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Being a Doctoral Researcher in the Leibniz Association

Perspectives on Graduate Schools

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on behalf of the Leibniz PhD Network

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Contents

1 Summary

This report presents graduate school specific results based on data from the 2019 Leibniz PhD Network Survey Report[1]. As is more common with larger surveys, not all data were fully displayed. In this work, we provide a more in-depth analysis of this topic.
Out of 937 doctoral researchers (DRs) who participated in the 2019 survey, 513 respondents stated that they are enrolled in a graduate school (GS). This provides a good database with which we can examine various effects of, and reasons for, graduate school enrollment.
Mainly, this report focuses on reasons and effects of enrollments and thus compares enrolled and not enrolled doctoral researchers on various topics, differences based on fields of research (*sections*) and on nationality. For more information on sections and nationalities within the Leibniz Association please refer to the general report.

[1] Beadle, B., Do, S., El Youssoufi, D., Felder, D., Gorenflos López, J., Jahn, A., Pérez-Bosch Quesada, E., Rottleb, T., Rüter, F., Schanze, J.-L., Stroppe, A.-K., Thater, S., Verriére, A., Weltin, M. (2020). Being a Doctoral Researcher in the Leibniz Association: 2019 Leibniz PhD Network Survey Report.

Main findings from the following report:

- The answers in the free text option indicate a lack of information on graduate schools for at least some doctoral researchers within the Leibniz Association.
- *Financial support for conferences and travel* is the most common offering of graduate schools among all respondents (81%), while *equipment* is the least supported of the aspects surveyed (42%).
- Being enrolled in a graduate school correlates significantly positively with satisfaction in terms of *workshops and skills*, *career development*, and *contribution to science*.
- Non-German doctoral researchers have a higher enrollment rate (59% within EU, 70% outside EU) than German doctoral researchers (56%). Our data suggests a higher *lack of interest* and a lower *perceived value* from German doctoral researchers compared to non-German ones could be possible reasons.
- Field of research (*sections*) has also an impact on enrollment rate and reasons for not being enrolled: At 76%, the proportion of doctoral researchers enrolled in a graduate school was by far the largest in Section C (Life Sciences). Regarding reasons for not being enrolled, Section B (Economics, Social Sciences, Spatial Research) stands out with 39% stating “I don’t want to”.

2 Graduate schools of the Leibniz Association

Six questions were asked in the graduate school section, including an open text question for general comments. Some responses in the open text illustrated an information deficit among some DRs:

- *I do not know what the Graduate Schools are. I did not hear about them.*
- *I have never heard about graduate schools before.*
- *Are universities graduate schools? I do not understand this term.*

This might be due to the history of GSs in Germany. In other countries, such as the U.S., GSs are an essential element of a doctorate, although it should be noted that their structure is somewhat different. Nonetheless, GSs have been established for a long time for doctorates. In Germany it is a comparatively recent development and has a common alternative with the chair doctorate. Nevertheless, graduate schools are becoming widespread in Germany, which is also reflected within the Leibniz-Community. In this report, our definition of graduate schools is illustrated by the following aspects:

- Graduate schools are bodies for structured doctoral programs that promote exchange and transdisciplinarity within a larger thematic framework.
- DRs are usually supervised not only by few individuals but by a larger research team. Usually, DRs are supervised more intensively here.
- In Germany, ‘graduate schools’ are to be distinguished from so-called ’Graduiertenkollegs’, which usually consist of a narrower thematic focus and smaller groups.

3 What graduate schools offer

Being aware of what graduate schools offer to DRs within the Leibniz Association is one of the starting points towards a better understanding of their status quo by means of the analyzed data.

In terms of financial support, travel expenses are in general fully or partially reimbursed by GSs (81%), which helps to promote scientific exchange (Figure 1). *Methods courses* are usually provided as well (68%). Since GSs are meant to complement the doctoral programs, *methods courses* are one of the key aspects that should be offered to DRs and although it achieves a relatively good positive response ratio, there is still room for improvement in this regard. In contrast, other elements are reported to be lacking financial aid, such as *support for publications* whose positive answer ratio only achieves 52%. Financial support for *PhD organized events* and *equipment* are provided in less than 50% of the respondents' GSs, an issue that could hinder and delay the development of the DRs. In general terms, the availability of all the listed items above is a good incentive for DRs to enroll in a GS, as it will be explained in section 5 (*Differences in and reasons for enrollment*).

