2022 Survey Report

The Postdoc Network of the Max Planck Society

PostdocNet
Max Planck

Max Planck PostdocNet Survey Report 2022

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Lastly, we thank all of the MPG postdocs who participated in this survey! Your participation is greatly appreciated.

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1 Introduction

The Max Planck PostdocNet brings together all postdoctoral researchers across the 85 Max Planck Institutes throughout Germany and abroad. Established in 2019, PostdocNet's main goal is to improve the working conditions and career prospects of postdoctoral researchers (postdocs) by advocating for changes to the Max Planck Society (Max-Planck-Gesellschaft, MPG) while facilitating knowledge transfer from institute to institute. At the MPG, there are three broad sections of institutes: Biology and Medicine (BM) Section, Human Sciences (HS) Section, and Chemistry, Physics and Technology (CPT) Section. Currently (as of May 2023), the PostdocNet is represented in 49 out of the 85 institutes across all three sections, and the number is growing each year.

1.1 Definition of a postdoc

Because the term postdoc is applied to a heterogeneous group of people, it can be very difficult to paint a comprehensive picture of who a postdoc actually is, let alone define it, as this may vary depending on their research field. For the purposes of this survey, an MPG postdoc is defined as any person who has been awarded a doctoral degree and is currently undertaking scientific research within the MPG by means of a time-limited contractual relationship from either internal or external funding. For the purposes of the PostdocNet, we also require that these researchers have not yet established a significant level of independence. In the survey, we constructed questions to identify if the respondent was in line with our definition of a postdoc and omitted their responses if they did not.

1.2 Aims and motivations

In 2020, the first PostdocNet survey was constructed and performed, mainly focusing on the MPG postdoc demographics and working conditions throughout all institutes (Vallier et al. 2020). The results of this survey showed the diverse backgrounds that postdocs at the MPG come from while also highlighting the disparity in working conditions between sections and institutes. This survey was a very valuable resource for the PostdocNet Steering Group, allowing them to advocate for changes in contract situations for many postdocs.

The goal of the 2022-2023 survey was to increase the breadth of questions asked to our postdoctoral community while gaining valuable data that can be used to understand the

life of a postdoc at the Max Planck Society and in Germany. We asked over 120 questions in this survey from five main categories: demographics, working conditions, career development, personal and professional well-being, and the effect of the COVID-19 pandemic. Overall, there were several main questions that we wanted to address:

1. What are the demographics of the MPG postdocs? How are they characterized in terms of demographic information and academic trajectories?
2. How many postdocs are on contracts, fellowships, and stipends? Are postdocs well-informed about their employment situation?
3. What are the career aspirations of MPG postdocs and do they receive adequate opportunities to prepare for career steps following the postdoctoral phase?
4. What is the state of personal and professional well-being of the MPG postdocs? How satisfied are they with the different aspects of their lives and should we be concerned about their mental health? What burdens them in their private life and at work?
5. How did COVID-19 affect the MPG postdocs? How have their careers been affected and are they well-supported by their mentors, institutes, and the MPG as a whole?

1.3 Construction of the 2022 survey and participation

The current survey was initiated by the 2020-2021 Survey Working Group and finalized by the 2021-2022 Steering Group of the PostdocNet, along with the Survey Working Group in May of 2022. It was subsequently administered for more than two months, from the end of July to the end of September 2022. PostdocNet sent out survey invitations to the over 2,000 postdocs identified by the PostdocNet External Representatives at the institutes, and 659 postdocs completed the entire survey.

2 Recommendations

From our survey, we have prepared the following recommendations derived from our findings.

1. **Mental health support needs to provide exhaustive preventive measures, targeted case-to-case support, and relief from stressors inherent in academia to be successful**
   Depression, anxiety, and stress are the rule rather than the exception among postdocs, of whom many even have clinical symptoms.
2. **Develop effective policies to prevent and act against antisocial behaviors at work**
   There is still a significant number of postdocs who experience antisocial behavior, harassment, and discrimination at work.
3. **Resolve systemic inequalities in employment schemes**
   Some contract holders are still not correctly staged, and many postdocs are not well informed about their rights and entitlements, particularly those on fellowships and stipends.
4. **Provide adequate support for postdocs with caring responsibilities**
   Postdocs with caring responsibilities are in severe need of support to maintain work performance and their mental health.
5. **Construct an accountability measure program so that postdocs will have access to vital career development measures**
   The MPG has many career development and mentoring programs for postdocs, but there is no accountability system to mandate these programs, as a majority of institutes do not have a postdoc coordinator.
6. **Make sure that postdocs work within the agreed hours and take their holidays to maintain mental health**
   Most postdocs work more than 40 hours a week, and most do not even use their vacation time according to the legal minimum leave.
7. **Provide institutional support beyond acute crises, such as in the aftermath of the COVID-19 pandemic**
   Contract extensions and the possibility to work remotely are measures to alleviate the impact of the COVID-19 pandemic. This is especially relevant for postdocs with caring responsibilities who have felt most affected by the pandemic and have also been less likely to have their contract/fellowship extended.

3 Demographics

In this chapter, we look at the demographics of the MPG postdocs, including age, gender, nationality, and parenting so that we can gain an in-depth understanding of what the average postdoc looks like at the MPG.

3.1 Main Findings

1. The average age of a postdoc is 35 years.
2. Out of the respondents, 47% identify themselves with the female gender, 49% with the male gender and 0.4% with other gender identities.
3. Out of the respondents, 22% hold a German citizenship, 28% a European one, and 50% hold a citizenship from outside the European Union and European Economic Area (EU/EEA).
4. Roughly half of MPG postdocs have less than 3 years of total postdoctoral experience. As well, 22% have between 3 and 5 years, and 26% have more than 5 years of postdoctoral experience.
5. Out of the respondents, 18% started their contract as parents and 27% are parents at the time of the survey.

3.2 Age

On average, postdocs at the MPG are 35 years old (Fig. A.1). We observe that postdocs in the HS and BM sections are older on average than postdocs from the CPT section. We speculate that this is likely due to the habilitation procedures in the humanities disciplines as well as time-intensive work with livestock in biomedical research, requiring longer project durations compared with other research fields.

3.3 Gender

Overall, 47% of the respondents identify with the female gender, 49% with the male gender and 0.4% with other gender identities (Fig. A.2A). We observe an almost equal balance between men and women in both BM and HS sections, whereas in the CPT section, only 45% of the respondents identify as female. In the 2020 PostdocNet Survey, there were 42% female and 58% male postdocs in total, showing that the gender distribution

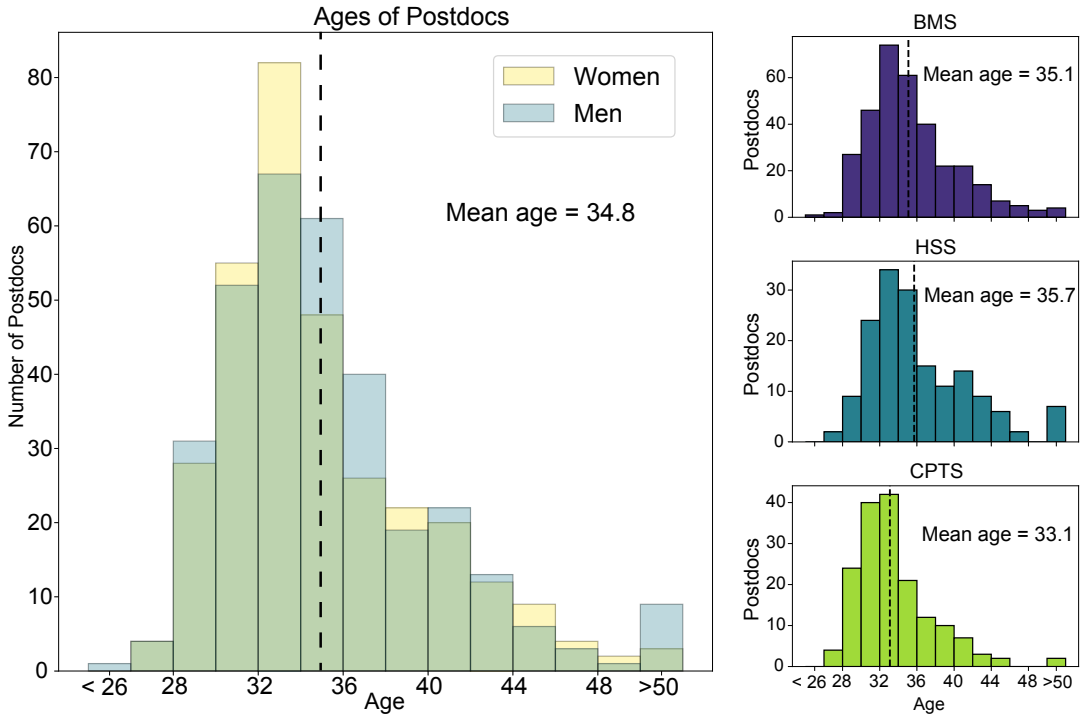

Figure A.1: Age distribution. Left: for all MPG postdocs, stratified by gender. Right: Within each section.

of postdocs has become more balanced (Vallier et al. 2020). A similar trend has also been observed by the MPG PhDNet (Carollo et al. 2022).

We try to use language in a respectful and inclusive manner for all gender identities. Throughout this text, we refer to self-identified gender as indicated by the respondents. As only a very small number of respondents identified as other genders than male or female, subgroup analyses for these individuals are limited. The following data in the report are thus stratified as “men/women" or “male/female", when presenting gender differences.

3.4 Nationality

The MPG is recognized as an international research institution. Because of this, the distribution of nationalities amongst MPG postdocs is decidedly distinct from other universities and research institutions in Germany. There is almost equal share of Europeans and non-Europeans across sections (Fig. A.2C). Among the respondents, 22% are of German nationality, 28% are from the EU/EEA but not Germany, and 50% are from outside the EU-/EEA area. German postdocs are evenly distributed between sections, and over 50% of the postdocs in the CPT section come from outside of the EU/EEA.

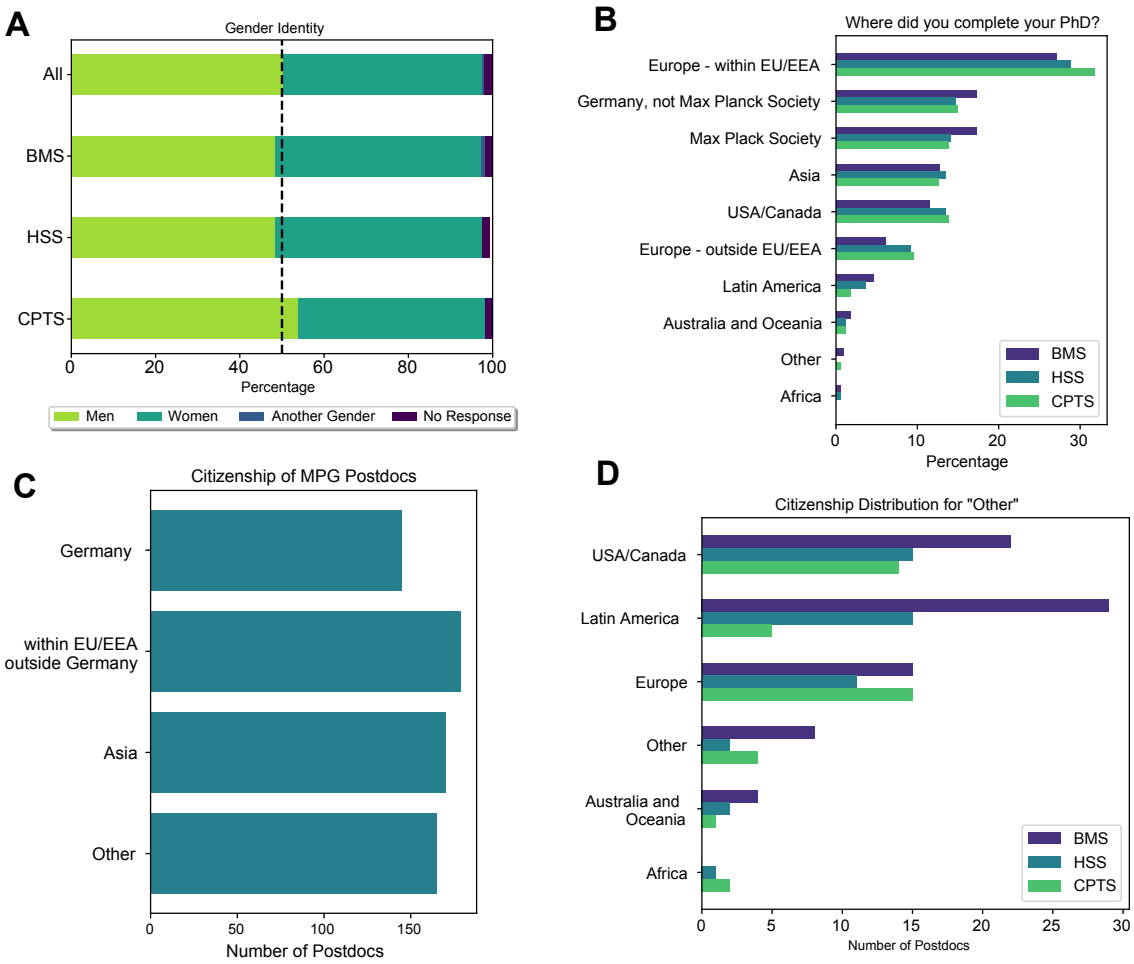

Figure A.2: A) Gender identity distribution across sections and overall; B) Country/region where postdocs have completed their PhD, stratified by Section; C) Distribution of country of origin for postdocs (Germany (N = 145), EU (N = 179), Asia (N = 170), and Other (N = 165)); D) The distribution of the “Other" group in C), stratified by section.

It is important to emphasize that among the postdocs from outside the EU/EEA area, 50% of them are from Asia (Fig. A.2C-D). Therefore, throughout the following chapters, we stratify by countries of origin with four clusters which have similar sample sizes: Germany (N = 145), EU (N = 179), Asia (N = 170), and Other (N = 165).

While nationality is one factor, we also asked postdocs where they completed a majority of their PhD work (Fig. A.2B). Only 15% of current postdocs completed their PhD work at a Max Planck Institute. As well, 31% of postdocs completed their PhD in Germany, while 30% completed it somewhere else in the EU. Many postdocs finished their PhDs outside of the EU, including 12% from Asia and 12% from USA/Canada. This data suggests that many MPG postdocs already moved countries for their PhD and continued to move for their postdoctoral careers.

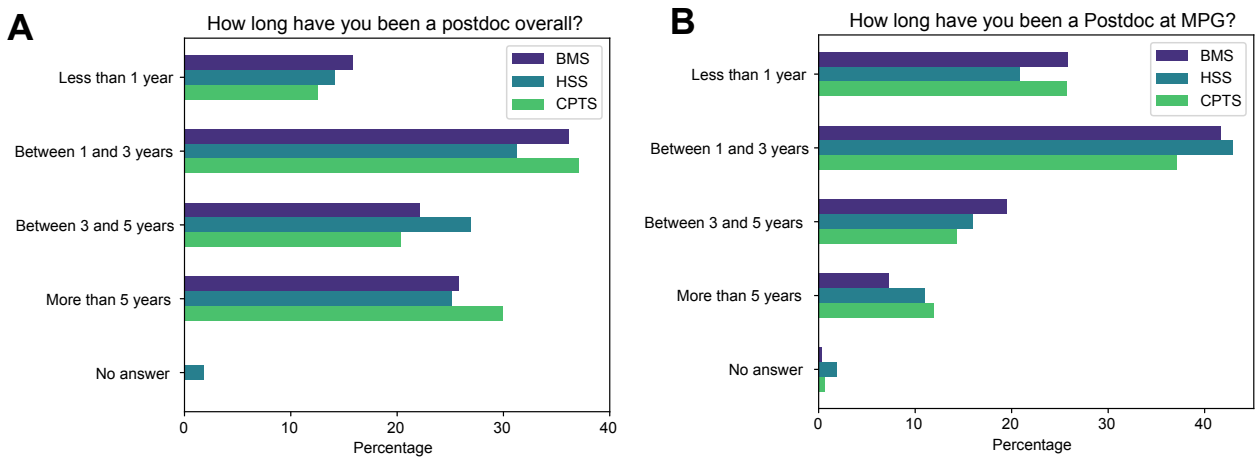

Figure A.3: Postdoc experience level both A) overall, and B) at the MPG, stratified by section.

