTGs, however, a clear correlation does exist: While those with only or mostly RTG funding complete their doctorate after an average 3 years and 10 months, those with only or mostly other funding sources needed half a year longer – 4 years and 4 months – to finish their degree. This may be due to additional obligations not directly related to the doctorate, such as teaching or work on network projects outside the scope of the PhD thesis.

3 Discussion and Outlook

Over 10,000 doctoral researchers work in Collaborative Research Centres and Research Training Groups, and more than 1,000 complete their doctorates each year under these programmes. The majority of these degrees are in the life and natural sciences. The average time-to-doctorate varies by scientific discipline, grant programme, and source of funding. Doctorates in RTGs take less time on average than those in CRCs. Doctoral researchers with RTG funding tend to complete their degrees faster than those funded from other sources; in CRCs the funding source has no effect on the time-to-doctorate. A comparison of doctorates across scientific disciplines reveals that those in the humanities / social sciences and the engineering sciences take the longest. However, this difference disappears when the self-reported duration of the doctoral period is considered. The analysis of the self-reported time-to-doctorate also shows that the target duration of the qualification phase in RTGs and the maximum funding period of three years are exceeded in most cases. Only one-quarter of PhD holders report having completed their degree within three years.

Many doctoral researchers finish their degree only after they have left the RTG or CRC. This cohort has not been included in the DFG's annual surveys so far. Doctoral researchers who did most of their thesis work as members of a DFG-funded network but did not complete their PhD until later could therefore not be considered in these analyses. As a result, the number of doctorates produced by CRCs and RTGs is underrated. The same is true for the average time-to-degree, which also does not reflect doctorates completed post-membership. For this reason, future monitoring surveys are set to collect also information on individuals who left the network before their doctorate was completed.

Using data collected in CRC and RTG monitoring surveys, a comprehensive picture can be drawn of the situation of doctoral researchers in Collaborative Research Centres and Research Training Groups. These data also reflect the changing environment for doctorates at German universities. When it comes to evaluating DFG instruments for early career support, issues such as mentoring and future career outlook also play important roles. These questions are the focus of "ProFile", a panel study that is being conducted by the DFG in collaboration with the Institute for Research Information and Quality Assurance.

Thus far, DFG monitoring has been limited to the CRC and RTG programmes. To be able to analyse a greater portion of its portfolio, the DFG plans to include additional programmes in the monitoring process. It uses programme monitoring also to gain additional insights into programme-specific and general research policy issues (such as internationality¹³ and gender equality), to evaluate programme developments, and to support management and strategy development in its programmes. Generally speaking, the DFG's various programme monitoring activities – which include, in addition to the annual CRC and RTG surveys described above, comprehensive statistical breakdowns and the DFG Funding Ranking – help improve the information base on DFG-funded programmes and their results.

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Contact

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

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¹³ Statistical data on the countries of origin of foreign visiting researchers in CRCs and of foreign doctoral researchers in RTGs can be found in the DFG's 2010 annual report (cf. Deutsche Forschungsgemeinschaft, 2011a, pp. 180 and 185).