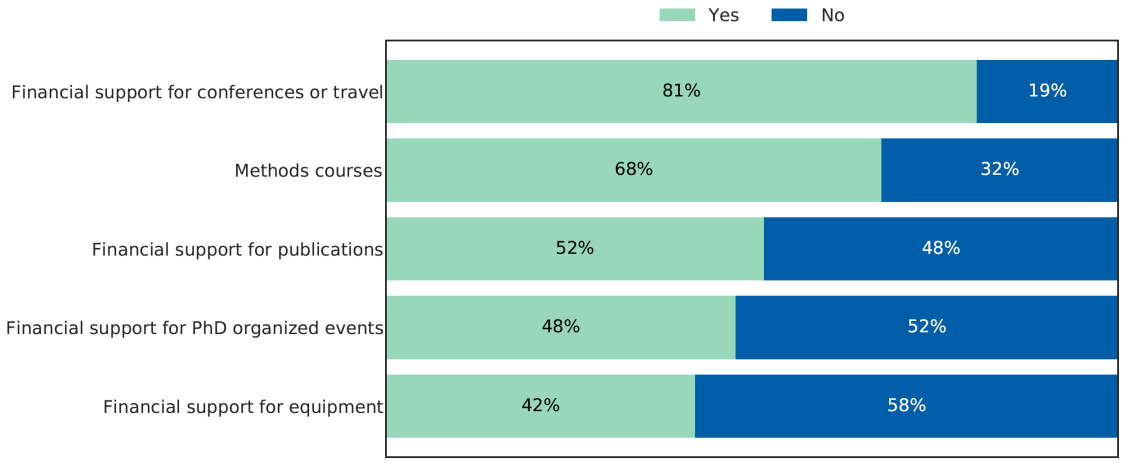

Figure 1: *"What is it offered to you by your graduate school?" (n = 513)*

4 Satisfaction

As in other sections of the 2019 report, *satisfaction* has been surveyed for GS as well.
To see the impact of GS enrollment on this important aspect, we compared the satisfaction levels of DRs enrolled in a GS versus those who are not enrolled.[2]

[2]A standard Likert scale approach together with t-test analysis are utilized to allow statistical conclusions. For further information see Appendix.