3.5 Previous postdoc experience

We also asked how long our researchers have been postdocs overall (Fig. A.3A). We note that 14% have less than one year of postdoctoral experience, 35% have between 1 and 3 years, 22% between 3 and 5 years, and 26% more than 5 years of post PhD experience. The implication is that the postdoctoral researchers at the MPG have a diverse range of experience levels, with 49% having less than 3 years of overall postdoctoral experience.

The German Law *Wissenschaftszeitvertragsgesetz* (WissZeitVG) governs fixed-term employment for academics in Germany. Currently, the law stipulates that a postdoc may not be on temporary contracts for longer than six years, with some exceptions. The law is currently undergoing reform and a proposal by the German Ministry for Education and Research (BMBF) is expected soon. A redacted proposal[1], suggested to shorten the maximum time for temporary employment of postdocs from six to three years. This proposed change would affect 26% of MPG postdocs that are currently employed by contracts for longer than 3 years, and about 40% of postdocs who have spent between 1-3 years on fixed-term contracts (Fig. A.3B).

3.6 PostdocNet external representatives

The PostdocNet was formed in 2019 and has attempted in these four years to grow the network throughout the MPG. Therefore, we asked the postdocs if they were aware if their institute had a PostdocNet External Representative, the elected liaison of their institute

[1] https://www.bmbf.de/SharedDocs/Downloads/de/2023/230317-wisszeitvg.pdf?__blob=publicationFile&v=1

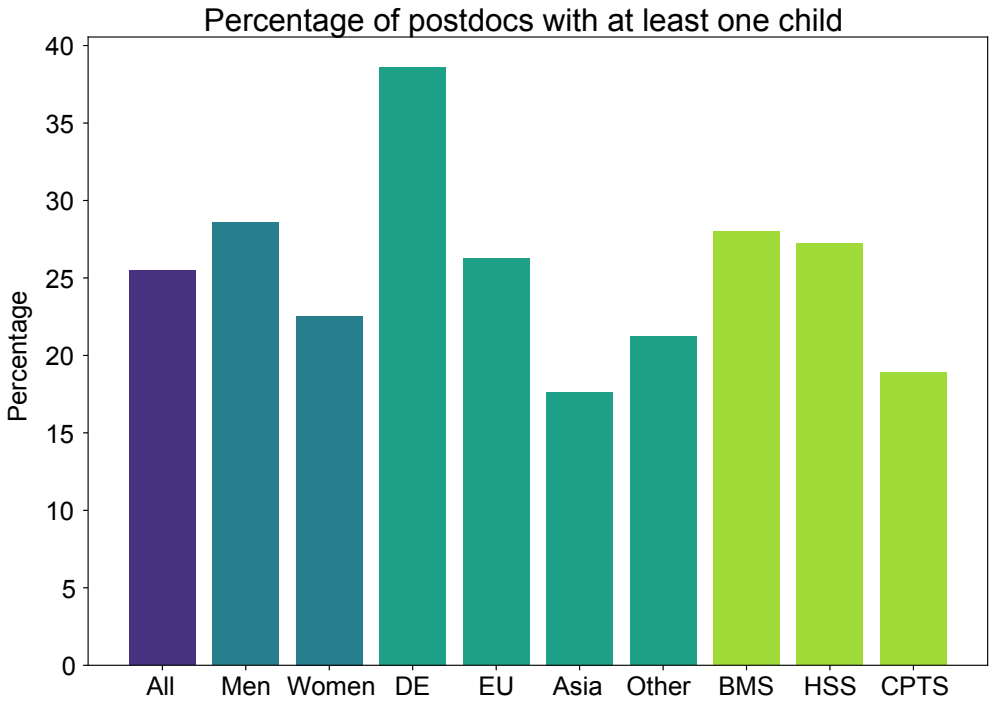

Figure A.4: Percentage of postdocs who have at least one child, stratified by gender identity, nationality, and section.

to the PostdocNet Steering Group. We observed that 65% of the respondents know that there is an external representative in their institute, whereas 28% do not know (Fig. S.1).

3.7 Parenting

We found that among the respondents, 18% started their postdoctoral work as parents, and 27% were parents at the moment they responded to the survey (Fig. A.4). That means that about one in four postdocs is currently the caregiver to one or more children. Among those, 7% are single parents, three quarters of which are female postdocs.

We note that the majority of parents in our sample are male, which could be an indicator that female postdocs start a family later in life, choose to not have children at all, or decide to leave academia when they have children. The majority of parents are of German nationality, as 39% of German postdocs are also parents, compared to 18% of Asian postdocs. Regarding MPG section, we observe that the parenthood rate is lower in the CPT section, possibly because the majority of CPT postdocs are younger and more frequently originate from countries outside of the EU/EEA.

4 Working Conditions

In this chapter, we are interested in the working conditions of MPG postdocs. We examined the employment condition statistics of MPG postdocs and stratified these by demographics and other characteristics. We looked closely at the group of stipend and fellowship holders and their conditions and benefits compared to contract holders. Finally, we looked at the working hours and vacation time of postdocs in relation to their contractual allowances.

We focused on two specific questions spurred by observations from our previous survey (Vallier et al. 2020).

1. In 2020, it was found that a significant portion of contract holder postdocs are on lower pay scales than what would be commensurate based on their prior working experience. To what extent has this issue been addressed?
2. To what extent were fellowship and stipend holders aware of their rights and benefits, or the lack thereof, prior to commencing their postdoc?

4.1 Main Findings

1. The proportion of stipend holders has decreased from 6% in 2020 to 3% in 2022.
2. A considerable proportion of postdocs on contracts (12%) are on pay scales below E13.3 (usually E13.1 or E13.2).
3. Most postdocs reported having contracts of around 39 hours, but a vast majority of postdocs report working more than their contract hours, frequently working on weekends and taking fewer vacation than they are entitled to.
4. Individuals on stipends and fellowships are not well-informed about their entitlements.
5. The majority of postdocs are not well-informed about their salary in advance and are unaware of conditions for contract extension.

4.2 Contract, stipend, and fellowship holders

We distinguish between three types of employment for MPG postdocs with distinct properties regarding the funding source, employment conditions and benefits:

- Contracts: a fixed-term employment contract according to the *Tarifvertrag für den Öffentlichen Dienst* (TVöD, public sector employment). Contract holders typically pay taxes and social contributions (e.g. for unemployment insurance, retirement insurance, and health insurance of which the institute (i.e., the employer) contributes half of the health insurance rate).
- MPG scholarships (stipends): a stipend awarded directly by the MPG, usually provided by the supervisor of the postdoc, for a duration of no longer than 2 years. Here, the MPG determines employment conditions.
- Third-party fellowships: a fellowship usually awarded by a funding agency from which the postdocs themselves receive a grant. For this stipend type, the MPG has little control over the employment conditions. Depending on the funding agency, this fellowship is paid out to the postdoc as either a stipend or a contract.

We examined the distribution of contract holders, stipend holders and fellowship holders and stratified the results by their demographic characteristics.

We found that 85% of the postdocs were employed through a contract (Fig. B.1A), whereas 3% received stipends and 7% fellowships. The remaining respondents indicated that they were former contract holders (2%) or did not provide information about their employment (3%). Out of all contract holders, about 85% were continuously employed via contracts during their MPG affiliation (Fig. B.1B). By comparison, in the last PostdocNet survey conducted in 2019-2020, there were 84% (508/604) contract holders, 7% (39/604) stipend holders and 6% (38/604) fellowship holders (Vallier et al. 2020). This decrease in stipend holders holds in all sections, although distinct variation between the sections can be observed.

When stratifying the respondents by their demographic characteristics, we found a number of notable differences between the relative frequencies of contract, stipend and fellowship holders (Fig. B.2). Fellowship and stipend holders are more prevalent in the CPT section, followed by the BM section (Fig. B.2A). Most stipend holders skewed towards younger age brackets (25-35) (Fig. B.2B), but we found no notable differences in gender (Fig. B.2C). Furthermore, postdocs from certain nationalities are over-represented among stipend and fellowship holders. Stratifying the respondents into four nationality groups (see Section 3), we find non-German postdocs are over-represented among both stipend and fellowship holders compared to German postdocs, with Asians having the lowest proportion of contract holders (Fig. B.2D-E). This can partly be attributed to the fact that certain fellowships are only open to researchers outside of Germany (i.e. non-German citizens or German citizens that have lived abroad for more than 5 years). It is also possible

that German citizens are more informed about the benefits of a contract and are therefore less likely to accept stipends or value the benefits of a contract more than non-German researchers.

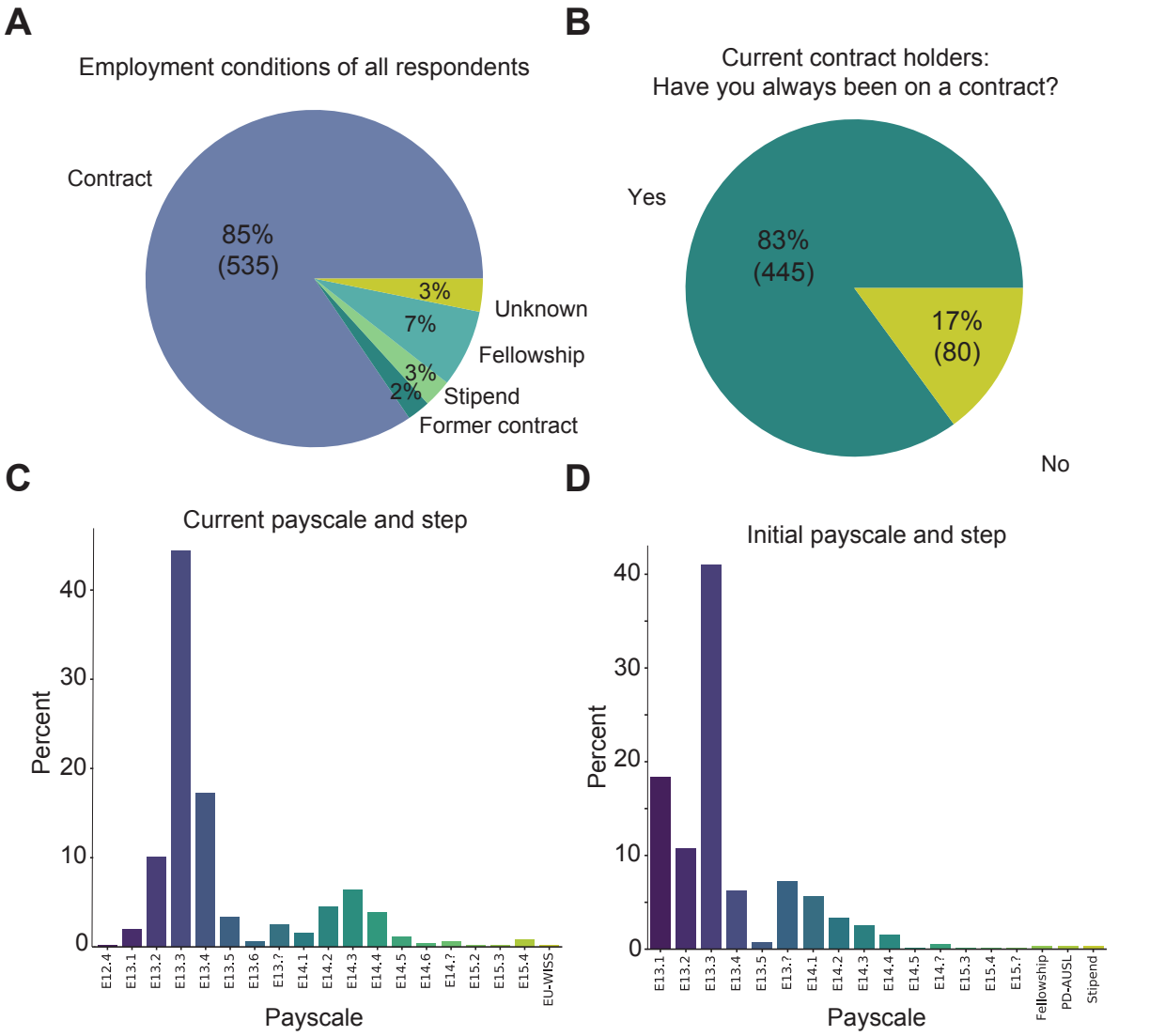

Figure B.1: Summary of employment conditions and pay scales of all respondents. A) Employment type of all respondents (number of respondents). B) Initial employment type of current contract holders (number of respondents). C) Distribution of current pay scale (*Entgeltgruppe*) and level (*Stufe*) of current contract holders. D) Distribution of initial pay scale (*Entgeltgruppe*) and level (*Stufe*) of current contract holders. Answers with "13.?" or "14.?" are respondents who did not know which *Stufe* level they were in.

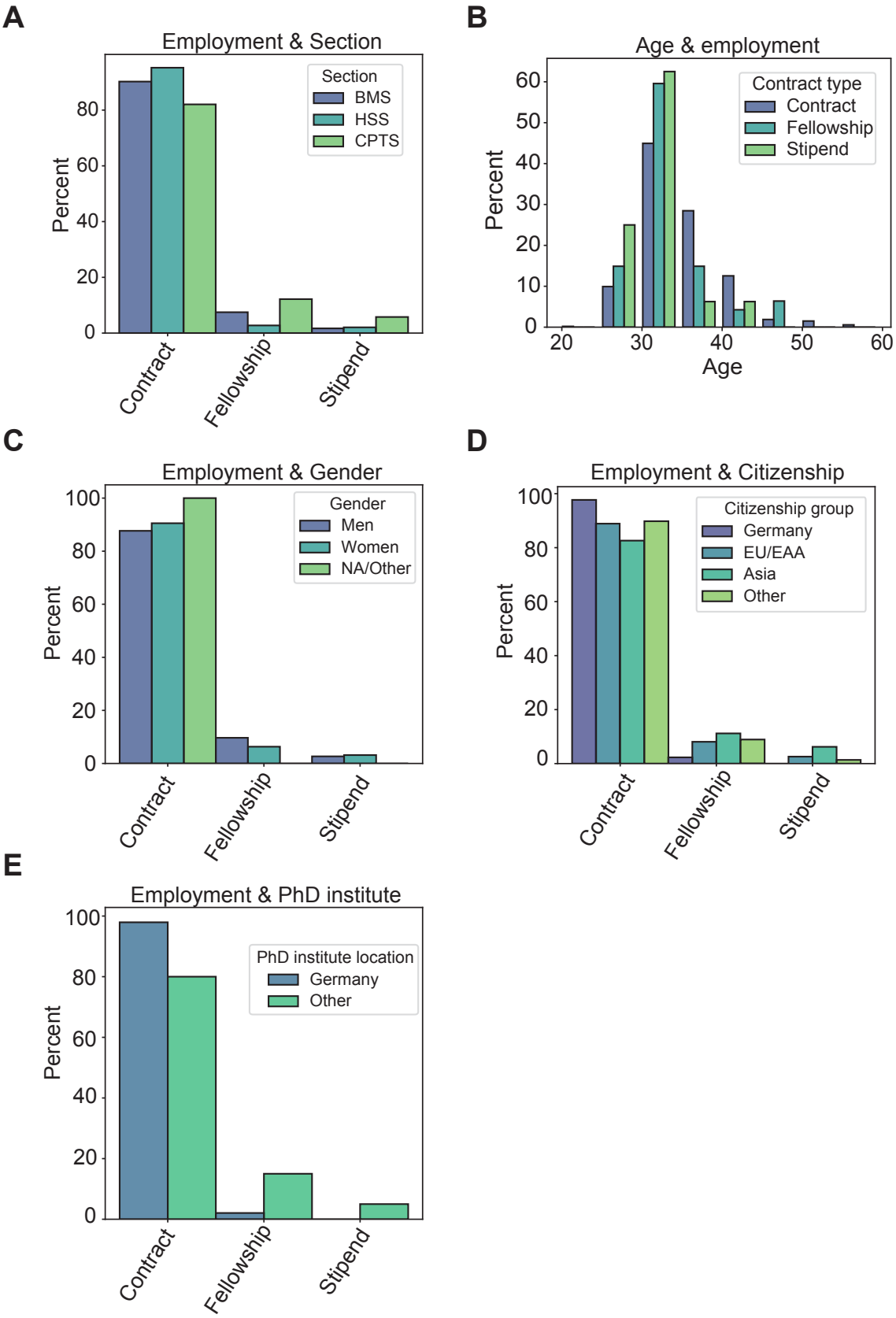

Figure B.2: Stratification of contract, stipend and fellowship holders by the following demographic characteristics: A) MPG Section, B) Age, C) Gender, D) Primary citizenship grouped by geographic location and E) Institute where the PhD was obtained grouped by geographic location. The percentages for each color group add up to 100.