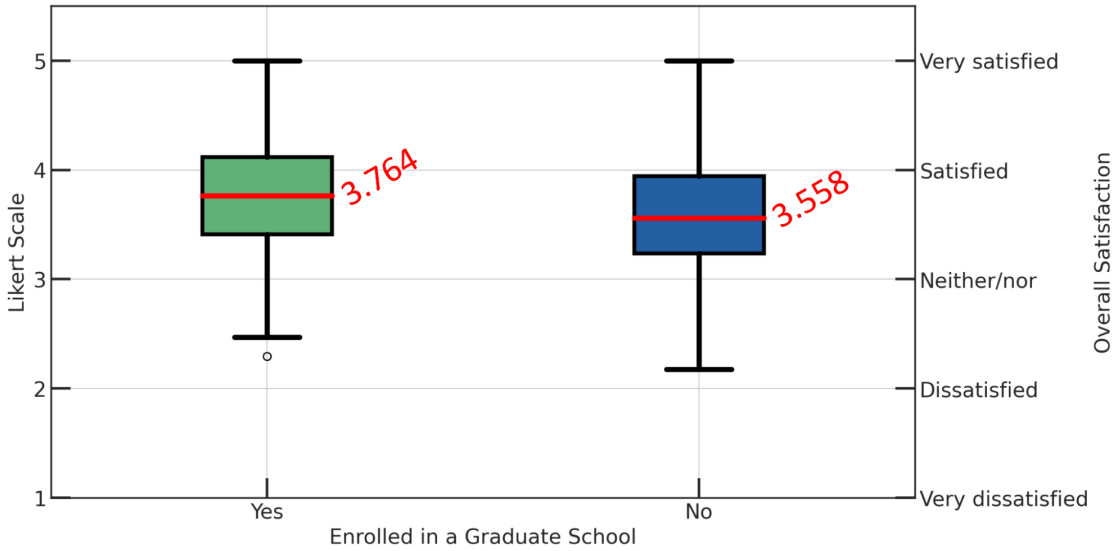

Figure 2: *Mean overall satisfaction for DRs in and out of GSs (median difference = 0.206 with a p-value of 0.029 between the two groups, the IQR in both cohorts is about 0.706)*

Figure 2 presents the overall satisfaction obtained with the cumulation of each individual aspect inquired in the former survey (e.g., *supervision, family support, career development*, etc.). If we consider this metric as an indicator of general satisfaction with the working situation, a slightly better result is achieved by the participants that are enrolled in a GS. Looking at the individual items of the Likert scale, GS Students and Non-GS Students differed to varying degree and significance: Only *workshop and skills training, career development* and *contribution to science* are significant[3] but all of them help reveal details about the positive influence that GSs have on DRs' satisfaction[4]. This is consistent with the findings on *travel support* and offering *methods courses* (Figure 1). Since DRs at GSs are usually supervised by a larger team of researchers and the program is more structured in general, we had expected a significant influence of enrollment on supervision satisfaction. This assumption was not confirmed in the data (see Appendix, Figure 9).

5 Differences in and reasons for enrollment

The number of DRs enrolled in a GS at the Leibniz Association is about 60% (29.7%, N = 257 at the own institution and 29.6%, N = 256 somewhere else), which is considerably higher than the GS enrollment rate in Germany (17%[5]). In both cases, at the Leibniz Association and on the national level, the enrollment rate for non-German is higher than for German DRs. Our data also showed that the field of research (*sections*) is a factor to consider in the GS enrollment rate.

[3]For $p < 0.05$.
[4]See Appendix.
[5]Statistisches Bundesamt (2019): Statistik der Promovierenden 2019.

5.1 Nationality

The enrollment rate for German DRs in the Leibniz Association is slightly lower (56%) than for DRs from other EU countries (59%) and noticeably lower than for DRs from outside the EU (70%) (Figure 3). To determine the reasons for these differences, we examined the data from those DRs who were not enrolled in a GS (Figure 4).

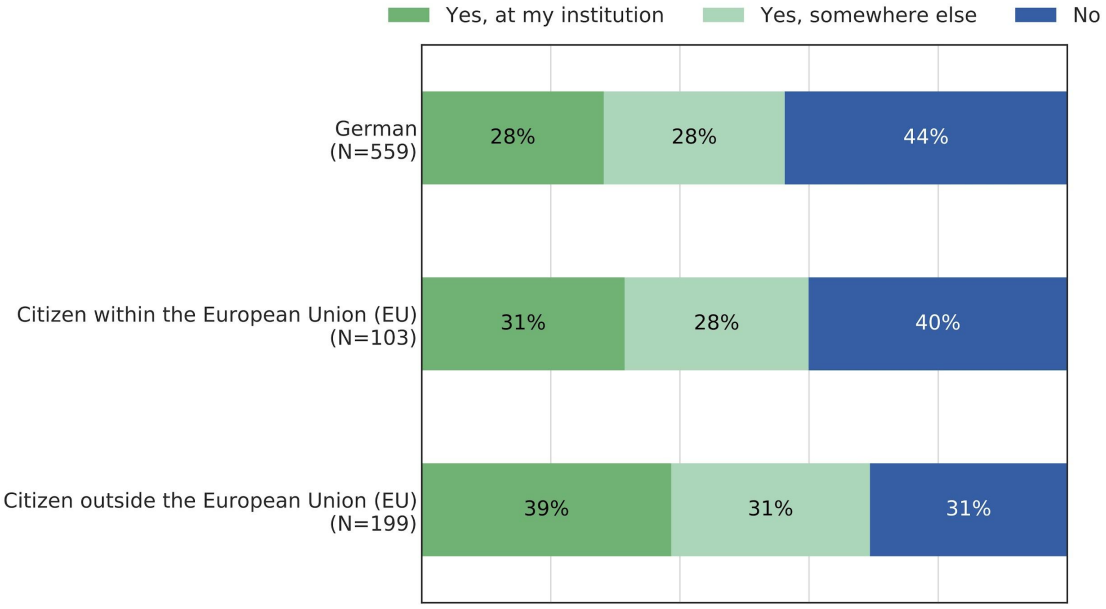

Figure 3: *"Are you currently registered in a graduate school?" by nationality*

Interest is one of the major factors that explains some of the tendencies in (Figure 3). 30% of German DRs that are not enrolled in a GS explicitly state *I don't want to* (Figure 4). In comparison, this accounted as the reason to not enroll for 24% of DRs from other EU countries and only 13% of DRs from outside the EU.

The second most reported reason for German DRs not enrolling in a GS is the *shortage of availability* (25%), with similar percentages also for EU and non-EU DRs. The least common reported reason to not enroll is the *supervisor not supporting the GS*, which was not reported by DRs from other EU countries, and only accounted for 2% of German DRs and 3% of non-EU DRs. This result gives us insights into the supervisor's positive role in advocating for graduate school participation.

Furthermore, when asking whether it would be beneficial to join a GS, 57% of Germans answered *yes*, in contrast to 70% from other EU countries and 73% from non-EU countries (Figure 5). Thus, the perceived value of GSs is an additional factor that explains higher enrollment from non-German DRs.

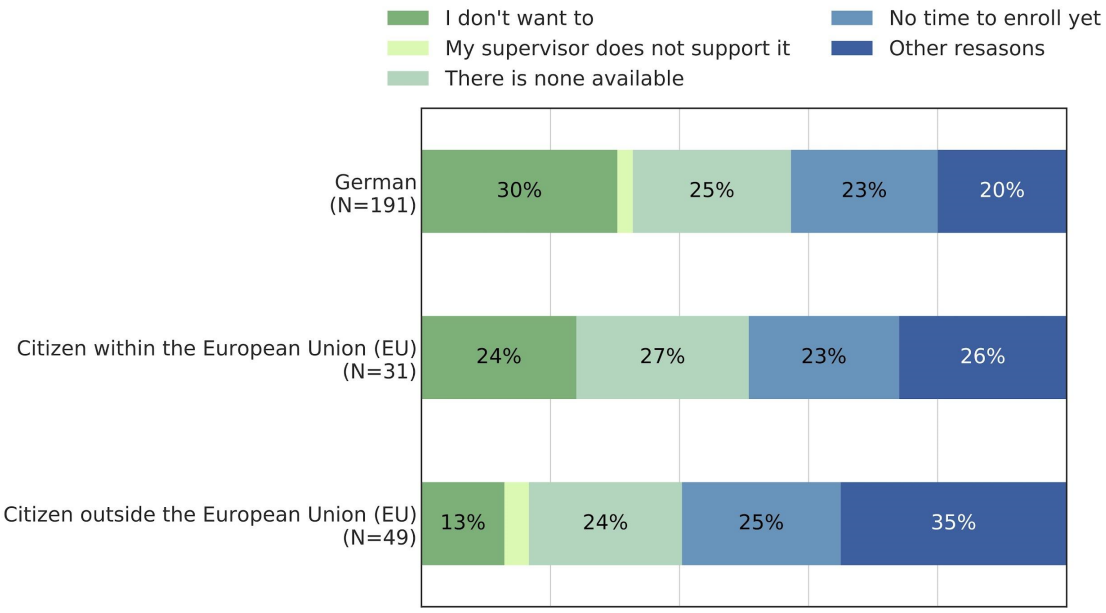

Figure 4: *"Why are you not enrolled in a graduate school?" by nationality*

In sum, the enrollment rates of DRs in GSs are higher in the Leibniz Association compared to Germany in general and the results go in line with the national tendency in which the majority of DRs enrolled in GS are non-German. This could be due to a lack of interest and perceived value from the German DRs. As described previously, GSs generally provide tools to support DR's career by financing academic activities and providing methodology and guidance courses. These benefits could be particularly interesting and valuable for non-German DRs who are willing to join the research community in a foreign country. This aligns with the socialization theories which hold that GSs are an opportunity for international DRs to acquire support and a community membership by learning the knowledge, skills, values, and beliefs within the specific academic contexts[6].