4.3 E13.3 contract holders

In Germany, scientists on a federal contract are employed under the TVöD. This system is subdivided into wage groups (*Entgeltgruppe* - E) that are assigned based on a researcher's degree and the job description. Employees with a master's degree or higher are typically assigned to E13-E15, whereas the higher salary groups are typically given to employees with managerial responsibilities such as group leaders. Since postdocs have at least a doctoral degree or equivalent, they should be at least in E13. Each wage group is then subdivided into wage levels or steps (*Stufe*) that depend on the time spent in the previous level. According to these steps, previous experience of between 3 to 6 years corresponds with step 3. Therefore, first-year postdocs should be placed at least on E13.3 contracts if their PhD experience is properly counted as relevant working experience. However, we observed in previous surveys that not all postdocs are staged properly and some received contracts below E13.3 that do not take into account their previous experience (Vallier et al. 2020). Due to this survey, a task force at the MPG was set up to examine this problem. In January of 2022, the task force issued a statement stating that all postdocs, with some exceptions, should be staged at E13.3. This survey was conducted 6-8 months after this ruling went into effect. In this section, we analyze the wage group and wage steps of respondents on TVöD contracts.

Overall, we find that about 77% of contract holders are currently on E13 and 18% are on E14. This is comparable to the previous survey, where roughly 80% were found to be on E13 (Fig. B.1C).

Looking at the detailed pay scale and step (*Stufe*), we find unimodal distributions among E13 and E14 contract holders with clear peaks at E13.3 and E14.3, respectively (Fig. B.1C). This again is comparable to the step distributions presented in the 2019-2020 report. However, responses about the initial contract and step show a clear shift towards the lower steps (e.g. E13.1 and E14.1), indicating that many of the current contract holders on Step 3 started on a lower step (Fig. B.1D).

As E13.3 is the current standard for new postdocs at MPG, we looked more closely at the group of postdocs that are currently classified in a pay scale lower than E13.3 and aimed at identifying demographic characteristics of this group. This group, hereafter referred to as lower pay scale contract holders (LPSCHs), includes 52 postdocs on E13.2, 10 postdocs on E13.1, and one postdoc on E12.4.

The demographics of the LPSCHs showed notable correlations with MPG section, age, citizenship, PhD institution and previous work experience (Fig. B.3). First, we note the

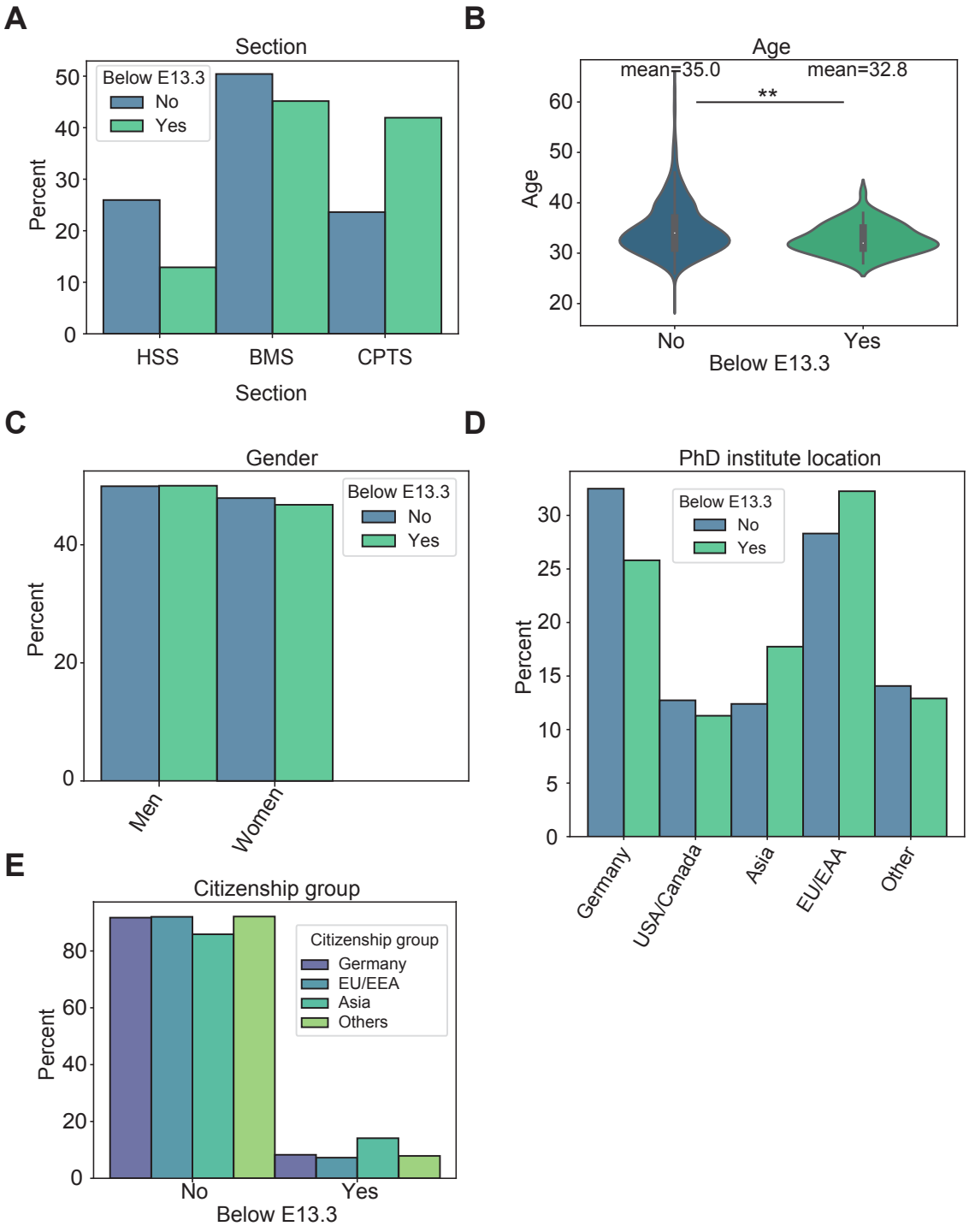

Figure B.3: Demographics of contract holders currently at a pay scale lower than E13.3. A) Stratification by MPG Section. B) Separate age distributions for contract holders on and below pay scale E13.3. Mean ages are 35.0 for the "No" group and 32.8 for the "Yes" group. Mann-Whitney U test, $p < 0.005$. Further stratification by C) gender, D) location of PhD institution and E) primary citizenship. The percentages for each color group add up to 100.

highest proportion of LPSCHs in the CPT section, followed by the BM section and with the lowest proportion for the HS section (Fig. B.3A). The average age of the LPSCHs was 32.8 years, about 2.2 years younger than the average contract holder at 35.0 years (Fig. B.3B). However, we again find no notable differences between gender for LPSCHs (Fig. B.3C). Regarding citizenship, we find a strong over-representation of LPSCHs among those with Asian nationality (Fig. B.3E). Finally, those who obtained their PhD in Asia or in the EU/EEA were also more highly represented among LPSCHs (Fig. B.3D).

As the Stufe should reflect past work experience, we looked into the employment history of LPSCGs (Fig. S.2). As expected, LPSCHs were more likely to have fewer years of total experience (Fig. S.2A) as well as fewer years of experience at the MPG (Fig. S.2B). Furthermore, they were more likely to be doing a first postdoc rather than having previous postdoc experience (Fig. S.2C).

4.4 Fellowship and stipend holders

Outside of contracts, postdoctoral researchers can be also employed with an MPG scholarship or through third-party fellowships. This difference in contractual conditions could lead to differences in working and social conditions and benefits. In order to properly evaluate the working conditions, we have separated stipend holders and fellowship holders depending on which is the funding agency, as explained in the previous section.

4.4.1 Stipend

The sample size for stipend holders is rather small ($n = 17$) in comparison with the total sample size ($N = 633$), and thus these numbers should be interpreted with caution.

The monthly stipend allowance varies widely, with a median of €2600. Stipend allowances ranged from €2500 up to €3600. Due to the low number of responses, we have not further stratified this data with the demographics to avoid skewed conclusions. The initial duration of stipends ranged from less than six months to more than 2 years (Fig. B.4A). Most MPG scholarships had an initial duration between either 1.5 and 2 years (6/17) or 6 months and 1 year (6/17).

Stipends usually do not include social security coverage. To evaluate differences between stipend and contract holders, several points were surveyed: (i) the prior knowledge of both the employment on a stipend and the social/work conditions associated with this type of employment; (ii) the employee rights (as benefits in the institute) and finally (iii)

social benefits (Fig. B.4B-E).

Almost every postdoc knew before starting their position that they would be employed with a stipend and were informed about the salary they would get (Fig. B.4B). However, the most surprising finding among stipend holders is that most are unaware of the dif-

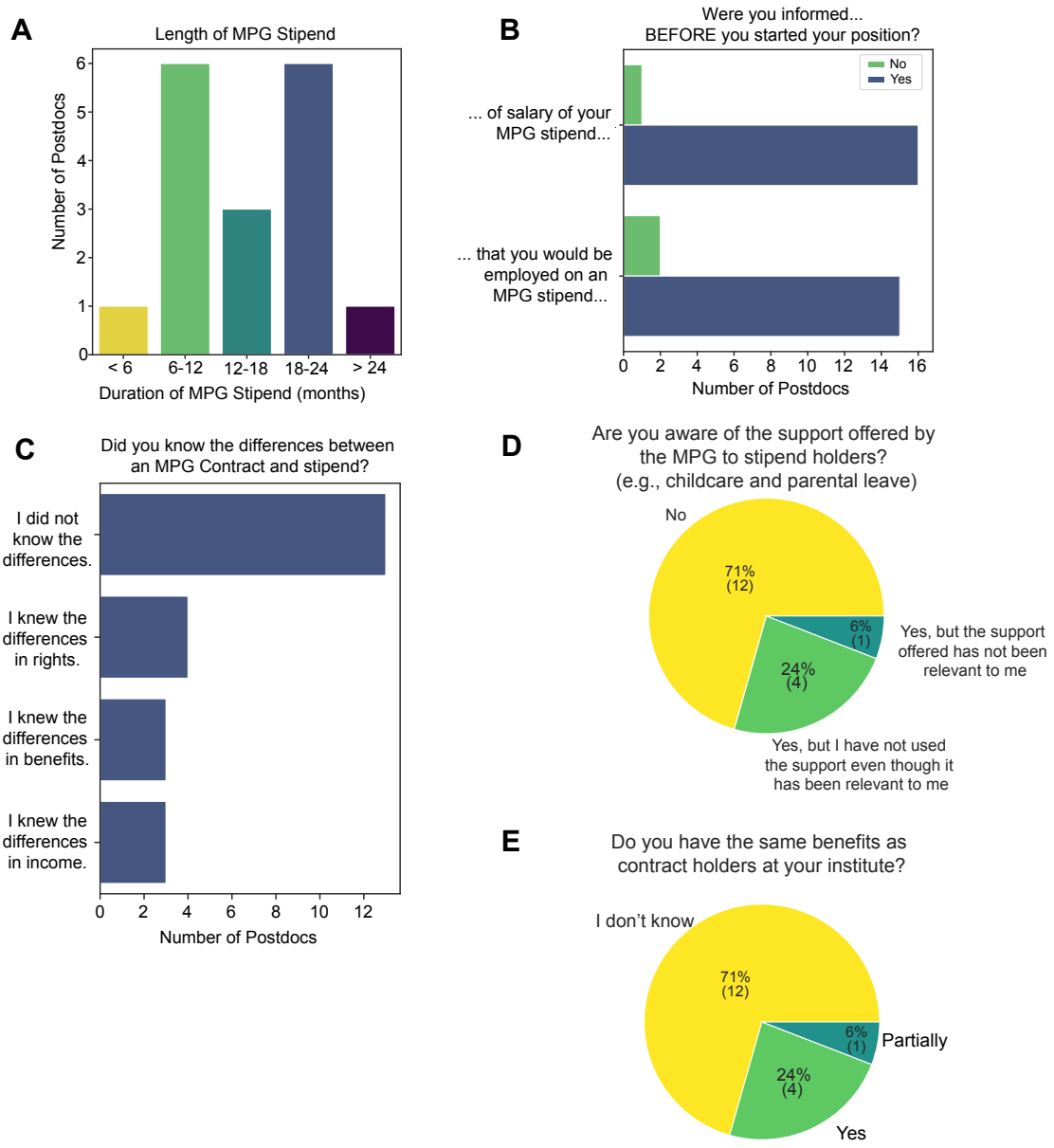

Figure B.4: Questions regarding stipends: A) Total duration of current stipends; B) Answers to the question of whether the stipend holders knew about their salary and the contractual form; C) Answers of stipend holders to the question is they knew the differences between MPG stipend and MPG contract; D) Awareness of postdoctoral researchers with stipends about the support of the MPG, and E) their benefits in their institutes.

ferences between stipends and contracts, the support offered by the MPG, and if they have the same benefits as contract holders. Most of the stipend holders (76%) claim to not have been informed about the differences and social/working conditions associated with this type of employment (Fig. B.4C).

When they were asked what they would have chosen if they had known the differences between scholarship and contract, only 2 of the respondents said that they would have chosen a stipend whereas 8/17 would have chosen a contract and the rest responded that they don't know. Comments from these postdocs suggest that they did not have the possibility to choose a stipend or contract, and many would have preferred contracts because of differences in income and benefits. The reasons given to prefer a stipend over a contract are prestige given to the CV or for tax reasons.

The second question investigated whether employee rights are comparable between stipend and contract holders. The employee rights are the opportunities given to employees to participate in their institute's life (e.g. voting rights in the elections of the works council and Ombudsperson) and benefits at their institute (e.g., electoral rights for Scientific Staff Representative, Works Council and Ombudsperson, equipment usage rights, childcare). The majority of stipend holders are not aware of the support offered by the MPG to stipend holders (Fig. B.4D). In contrast, only five respondents were aware of the support but did not use it or it was not relevant to them. Regarding the benefits at their institute, twelve respondents are not aware of the benefits at their institute, and the remaining five responded yes or partially (Fig. B.4E).

The last question investigated whether stipend holders have the same social benefits as contract holders (Fig. B.5). In the case of health insurance, this contribution is mandatory in order to have a residence permit in the country. Surprisingly, four of the stipend holders reported that they do not have health insurance. For the 59% (10/17) of stipend holders that pay health insurance, the amount per month paid ranges from €83 per month to €620 with a median of €267. The stipend holders can also choose to pay unemployment insurance and pension insurance; however, only three respondents pay both of these contributions.

Finally, an MPG stipend does not contain information regarding working hours per week or number of vacation days. We asked the stipend holders for their agreed-on workload (in hours per week) and the most common answer is 40 hours. We also asked them about their agreed-on vacation days per year, and the answers ranged between 14 and 36 days, with 30 days being the most common answer.