5.2 Sections (fields of research)

There are significant differences in the enrollment rate in a GS within the Leibniz Association's various sections (Figure 6). At 76%, the proportion of DRs enrolled in a GS was by far the largest in *Section C* (Life Sciences). The second-highest share was found in *Section E* (Environmental Research) with 58%, closely followed by *Section B* (Economics, Social Sciences, Spatial Research) with 56%. In comparison, GSs are less common in *Section D* (Mathematics, Natural Sciences, Engineering) with 48% and in *Section A* (Humanities and Educational Research) with 47%. To determine the reasons for these differences, we examined the data from DRs in each section who were not enrolled in a GS (Figure 7).

[6]Perez, R. J., Robbins, C. K., Harris, L. W., Jr., Montgomery, C. (2020). Exploring graduate students' socialization to equity, diversity, and inclusion. *Journal of Diversity in Higher Education*, 13(2), 133-145.

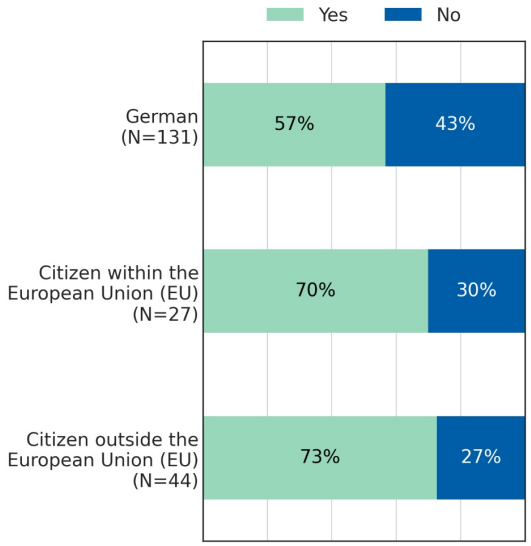

Figure 5: *"Do you think you would profit from enrollment in a graduate school?" by nationality*

Section B (Economics, Social Sciences, Spatial Research) stood out with 39% of respondents stating *I do not want to enroll* in a GS. The second-highest proportion was 26% of respondents from *Section A* (Humanities and Educational Research), for which *non-availability* was the most significant reason at 31%, even compared to the other sections. However, in *Section A*, the *time for enrollment* accounted for the smallest share (13%), which seemed to be the most critical reason in *Section C* (Life Sciences). This is coherent with Figure 6, since *Section C* had the highest enrollment rate among all. In *Section E* (Environmental Research), *time to enroll* was the most decisive issue with 29%, if *other reasons* are disregarded, while availability was only stated by 15% as the critical factor, which is lower than the other sections' shares.

When asked whether enrollment in a GS would be beneficial, *Section E* is far ahead with 75% stating *yes*, followed by *Section A* with 66% (Figure 8). Overall, a slight tendency towards a positive attitude for GSs can be seen in almost all sections. Only *Section B* seemed somewhat skeptical with only 50% submitting *yes*, which is in line with other results showing that this section has a higher lack of interest (Figure 7).

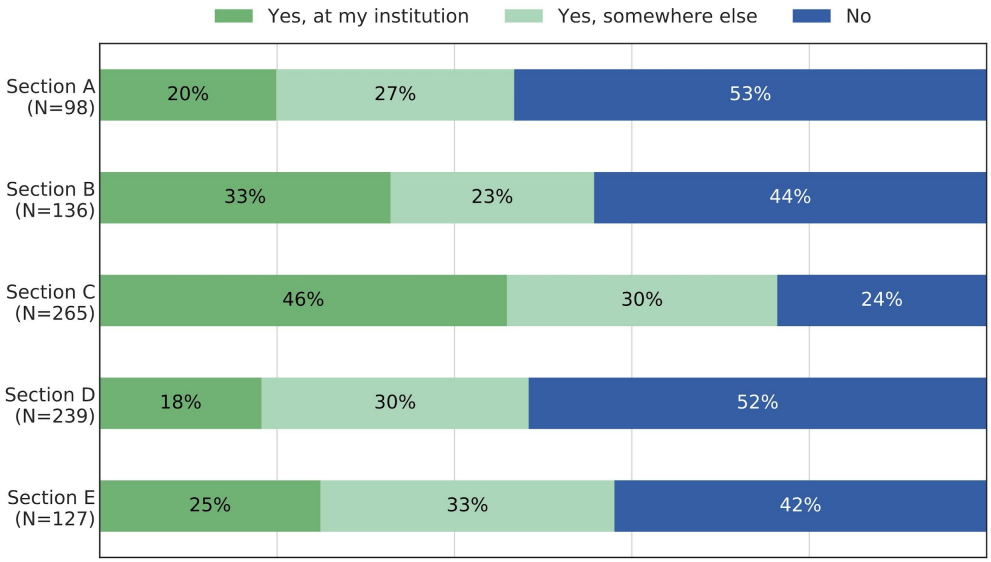

Figure 6: *"Are you currently registered in a graduate school?" by sections*

These results could be interpreted in light of the role of GSs in each disciplinary context. As stated by Austin (2002)[7], each academic discipline appreciates different values of the academic practices such as research methods, peers relationship, or academic community. Though, this possible explanation will require more section-specific questions in future surveys to be backed up by the data.

[7] Ann E. Austin (2002) Preparing the Next Generation of Faculty: Graduate School as Socialization to the Academic Career, *The Journal of Higher Education*, 73:1, 94-122, DOI: 10.1080/00221546.2002.11777132.