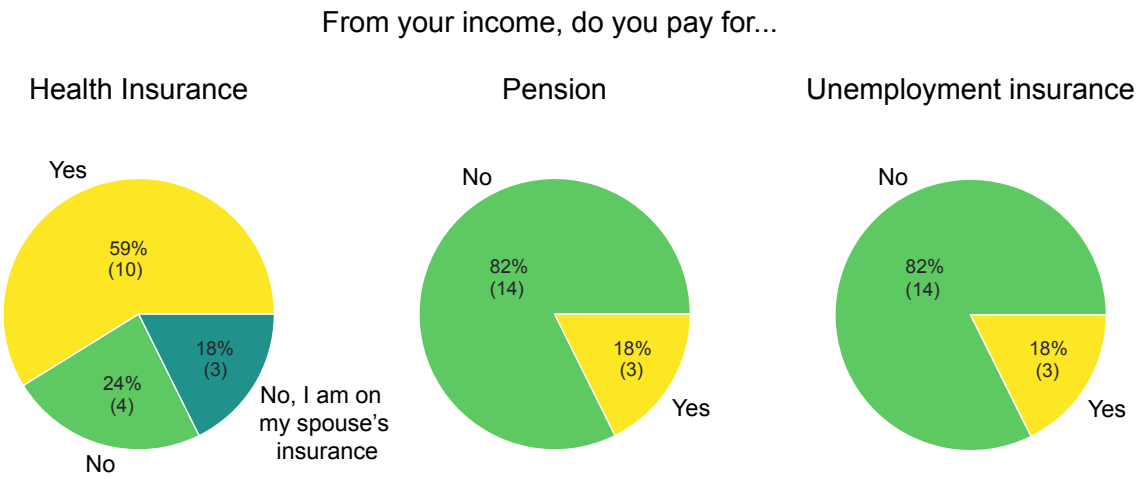

Figure B.5: Social security benefits paid from the stipend holders from their *netto* income. Left: Health insurance, Middle: Pension insurance, Right: Unemployment insurance

4.4.2 Third-party fellowships

We now look at postdocs with third-party fellowships. Unlike MPG stipends, some third-party fellowships require the institute to issue the researcher a contract. Out of the respondents, 47 postdocs have been awarded a third-party fellowship. We have further separated the fellowship holders, into two groups: postdocs for which the funding agency requires the host institute to issue an employment contract and postdocs that receive stipends. Only 25% of postdocs receive a contract from their institute whereas 60% of the fellowship holders claim that they do not get a contract from their MPI (15% are unsure about their situation). We have excluded for further stratification the respondents that are unsure about their employment mode.

Of all fellowship holders, 60% transitioned from an MPG stipend or contract within their fellowship, while the remaining 40% started directly with the fellowship.

Regarding the duration of the fellowships, the initial duration of the fellowships ranges from six months to more than 2 years (Fig. B.6A). Most fellowships had an initial duration between either 1.5 and 2 years (31/47), followed by 6-12 months (12/47), and a few have a fellowship for more than 2 years (4/47).

For fellowship holders with a contract issued by their MPI, their monthly *brutto* salaries (before tax deductions) range from €2650 to €6900, with a median value of €4800. As well, the agreed-on workload in hours per week ranges from 39 hours to 50 hours, with 40 hours being the most common answer (67%). Their vacation days ranged from 14 hours to 36 hours, with 67% of these postdocs receiving 30 days of vacation.

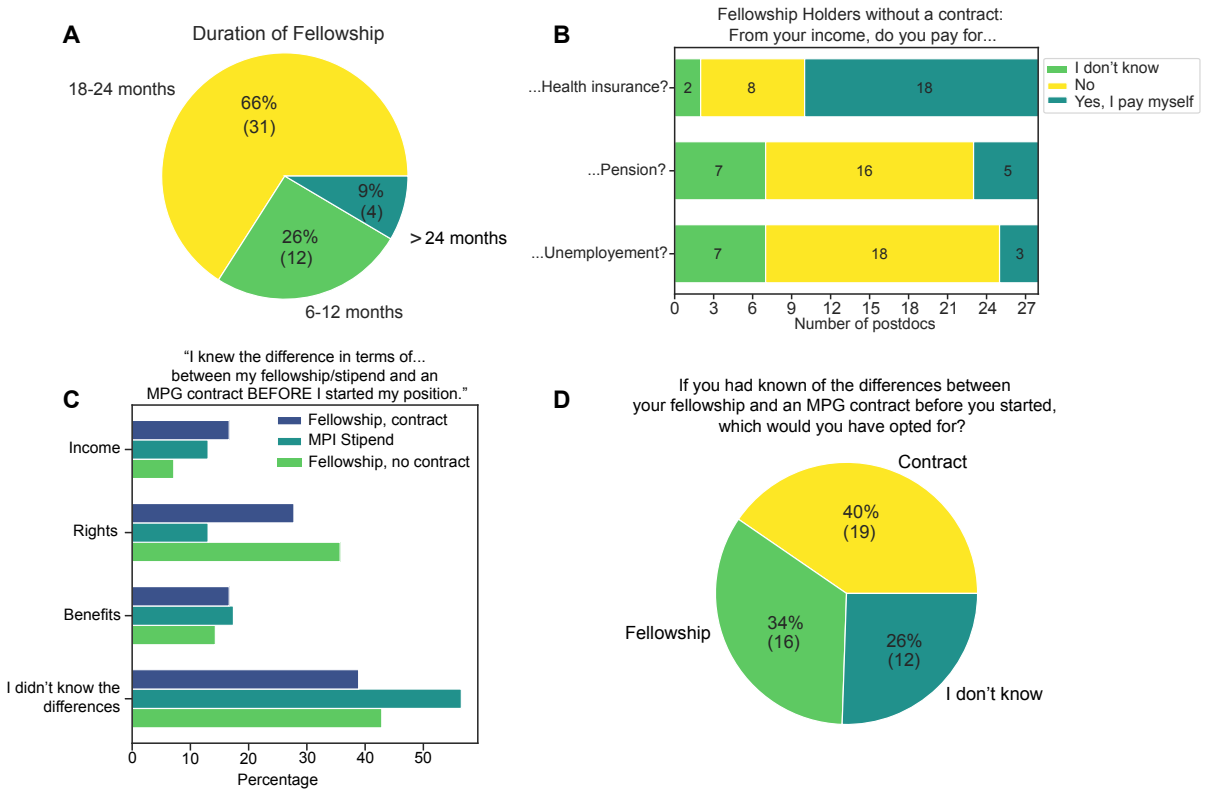

Figure B.6: Information regarding fellowship holders: A) The duration of current fellowship; B) Social benefits from fellowship holders who do not have a contract; C) Answers to the question: "Did you know the differences about income, rights, and benefits" between contracts and fellowships/stipends. D) Percentage of postdocs that would have taken a contract or fellowship had they known the differences between the two.

For fellowship holders with an external stipend, we did not ask specifically about their monthly allowance as this can vary significantly from fellowship to fellowship. As for social benefits, some percentage of the respondents 28% reported that they do not have health insurance, whereas 64% of stipend holders pay for their health insurance with a median of €222 per month (Fig. B.6B). Only 18% of these stipend holders can also choose to pay pension insurance, paying amounts ranging from €90 to €500 per month. As well, only 11% of these stipend holders report that they pay for unemployment insurance, ranging between €63 and €400 per month. The rest of the respondents either do not pay or are unsure about it (Fig. B.6B).

Next, we asked all fellowship holders about their rights in their institutes (Fig. B.6C). Around half of the fellowship holders reported that they have parental rights via their fellowships. However, 38% do not know if they have such rights. In the case of rights in their institute, 83% of the fellowship contract holders claim that they have the same rights in contracts, in contrast to 21% of the fellowship stipend holders. Around 30% of each group claim

that they do not know if they have the same rights as the contract holders.

Similar to what we observed with the MPG stipend holders, 50% of the stipend fellowship holders and 50% of the contract fellowship holders did not know the differences between the different types of employment options (Fig. B.6C). Only a small number of the fellowship holders knew about the differences in income, and less than 20% knew the difference in benefits and in rights.

Finally, we asked what they would have chosen if they had known the differences. We find that 40% of these postdocs would have preferred a contract, 34% would till take the fellowship, and 26% do not know which one they would choose (Fig. B.6D). The comments suggested that the respondents did not have the possibility to choose and that contracts would have been preferred. On the other hand, those that would have chosen a fellowship due to prestige added to their CV.

4.5 Working hours

Academia can be an extremely time-demanding profession, with some researchers working very long hours. We wanted to understand how many hours postdocs worked compared with how long they are contractually obligated to work.

The vast majority of respondents (89%) reported having 39-40 hour contracts, both among contract holders as well as stipend and fellowship holders (Fig. B.7A). Furthermore, 92% of MPG contracted postdocs, 62.5% of stipend holders, and 75% of fellowship holders reported having around 30 holidays in total (Fig. B.7B). Deviations from these numbers could be either due to part-time contracts or new employees starting after January and reporting numbers for their current year.

In practice, however, respondents typically work more than their contract hours and take fewer vacation days than their allowance. Approximately 64% of postdocs reported working more than 40 hours a week (Fig. B.7C) and 72% of participants reported working on the weekend at least once a month (Fig. B.7E). It is notable that about 4% of respondents reported working more than 60 hours a week, and 47% of respondents reported working on the weekend multiple times a month or every weekend. This indicates that overworking is prevalent among MPG postdocs.

Furthermore, there is considerable variability in the number of holidays taken (Fig. B.7D). Most MPG postdocs are making use of their holidays, as 82% have taken 8-30 vacation days in the last 12 months. However, the fact that 38% have only taken less than two

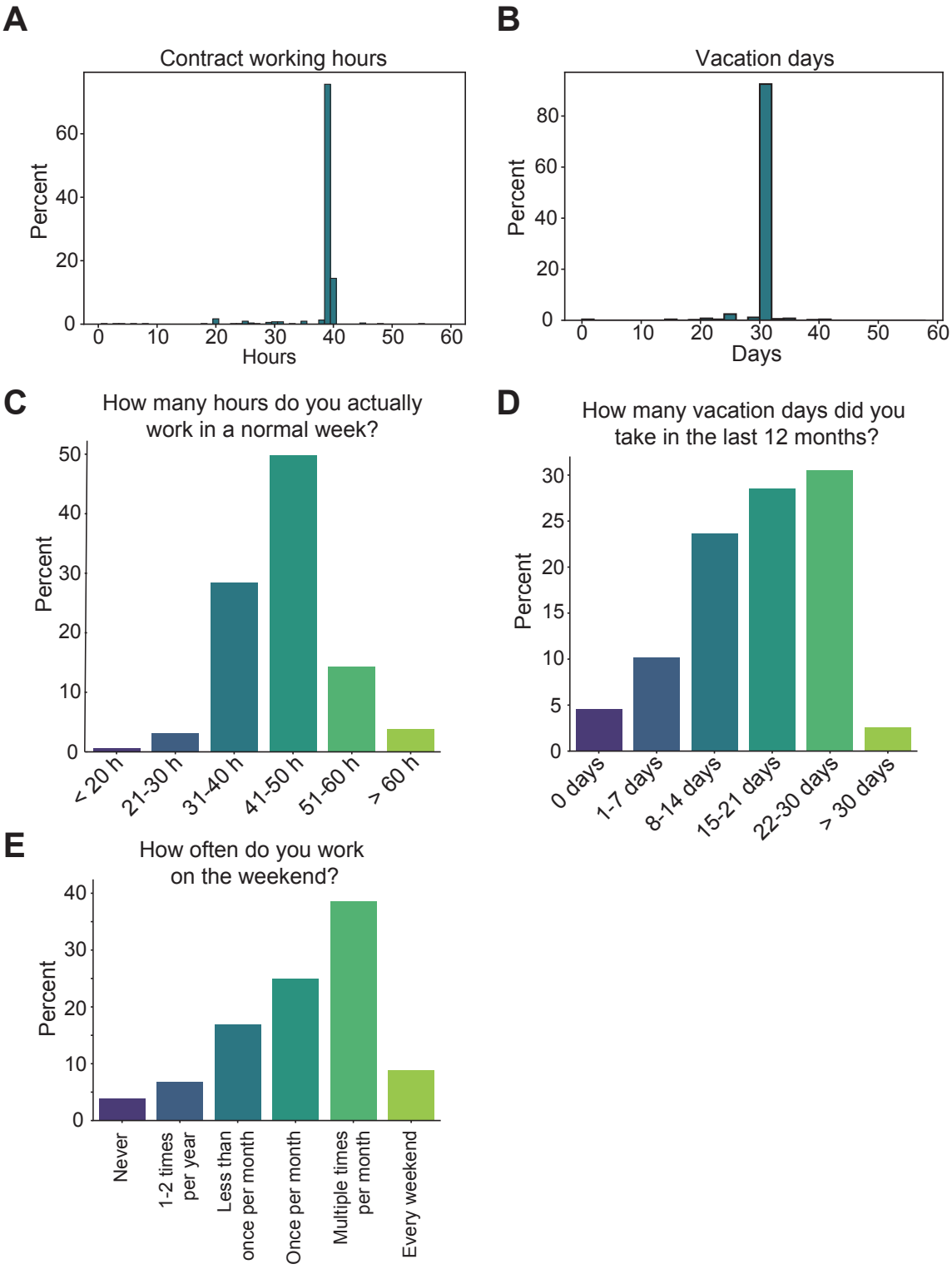

Figure B.7: Working hours and vacation time. (A) Contractual working hours. (B) Contractual vacation days. (C) Distribution of actual working hours by different categories. (D) Distribution of reported holidays taken in the last 12 months. (E) Distribution of frequency of working on weekends.

weeks of holidays indicates that a notable proportion of postdocs are taking significantly fewer holidays than they are entitled to. Of the postdocs that report 39-40 hours contracts, only 35% report taking at least 22 days of holidays, which is worryingly low considering that the German minimum for full-time employees is 20 vacation days (see the *Bundersurlaubsgesetz*).

4.6 Being informed about employment conditions

Finally, we examined the extent to which MPG postdocs were informed about employment conditions including their salary and possibilities for contract extension (Fig. B.8).

In terms of salary, about 44% of contract and stipend holders indicated that they were not informed about the salary they would receive before starting (Fig. B.8A). Furthermore, 67% of contract holders were not given any explanation on their salary classification (Fig. B.8B).

While MPG postdocs are employed on fixed-term contracts, extensions are possible in certain cases. We asked respondents whether they knew about the conditions under which they could obtain an extension, and we found that a majority of postdocs are generally unaware of the conditions for extension. Specifically, we asked about the extensions for parental leave, in order to complete a project, and to publish research. In all cases, only a small minority (30-40%) of respondents indicated that they were aware of the conditions for such an extension (Figs. B.8C-E).

Altogether, this demonstrates that the majority of MPG postdoc respondents are insufficiently informed about their employment conditions when it comes to salary and extension possibilities.