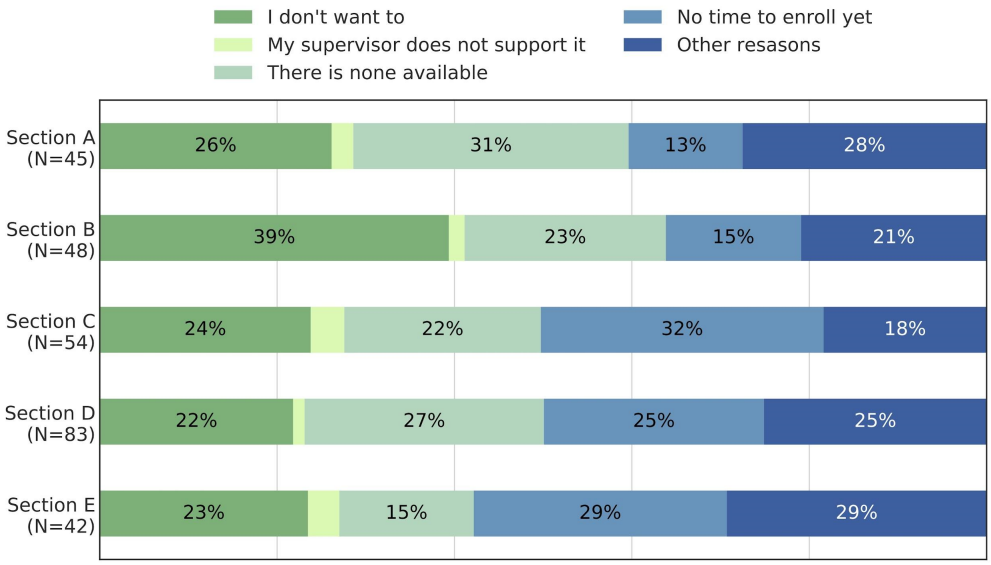

Figure 7: *"Why are you not enrolled in a graduate school?" by sections*

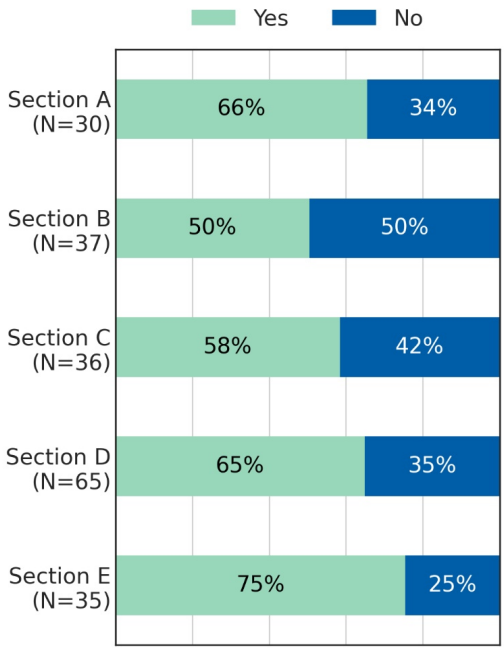

Figure 8: *"Do you think you would profit from enrollment in a graduate school?" by sections*

6 Conclusion

Overall, we found various positive effects of being enrolled in a GS. The significant correlations in terms of *workshop and skills training*, *career development*, *contribution to science*, and *overall satisfaction* paint a picture of some success. The special support offered by GSs are perceived by the respondents, which illustrates the structural benefits. Moreover, they seem to support non-German DRs in terms of integration. However, there are a few aspects where it might be fruitful to focus on in the future:

- **Awareness**: As pointed out, some DRs lack information about the nature and functions of graduate schools and there is some uncertainty about the term. To ensure that there is more awareness of the benefits and opportunities of graduate schools, special information events and other forms of communication could help. This could also increase the perceived value of enrollment, especially for German DRs.
- **Different forms of support**: In addition to the graduate school offerings, which are already widely perceived, further potential is apparent in areas such as *methods courses* (32%) or *financial support for equipment* (58%) (Figure 1).
- **Supervision**: Since the supervision of DRs at GSs is usually closer and focuses even more on the doctoral project, we would have expected a stronger effect of enrollment on supervision satisfaction, which is not confirmed significantly by our data (see appendix: Figure 9). As supervision is a pivotal aspect of a doctorate (see section 6.1 in the 2019 Report), this could be a profitable aspect to focus on.

7 Appendix

For a detailed description of the methodological background followed to gather and analyze the data reported in this work, the reader is referred to the appendix of the 2019 Report. In this appendix of the GS report we integrate the information presented there with the procedure adopted for the satisfaction analysis mentioned in section 4.

With a coherent approach to what has been done for the mental health variables in the previous report, the level of satisfaction is measured on a 5-point Likert Scale. For each question, the answer is converted to points (1: very dissatisfied, 2: dissatisfied, 3: neither-nor, 4: satisfied, 5: very satisfied). The total population of DRs is split in two cohorts based on their enrollment in a GS (group A: enrolled, group B: not enrolled). The t-test is evaluated on the two groups to determine if the means are significantly different from each other. For this analysis we have chosen a threshold of p-value > 0.05 to be considered significant. Supplementary Table 1 shows the variables extracted

	t_value	p_value	mean_A	n_A	mean_B	n_B
Supervision	0.82785	0.408	3.73855	524	3.677054	353
Vacation days	0.39309	0.6944	4.132692	520	4.108571	350
Administrative Support	0.19395	0.8463	3.28	525	3.266106	357
Workshops	5.22563	2.3E-07	3.69305	518	3.34971	346
Contribution to Science	1.9738	0.04872	3.685328	518	3.568966	348
Technical support	0.48736	0.6261	3.805769	520	3.773743	358
Career Development	2.8018	0.005198	3.235644	505	3.04386	342
Science Communication	1.4117	0.1584	3.41502	506	3.321637	342
Psychological Support	1.3338	0.1827	2.83114	456	2.725424	295
Laboratory Equipment	1.2879	0.1982	4.163814	409	4.076613	248
Office Equipment	1.3888	0.1652	4.060721	527	3.975138	362
Scientific Support	1,2185	0.2233	3,862857	525	3,783934	361
Family Support	0.820062	0.412615	3.83427	356	3.762557	219
International Support	0.127438	0.898658	3.514286	315	3.502564	195
Atmosphere	0.882246	0.377927	3.920152	526	3.861878	362
Workload	1.185586	0.236163	3.392308	520	3.314763	359
Social Life	0.881416	0.378382	3.584615	520	3.524355	349
Thoughts about Quitting*	0.944548	0.34519	2.998081	521	2.932394	355
Sum Score Satisfaction	2.1586	0.03213	3.53773	187	3.394939	101