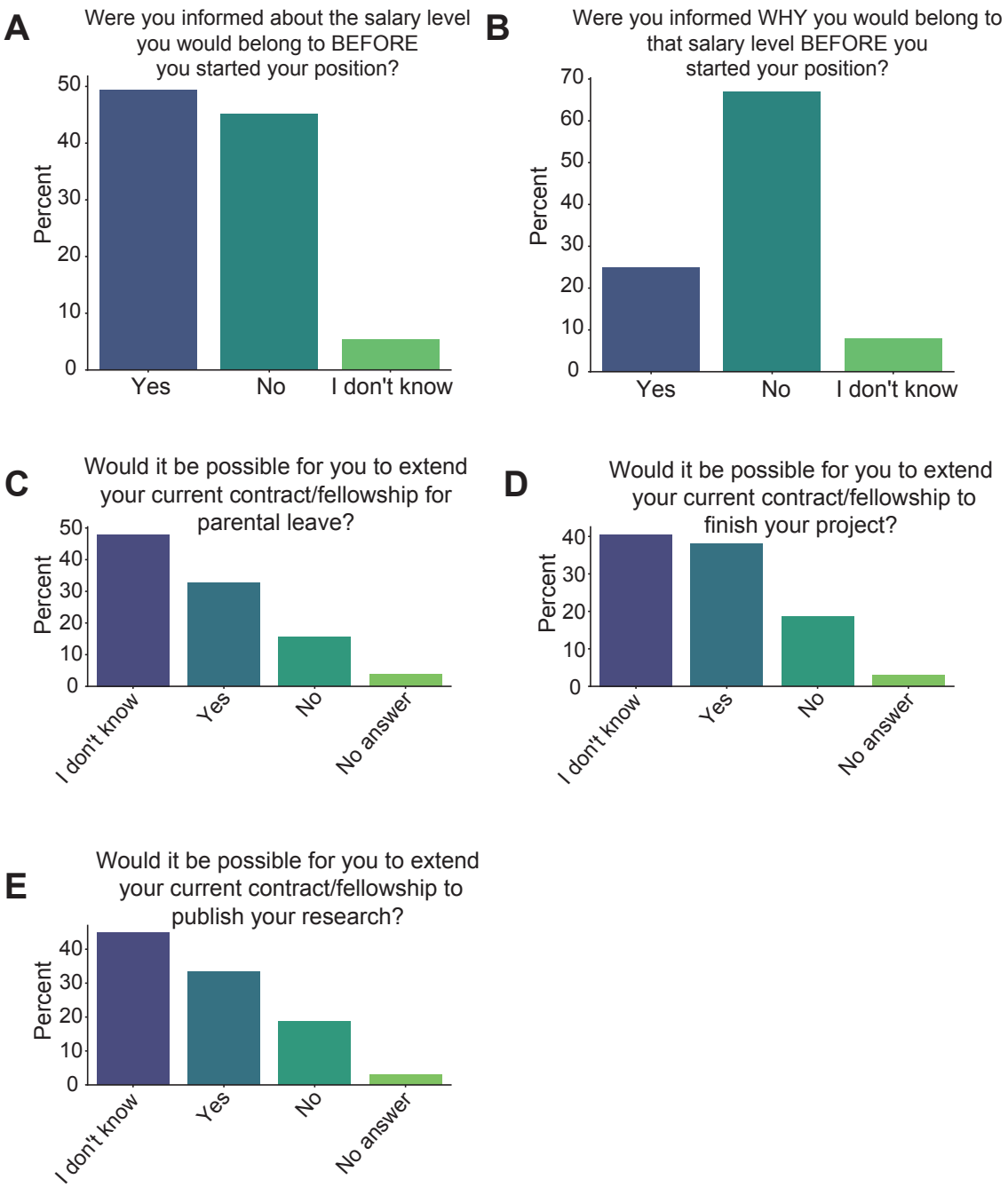

Figure B.8: Information about employment conditions. A-B) Respondents were asked whether they were A) informed about their salary before joining and B) about why they would receive that salary. C-E) Respondents were asked whether contract extensions would be possible in the case of C) parental leave, D) to complete a project, E) to publish research.

5 Career Development

The postdoctoral stage of a person's career is transient and temporary. As we have seen from previous chapters, a majority of MPG postdocs come from outside of Germany to perform high-level research and prepare themselves for a career after their postdoctoral phase. Therefore, it is imperative that throughout the postdoctoral phase, there is adequate professional development and mentoring to lead postdocs to their life goals and also show them options that they may not have considered. In this chapter, we analyze how postdocs feel about their career development, if they have the right mentoring and professional development opportunities around them, and if the MPG Postdoc Guidelines are helpful and being adhered to.

5.1 Main Findings

1. Most postdocs have aspirations to work in academia, but this may be due to their lack of perceived preparation for jobs in industry.
2. When looking for a permanent position, postdocs value a job that allows for intellectual challenges, a reliable work-life balance, and financial and job stability.
3. To achieve their long-term goals, courses in grant writing, project management, and leadership training would benefit postdocs the most.
4. Postdocs that have used the Planck Academy's services have found them useful, but HSS postdocs have not found useful offerings and many postdocs do not know about this service.
5. The Postdoc Guidelines are not being adhered to, leading to a lack of professional development, for two key reasons: postdocs are not informed about these guidelines, and there is no accountability process for them to be followed.

5.2 Potential careers for postdocs

We asked all postdocs about which type of career paths they could see themselves working in after their postdoctoral career was over (Fig. C.1A). Over 70% of postdocs would still like to work in academia, either as a group leader or as a staff scientist, while roughly 60% of the postdocs would like to work in the industry setting. Relatively few postdocs do want to work in non-research positions, but this is highest in the Biomedical section with roughly 20% of postdocs willing to work in such an environment. When stratifying

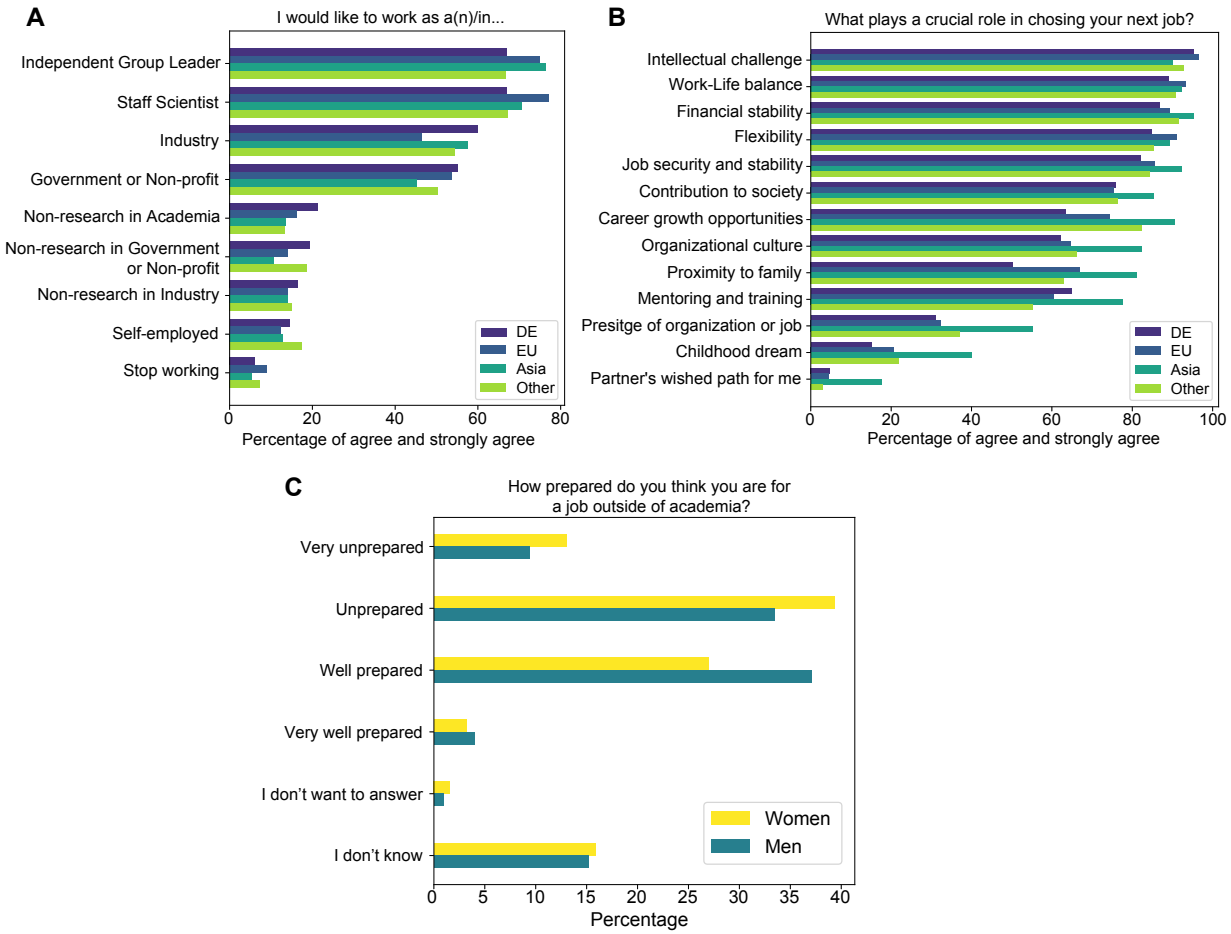

Figure C.1: A) Jobs that postdocs "agree or strongly agree" that they would like to pursue after their current postdoc. B) Characteristics that postdocs "agree or strongly agree" would play a significant role in choosing their job. C) Postdocs who feel that they are prepared or unprepared for a job outside of academia, stratified by gender identity.

this data via nationality, we notice that postdocs from Asia are much more likely to strive for an independent group leader position than the rest of the world, whereas German citizens are more likely to work in the public sector or non-research positions. Lastly, there is relatively little difference between the career aspirations of men and women.

Regardless of the type of position that the postdocs are attempting to pursue, there are characteristics of these jobs which are almost non-negotiable for most postdocs (Fig. C.1B). Over 80% of postdocs feel that an intellectual challenge, work-life balance, financial stability, flexibility, and job stability/security play a crucial role in choosing their next position, regardless of the sector they work in. Stratifying against sections, we note that HS section postdocs value their contribution to society a bit more than the others, while CPT and BM section postdocs value career growth opportunities and mentoring a bit more. Asian postdocs overwhelmingly say that the proximity to family plays a crucial role in pick-

ing their next job. As well, the German postdoc community does not feel the need for jobs that have a lot of mentoring and training. Lastly, there is no significant difference stratifying by male and female gender.

From Fig. C.1A, we noted that many postdocs are willing to take a position that is outside of academia. However, we can see that a majority of postdocs feel they are not prepared for jobs outside of academia and over 15% are unsure if they are prepared (Fig. C.1C). Most sections and nationalities feel similarly unprepared for this career, but there is a significant disparity when accounting for gender. We note that about 55% of women feel that they are unprepared or very unprepared whereas 42% of men feel unprepared or very unprepared.

5.3 Planck Academy

In 2018, the Max Planck Society introduced the Planck Academy, allowing employees of the MPG to gain training for their career goals. They offer several courses every quarter, catered to any MPG employee. When asked about what kinds of courses they would find useful to bolster their long-term goal perspectives, they answered that grant writing, project management, job hunting and application preparation, leadership training, and interview training were the most important (Fig. C.2A). On the bottom we see patents and legal forms, entrepreneurship, and German language skills. Stratifying this by section, the Biomedical section wants more courses on leadership, data analysis, hiring the right people, and intercultural awareness, whereas the CPT section wants courses in presentation skills and the HS section seems very keen on teaching praxis. Most postdocs take courses like this around once a year, but there is a significant percentage (25%) of postdocs who never take courses on any hard or soft skills (Fig. S.4A-B).

Out of the respondents that used the Planck Academy, an overwhelming majority found it useful (Fig. C.2B). However, over 60% of the postdocs surveyed had not used the service for a variety of reasons, including 15% of postdocs who did not know about the Planck Academy. When stratifying by section, we note that almost 25% of the HSS postdocs have not used the service because they have not found any useful courses. Over 20% of the postdocs in the CPT section have never even heard of the Planck Academy. As well, postdocs outside of the EU have used the service much more, with about 35% of the international postdocs using the service (and almost 40% of Asian postdocs). Stratifying by gender, we note that men are more likely not to know about the Planck Academy and women are more likely to participate (and enjoy) the services.

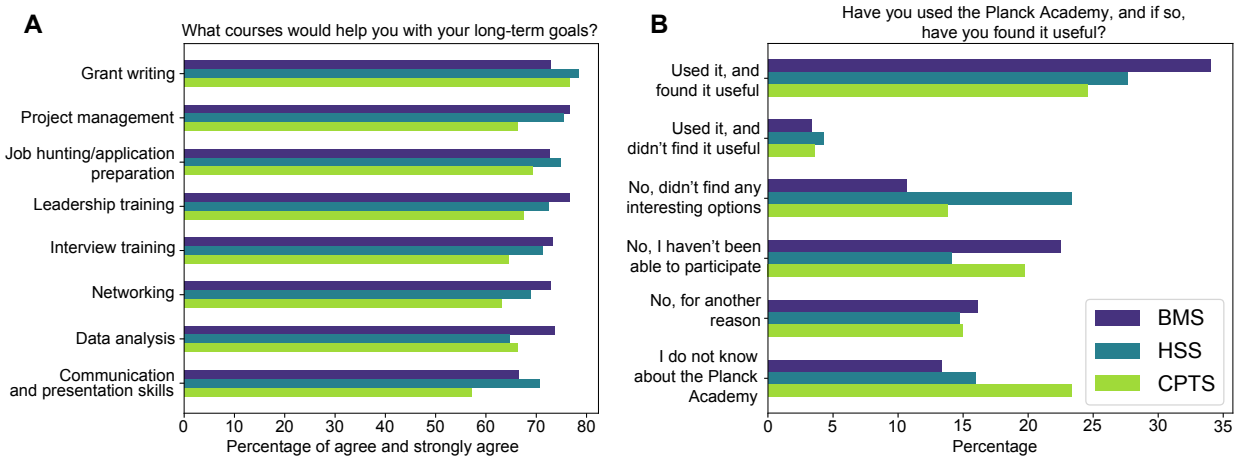

Figure C.2: A) Courses that postdocs would like to have for their professional development, stratified by section. B) Percentage of people that have used or not used the Planck Academy services, stratified by section.

The Planck Academy is an online medium with over 95% of the courses taking place online. When asked about courses offered in-person (or online) by local institutions such as a college or their MPI, over 50% of postdocs have done this and found them useful. Roughly 35% of postdocs have not done so because there have been no relevant courses. This leads to a general conclusion: The Planck Academy serves a very important purpose in the professional development of postdocs, as almost all postdocs who have participated in such courses found them useful. However, there needs to be more of a breadth of courses, particularly for HS section postdocs, and a better communication pipeline must be implemented so that postdocs can hear about the courses in a timely manner and know what the Planck Academy does.

5.4 Mentoring from direct advisors

Professional development courses are a significant tool in the skill set for postdocs, but on a daily/weekly basis, their professional development can be bolstered or hindered by the quality of their advisor. The mentoring they get, both from a research and a career development perspective, can help aid their transition to the career goals. Wee asked postdocs to tell us how often they meet with their advisor to discuss research progress (Fig. S.3). About 30% of postdocs meet with their advisors every week. Interestingly, there are 20% of postdocs that meet with their advisor only 1-4 times a year. When stratifying this by section, it becomes clear that the HS section postdocs are the majority of these postdocs, with over 30% of them only meeting with their advisors 1-4 times a year. The CPT section meets with their advisors the most, with about 60% of them meeting weekly. Men

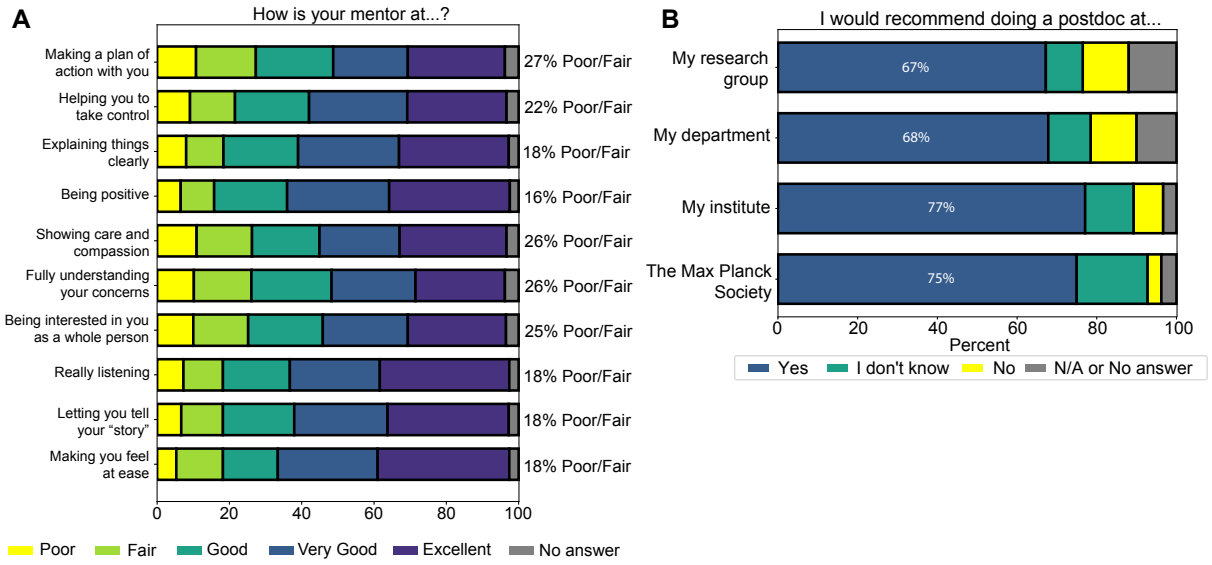

Figure C.3: A) Postdocs' feelings regarding the qualities of their direct supervisor/mentor. B) Percentage of postdocs that would recommend doing a postdoc in the MPG, their institute, department, or research group.

are about twice as likely to meet with their advisors bi-weekly than women, and there is relatively little difference between the meeting times stratified by nationality.

We also asked postdocs about the quality of their mentoring (Fig. C.3). Overall, postdocs are quite satisfied with the mentoring that they are getting from their direct advisors. Their advisors are very good at being positive, really listening, and making the postdocs feel at ease (Fig. C.3A). As well, most postdocs would recommend doing a postdoc at the Max Planck Society, their own Max Planck Institute, their department, and their own research group (Fig. C.3B).

5.5 The Postdoc Guidelines

A key pillar of the mentoring program for postdocs at the MPG are the Postdoc Guidelines. These call for three important steps: the mutual agreement, annual reviews, and status reviews.

5.5.1 The Mutual Agreement

The mutual agreement begins before the postdoc arrives at the institute. During this meeting, the advisor and postdoc should discuss the total duration of the postdoc phase, the research topic, and the qualifications that the postdoc plans to acquire. When asked if

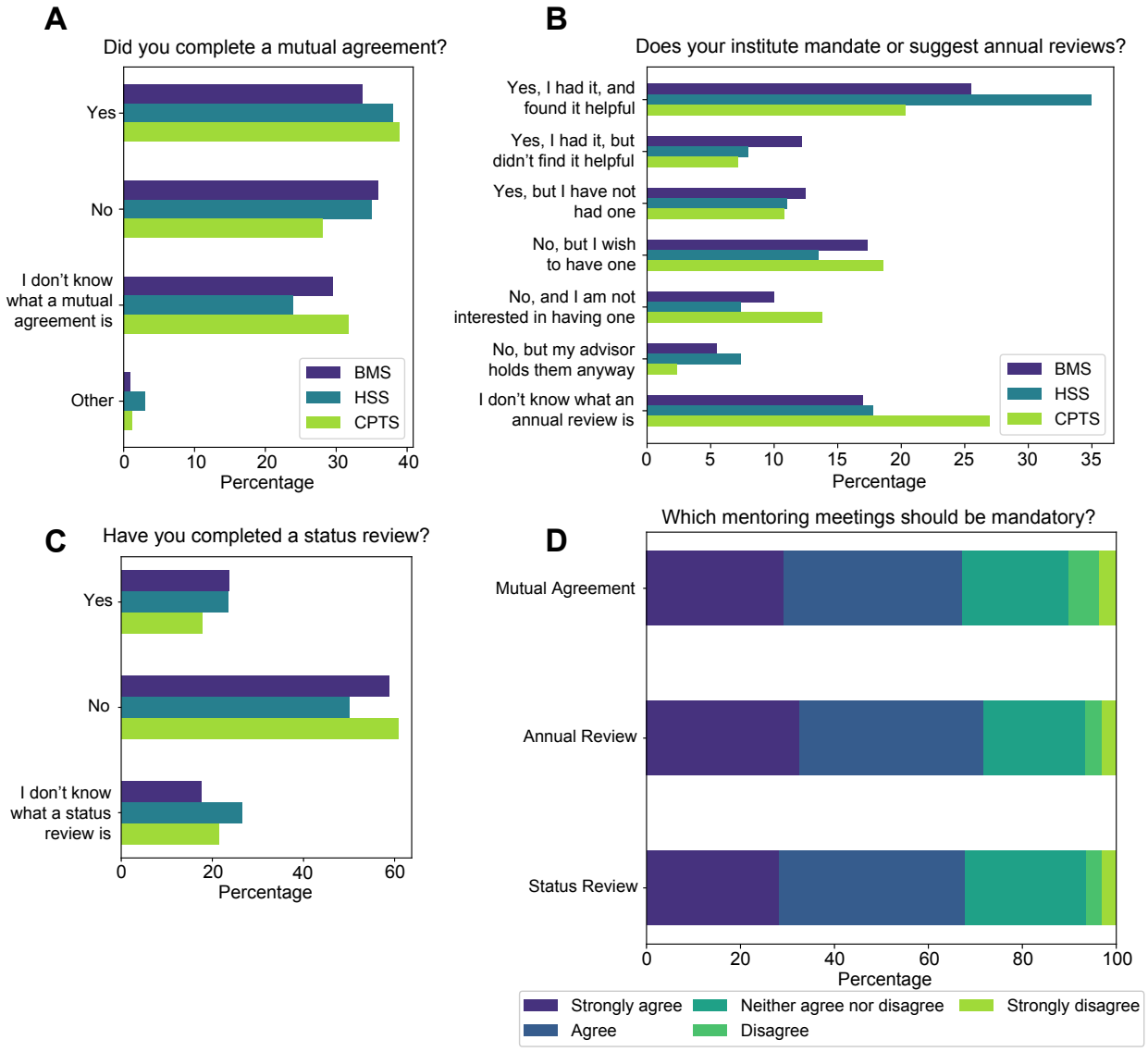

Figure C.4: Percentage of postdocs who have completed or not completed A) a mutual agreement; B) their annual reviews; and C) their status review, stratified by section. D) The percentage of postdocs who feel that mandating these programs would benefit their career development.

they had completed this mutual agreement, only 35% of postdocs said they had (Fig. C.4A). Surprisingly, over 30% of postdocs did not even know what a mutual agreement was. The CPT section had the lowest participation in the mutual agreement, with under 35% of them doing it. Interestingly, the BM section had the highest participation but also the largest percentage of postdocs who did not know what a mutual agreement was. More men completed mutual agreements than women, even though both were similarly informed about the process. When stratifying by nationality, almost 50% of Asian postdocs completed a mutual agreement compared with only 28% of German postdocs completing this.

5.5.2 The Annual Review

The annual review is also a crucial part of the postdoc phase. Every year, the advisor and postdoc should discuss the postdoc's career goals. This is an important distinction between research progress meetings, as they are solely for talking about where they see themselves after the postdoc and what training/aid they need to get to that position. Annual reviews should help center postdocs towards an achievable goal with realistic expectations and aid from their advisor. Unfortunately, only 45% of institutes mandate this meeting and only 40% of postdocs complete an annual review (Fig. C.4B). This lack of accountability shows, as about 17% of postdocs are in institutes that do not mandate such a meeting but would like one. As well, over 20% of postdocs do not know what an annual review is. Overwhelmingly, the HS section is the most active in holding these meetings, with over 50% of the postdocs having one each year (many of which find it helpful). The CPT section is the most disconnected section, with over 25% of respondents not knowing what an annual review is. The BM section has the largest percentage of postdocs that did not find their annual review useful (over 33% of the people who have completed it). Women are more likely to have had the review and are more interested to have these. Over 25% of Asian postdocs do not know what an annual review is, easily the largest percentage from any group.

For the people who have had this annual review, we asked what was discussed in it. Over 90% of respondents said that they discussed research progress, which is not supposed to be discussed during this meeting. About 75% of postdocs discussed their career goals, but under 60% of postdocs talked about their professional growth, skill development, and grants or conferences (only 40%). Even though a minority of postdocs are actually completing these reviews, it is concerning to see that what was discussed at these meetings was not the point of the meeting in the first place.

5.5.3 The Status Review

The last, but very important, step in the mentoring guidelines is the status review. This should be completed no later than the end of the 4th year of the postdoc phase. The goal of this review is to "realistically assess the researcher's own development and prospects of success in relation to the career objectives and to develop alternative career prospects." Out of the individuals that had completed 4 years, only 20% of them have completed such a status review, with another 20% of postdocs not even knowing what a status review is (Fig. C.4C). There were no major differences across the sections, gender, and nationality.

The postdocs who had this status review commented that they mainly discussed their

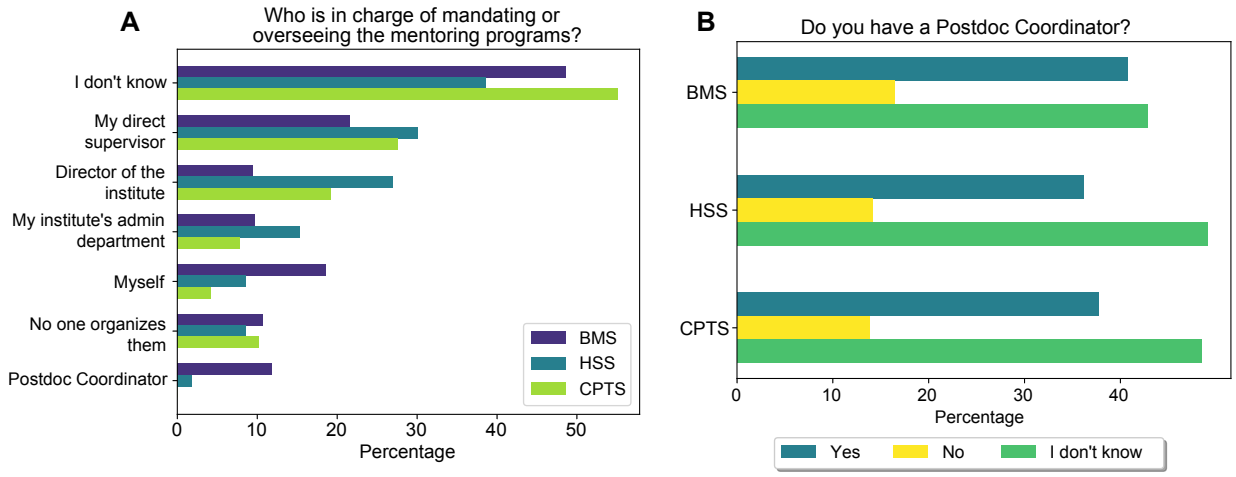

Figure C.5: A) The people who are in charge of mandating or overseeing their mentoring program at their institute. B) The percentage of postdocs that have a postdoc coordinator, stratified by section.

past research performance (81%) and professional growth (75%), whereas they did not talk too much about their strengths and weaknesses inside and outside of academia (32% and 16%, respectively). All four of these components should be included in a well-rounded status review as this should aid the postdoc to understand their possible trajectories after the postdoc is over.

5.5.4 Accountability

Out of all the postdocs sampled, only 35% have completed a mutual agreement, 40% complete an annual review, and out of the eligible postdocs, only 20% have completed a status review. This is caused – in large part – by defective communication pathways and a lack of accountability. Almost 70% of postdocs agree or strongly agree that mutual agreements, status reviews, and annual reviews be mandatory and have some form of accountability process (Fig. C.4D).

There is no one person in charge of overseeing this program at the headquarters or institutional level. Therefore, it is left to the postdocs and then institutes themselves to assign the accountability process to. Almost 50% of postdocs do not know who is in charge of maintaining or overseeing this mentoring program (Fig. C.5A). We find that 25% of postdocs say that their direct supervisor/advisor is the one that is supposed to maintain this. The lack of accountability on the supervisor is troubling, because even though many do in fact take the initiative to help their postdocs with career planning and mentoring, many do not and only focus on research. Postdoc coordinators would be the ones who would be able to monitor these programs, but we find that only a third of our postdocs have a postdoc coordinator at their institutes and many do not know if there is one (Fig. C.5B).

6 Personal and Professional Well-Being

This chapter centers on the personal and professional well-being of MPG postdocs. First, we assessed postdocs' mental well-being and (social) quality of life using four domains: i) general life satisfaction, ii) social support, iii) mental well-being (measured by the severity of symptoms for depression and anxiety), and iv) stressors. Second, we inquired about postdocs' experiences with antisocial behavior at work, such as bullying, discrimination and harassment.

6.1 Main Findings

1. Although there is general life satisfaction and good social support, prevalence of symptoms for depression and anxiety is almost three times higher in MPG postdocs than in the general German population of the same age.
2. Work is the most prevalent stressor, followed by caring responsibilities.
3. Lower mental well-being is correlated with not being employed on a contract, shorter contract lengths, as well as long weekly working hours.
4. A substantial number of postdocs have experienced at least one form of antisocial behavior at work (e.g., bullying, discrimination or harassment) with major consequences for their mental well-being.
5. Female postdocs with children have the worst outcomes for all measures of personal and professional well-being.

6.2 Life satisfaction

In figure D.1, we find that the majority of postdocs both report to be happy (83% at least moderately) and to see meaning and purpose in their lives (80% at least moderately). They are most satisfied with their family relationships and friendships. Almost half of all postdocs also report that they are very or extremely happy with the work they do (Figure D.1). At the same time, 17% of postdocs report to be unhappy to some extent and the majority of those are non-German. Unhappiness most often regards the financial situation (23% at least moderately unhappy), work (19% at least moderately unhappy), and health (21% at least moderately unhappy). These patterns are similar between the MPG sections, but there are differences when stratifying by employment, gender, care-giving responsibilities, and nationality. The financial situation is a source of unhappiness for 28%

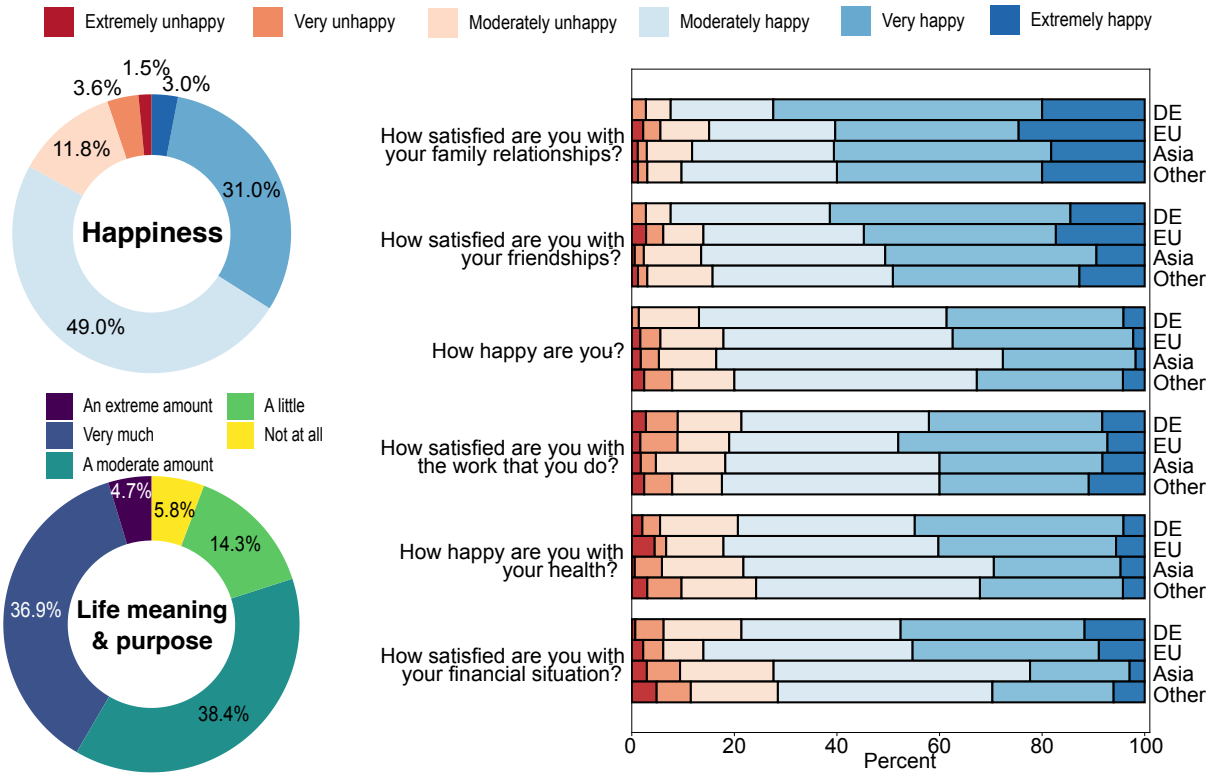

Figure D.1: Life satisfaction. Answers to questions regarding general life satisfaction. Left top: Answers to the question "In general, how happy are you?"; left bottom: Answers to the question "To what extent do you feel your life to be meaningful?". Right: All life satisfaction questions are stratified by citizenship.

of postdocs from Asia and 29% of postdocs from other non-EU postdocs (Fig. D.1).

6.3 Social support

Postdocs are overall socially well-connected, but there are important differences to consider regarding citizenship and caregiving (Fig. D.2). About 87% of postdocs have weekly contact with friends or family on the phone or in-person, and 66% of the postdocs feel they can confide in someone close to them on a regular basis. Mothers, men without children, and postdocs from outside of Germany are the most likely to report rare to no opportunities to engage in social exchange with friends, family, or other close relationships.