Table 1: *Influences of enrollment on various satisfaction aspects of a doctorate. Differences in the means of enrolled and not enrolled GSs. (*Thoughts about quitting was asked in an independent question)*

from this evaluation and supplementary Figure 9 gives a representation of the average difference in satisfaction for each individual aspect. All the items related to satisfaction questioned in the survey result in a higher score for group A compared to group B, although only the ones reported in bold letters exceed the p-value threshold and are therefore significant.

Supplementary Table 2 shows the results of the t-test on group A and B for variables related to mental health. The reader is once again referred to the Appendix section on the 2019 report for more details on how these parameters have been extracted. *Depression Classification* interprets all the information in a single entry. A higher score means to be more likely to suffer from depressed behavior. It should be noted that no items have passed the threshold to be significant.

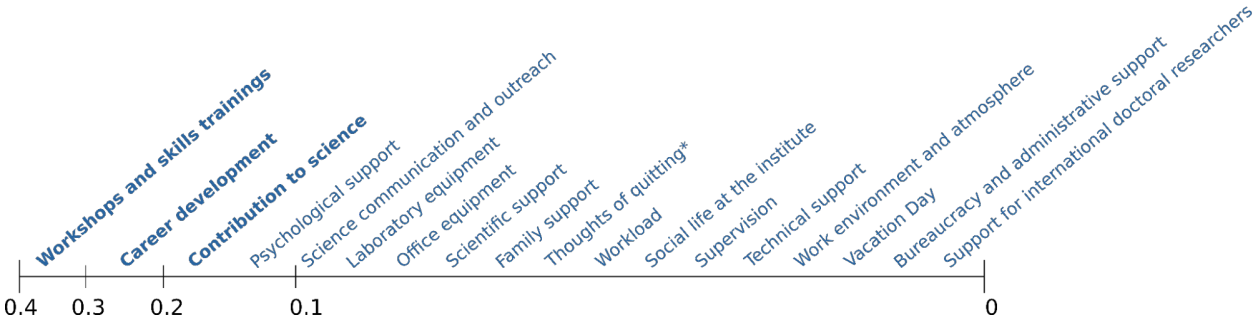

Figure 9: *Influences of enrollment on various satisfaction aspects of a doctorate. Differences in the means of enrolled and not enrolled GSs. (*Thoughts about quitting was asked in an independent question)*

	t_value	p_value	mean_A	n_A	mean_B	n_B
Depression Classification	-0.96795	0.33342	0.643863	497	0.704478	335
Apathy	-0.2108	0.833098	0.784615	520	0.79661	354
Depression	-1.53106	0.126207	0.608108	518	0.692308	351
Sleep	1.304087	0.192589	0.845857	519	0.765537	354
Tiredness	0.812205	0.416927	1.171154	520	1.123944	355
Eat	-0.41266	0.679977	0.438462	520	0.460452	354
Failure	-1.2384	0.215972	0.591876	517	0.663842	354
Worry	-1.7591	0.078991	0.512524	519	0.613636	352
Behaviour	0.17395	0.861954	0.232558	516	0.225714	350

Table 2: *Influences of enrollment on various mental health aspects of a doctorate. Differences in the means of enrolled and not enrolled GSs.*

8 Concluding Remarks

The 2019 survey is the first joint survey that was developed, conducted, and analyzed in close collaboration with our partners in N2 (the Helmholtz Juniors, the Max Planck PhDnet and IPP). N² unites more than 16.000 doctoral researchers of Germany's non-university research organizations to discuss the future of science – its working conditions, career perspectives and impact on society.