Most postdocs also participate in weekly social activities, for example at sports clubs or gyms (39%), group activities (21%), pubs and social clubs (20%), or social activities at the MPIs (15%) (Fig. D.3). About 36% of postdocs, however, do not attend any weekly social activities. These postdocs most frequently come from Germany (42%) and Asia (38%) or are parents (60% of mothers, 52% of fathers).

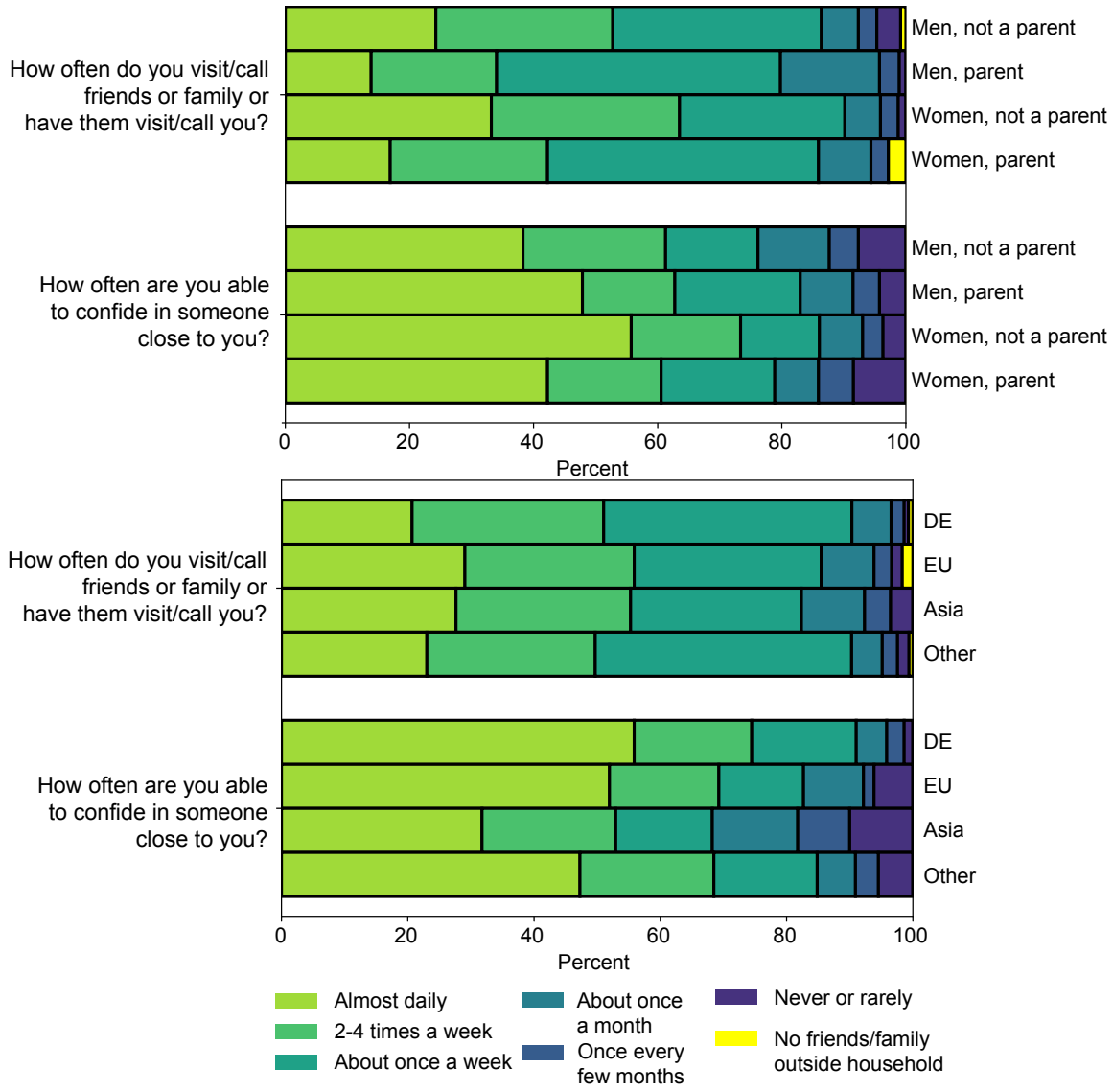

Figure D.2: Answers to questions regarding social support, stratified by gender and parental status (top) and citizenship (bottom).

6.4 Mental well-being

We asked the postdocs questions about their mental well-being using two established clinical screening questionnaires for depression and anxiety (PHQ–8 for depressive symptoms and GAD-7 for anxiety symptoms, see Methods section). When questioned about their mental well-being, 55% of postdocs report at least mild depressive symptoms and 48% report at least mild anxiety (Fig. D.4). More than 1 in 5 postdocs (22%) show signs of moderate to severe depression, which is considered a clinically relevant range of symptoms. Notably, this number is almost three times higher than the prevalence of depression in the German population (for ages 30-44 years in 2019-2020: Women 8.7%, Men 7.3%,

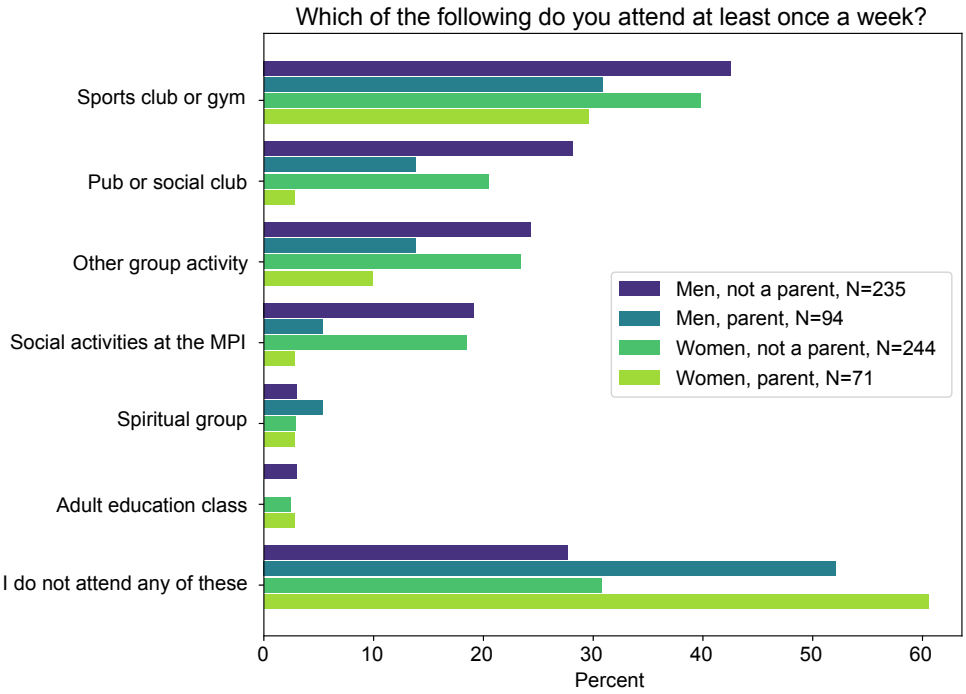

Figure D.3: Answers to the question "Which of the following do you attend at least once a week?" stratified by gender and parental status.

(Heidemann et al. 2021)).

Interestingly, the numbers are comparable across sections as well as citizenships, suggesting that the negative state of postdocs' mental health is an overarching problem. We observe small differences though for i) postdocs with Asian citizenship who report less pronounced depressive symptoms and anxiety compared to postdocs with other citizenship; and ii) for postdocs in the CPT section who report the least severe depression and anxiety symptoms. In line with known gender differences in affective symptoms (Salk, Hyde, and Abramson 2017; Altemus, Sarvaiya, and Neill Epperson 2014), we also observe higher scores for depressive symptoms and anxiety for women compared to men.

6.5 Relationship of mental well-being with working conditions

Interestingly, the survey data show that differences in mental well-being are related to postdocs' working conditions D.5). We investigated the relation between mental well-being and time spent at work. While there was no clear effect on mental well-being of how many vacation days postdocs took, there was a correlation with the weekly working hours. Postdocs who work no more than 40 hours per week are considerably less severely depressed and anxious than those who work more than the contractually agreed work-

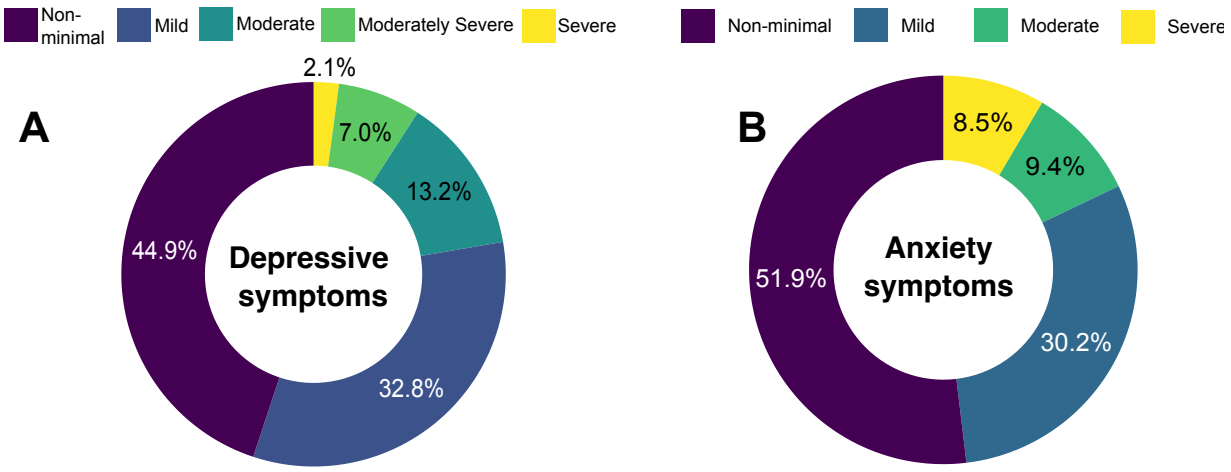

Figure D.4: A) Percentage of postdocs who report variations of non to severe depressive symptoms using the Patient Health Questionnaire (PHQ-8); B) Percentage of postdocs who report variations of non to severe anxiety symptoms using the Generalized Anxiety Disorder screener (GAD-7).

ing hours (Fig. D.5A). Consistently, every third postdoc working more than 50 hours per week shows signs of moderate to severe clinical depression and every fourth of those postdocs is moderately to severely anxious. Moreover, postdocs who are not employed on a contract more often present severe mental health issues than those postdocs with a contract (depressive symptoms: no contract 13% (moderately) severe, with contract = 6-10% (moderately) severe; anxiety symptoms: no contract = 13% severe, with contract = 6-11% severe). Across groups of varying postdoctoral experience duration at the MPG, we observe a gradual decrease of mental well-being scores the longer the postdoctoral phase lasts (from $<$1 to 5 years). Notably, this relationship flips for those postdocs with more than 5 years of postdoc employment at the MPG, showing that these postdocs exhibit the best mental well-being outcomes (Fig. D.5B).

Interestingly, we made similar observations across employment length with respect to work satisfaction. Postdocs with postdoctoral work experience between 1 and 5 years are most unsatisfied with the work they do (1-3 years: 22% at least moderately unhappy, 3-5 years: 21% at least moderately unhappy) whereas those who have started their postdoc less than 1 year ago (13% at least moderately unhappy) and those with postdoc experience of more than 5 years are the most satisfied with their work (17% at least moderately unhappy).

Figure D.5: A) Depression and anxiety scores stratified by reported weekly working hours. B) Depression and anxiety scores stratified by years of postdoctoral experience at the MPG. Scores were calculated using the PHQ-8 for depressive symptoms and GAD-7 for anxiety symptoms (see Methods section).

6.6 Stressors

As the previous section showed, postdocs spend a large amount of time at work and are exposed to a lot of stress. Looking into which stressors affect postdocs the most, we observe that work is by far the greatest source of stress (Fig. D.6). We find that 73% of postdocs say that they are bothered at least a little by stress at work and 25% of postdocs are bothered a lot by stress at work. Work stress is followed by stress of caring responsibilities and worrying about one's health. These two stressors gain a salient meaning in the context of the COVID-19 pandemic (see Section 7). As well, caring responsibilities are stressors for 43% of postdocs, even though we show in the demographics that 27% of all postdocs are parents (Fig. A.4). This demonstrates that postdocs' caring responsibilities go beyond childcare and affect more postdocs than assumed from parental status alone.

These results are also reflected an imbalance between professional and personal life demands. Postdocs state that work-related demands take over their personal lives and interests (Fig. D.7). In addition, postdocs who are also parents further state that their personal lives take them away from time they would like to spend at work.

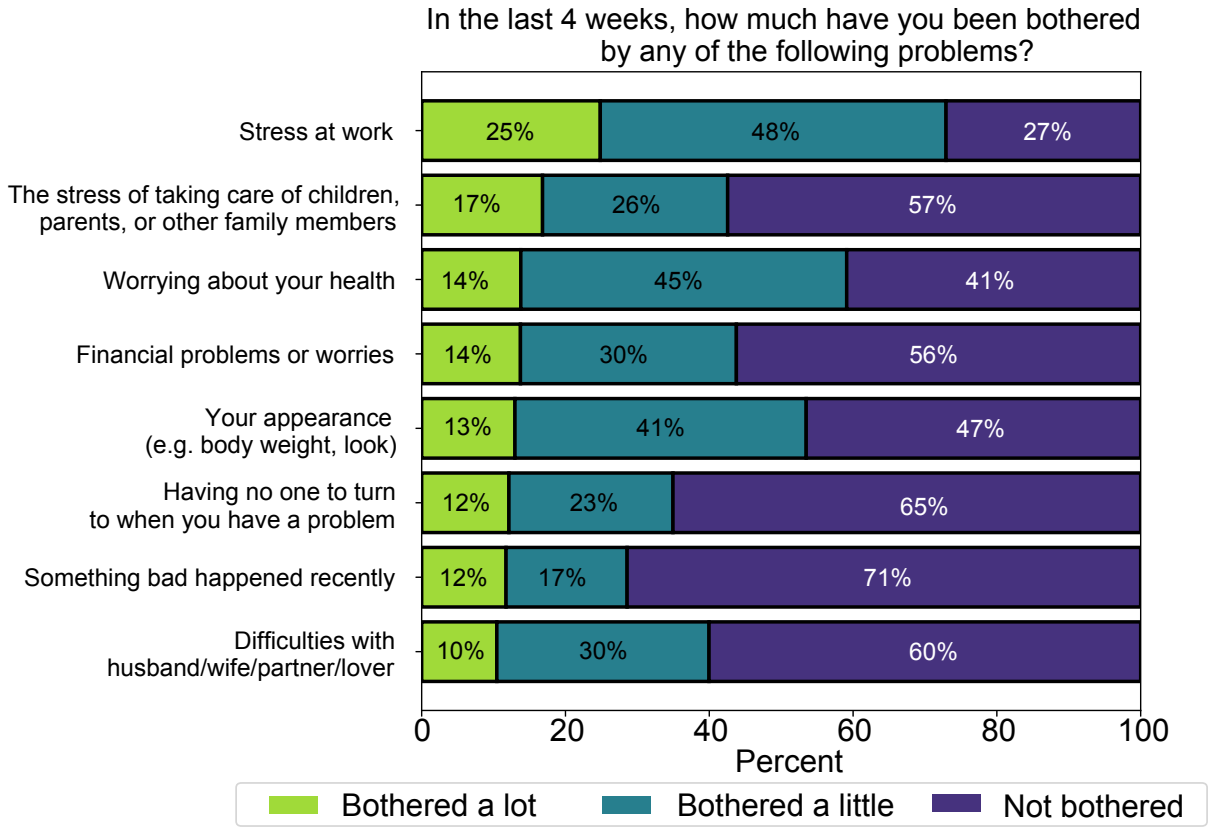

Figure D.6: Answers to the question "In the last 4 weeks, how much have you been bothered by any of the following problems?". Note that some percentages may not add up to 100% due to rounding.

6.7 Experiences of antisocial behavior at work

A key element of personal and professional well-being is the atmosphere in which postdocs work. The Max Planck PhDnet has recently shown that 1 in 4 MPG doctoral researchers is faced with antisocial behavior at work, including discrimination and serious conflict (Majev et al. 2021).

In this survey, we asked postdocs about their experiences with antisocial behavior and discrimination at work (Fig. D.8). Overall, 30% (∼200 individuals) of postdocs report having experienced at least one form of antisocial behavior at work. The experiences include bullying (12%), physical violence (0.5%) and sexualized violence (1.7%) (Fig. D.8A). Furthermore, 12% of postdocs observe discrimination at least monthly and more than 6% of postdocs experience discrimination themselves at least monthly. They report that nationality, gender identity, parenthood, and ethnicity are the most frequent reasons for discrimination (Fig. D.8B). Women experience discrimination 2.4-times more often than men (9% of women, 4% of men). We found that 13% of individuals who have a different gender identity or preferred not to answer have experienced discrimination, but the sample

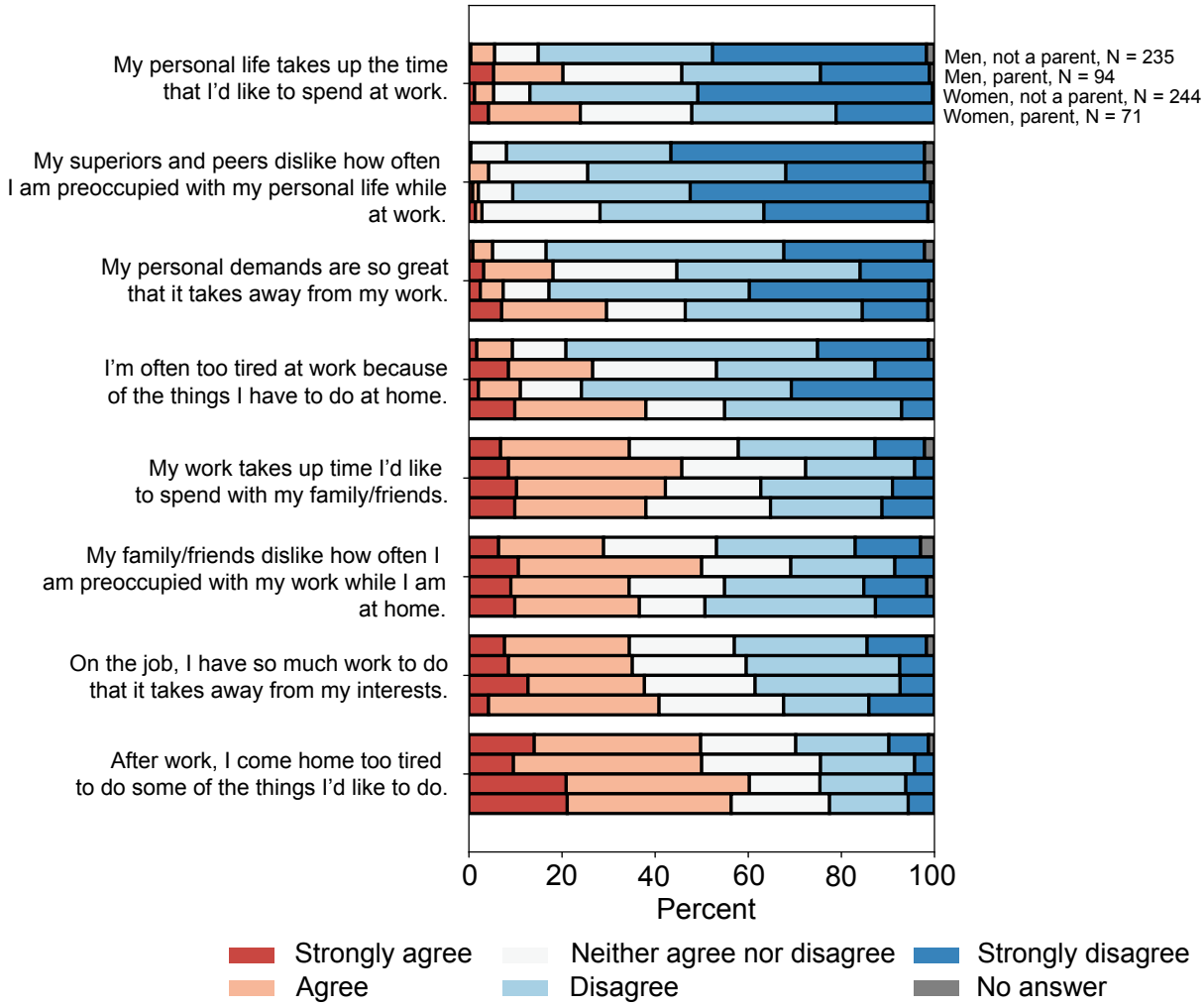

Figure D.7: Views on personal and professional life demands, stratified by gender and parental status.

size was too low to be included in further analyses.

Importantly, such experiences have clear implications for mental health. Using the PHQ-8 and GAD-7 scores obtained above, we find that those postdocs who have experienced antisocial behavior at work report much higher scores for depression (mean = 9.9) and anxiety (mean = 9.6) compared to those who have not experienced this (depression mean = 6.1, anxiety mean = 5.3).

6.8 Focus on postdocs with care work

In all analyses of this section, we observe that female postdocs with caring responsibilities stand out from other subgroup analyses. We find that mothers are most unhappy, depressed, anxious, stressed by care work and their work as postdocs. They also report

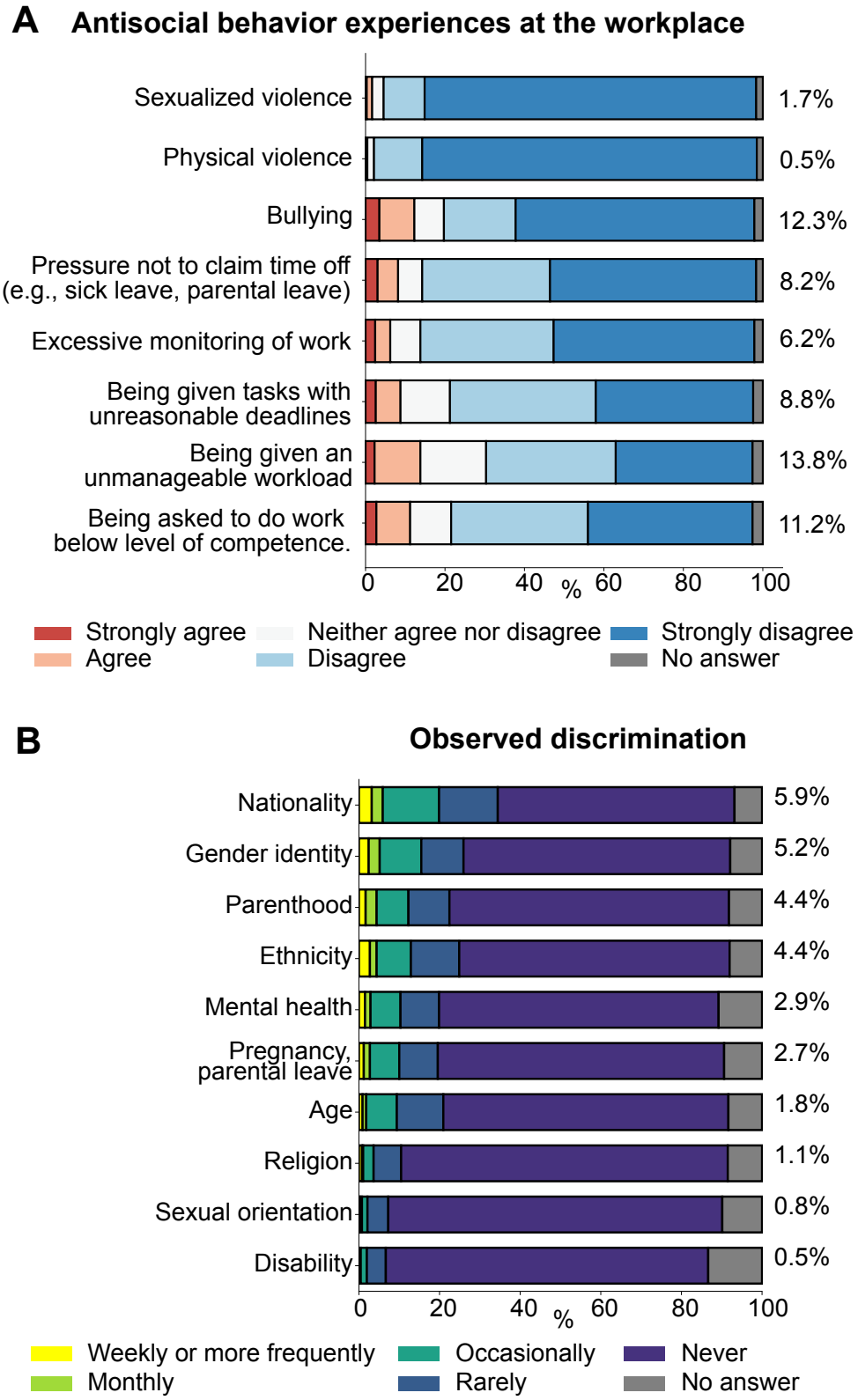

Figure D.8: A) The answers of survey respondents to questions regarding workplace experiences, with stacked bar charts showing the percentage of each answer. The total percentages of agreement with each question shown to the right include both Agree and Strongly agree answers. B) Answers of survey respondents to the question "During the last 12 months, how often have you observed a situation in your work environment in which one or more individuals were treated differently and/or with contempt/condescension because of the following characteristics?"

more personal conflicts (e.g. with their partner) and are most socially isolated. They also felt least supported during the COVID-19 pandemic and were less likely to have their contract/fellowship extended during this time (see Section 7). Below are some paraphrased quotes from postdocs who are parents regarding their situation at the MPG.

"As a part-time postdoc and mother of three school-age children, I'm now suffering from severe burnout from an excessive workload and poor performance."

"I must admit that I am horrified by the (non-) support that mothers (and fathers) at my institute receive — which, to be quite honest, is none. How can the MPG claim to care about families etc., when not a single institute offers childcare services that are appropriate for scientific work? Why is it that whenever these issues are raised, inaction is always justified?"

"I took a lengthy maternity leave in order to be able to return under a different director because my previous one treated me horribly while I was pregnant. This was unquestionably the best decision for me. Despite having considerably less time, I am really doing a lot more, now that I don't feel so pressurized and watched."

"More technical assistance during maternity leave would be wonderful. Although it is prohibited to work while pregnant, lab work is still anticipated and necessary for projects, but there are no technical assistants available who have the necessary time. Although support is formally granted, it largely has little effect because the assistants' already heavy duty is just increased."

Answers to the question: What is the most stressful thing in your life right now?

"Future career development: I have several work offers, but moving there would be problematic because of the kids (custody concerns, money issues, etc.). Life as a single mother postdoc at MPG: After all the school closures and other hardships we had to suffer, there is absolutely no help accessible here, which is tough to bear."

"Being pregnant while trying to write grants and coordinate research at the same time"

"To be a good scientist and mother at the same time."

7 COVID-19

This section investigates the COVID-19 pandemic's influence on MPG postdocs' research and personal lives, including their satisfaction with the implemented measures by the MPG.

7.1 Main Findings

1. The COVID-19 pandemic impaired the working conditions of MPG postdocs, as they had no access to laboratory facilities or archives and reduced capacity to work due to caring responsibilities and illness.
2. Postdocs were worried about the well-being of family or other loved ones, and were often separated from them. They felt they have more to do than they can handle and had sleep problems.
3. Most postdocs felt supported from their institute and their supervisor.
4. Following the pandemic, postdocs are mostly concerned about coming to the end of their contract or fellowship, and about reduced funding possibilities in the future.
5. Postdocs suggested mainly two measures to help them in the aftermath of the pandemic: contract extensions and the possibility to work remotely.

7.2 Impact on working conditions

The work of 79% of postdocs was affected in some form due to COVID-19 (Fig. E.1). Most postdocs (76%) had to postpone or cancel important meetings or conferences. About 20% of postdocs had their employment contract or fellowship extended during the pandemic, but about 12% of postdocs ended their contract or fellowship.[2] While 26% of postdocs in the HS section and 21% in the BM section received an extension, only 14% of postdocs in the CPT section had their employment extended.

The work and productivity of postdocs was further impaired by COVID lockdowns. More than 38% of the postdocs had no access to laboratory facilities or archives (the HS section was most affected), and 46% of postdocs could not access their institute or other facilities important to their research. About 30% of postdocs had reduced capacity to work

[2] The true percentage may be higher since we did not reach some postdocs whose employment at MPG ended by the time the survey was carried out.

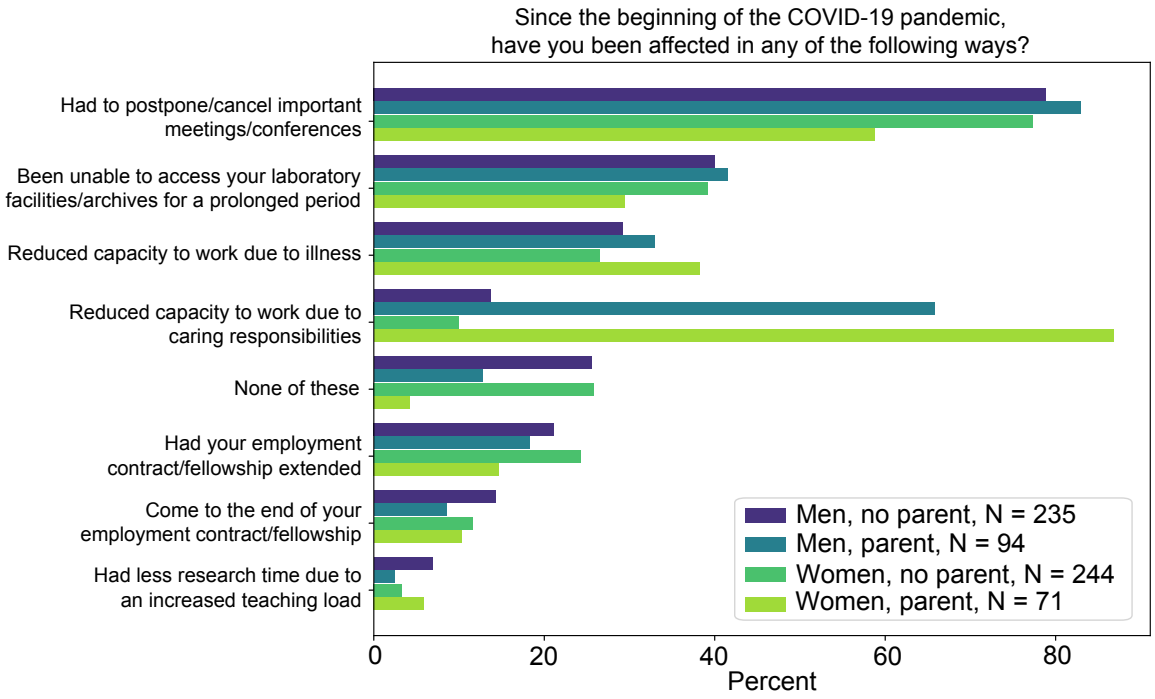

Figure E.1: Answers to the question "Since the beginning of the COVID-19 pandemic, have you been affected in any of the following ways?" stratified by gender and parental status. Note that multiple responses were possible.

due to caring responsibilities (35% in BM section, but only 24% in CPT section), and 30% had to reduce their work due to illness. For 5% of postdocs, the pandemic increased their teaching load, leaving them less time for research.[3]

7.3 Caring responsibilities

We find that 66% of male postdocs with children and 87% of female postdocs with children had a reduced capacity to work due to caring responsibilities. Surprisingly, these postdocs were also less likely to have their contract/fellowship extended, as 59% of parents were granted an extension if requested, whereas 80% of non-parents were granted an extension if requested.

To get a more detailed picture of how postdocs spent their time off work, we further asked how many hours per day they used for housework and for caring for others (Fig. E.2). First, all postdocs spent a median of 2 hours per day on housework (including cooking, cleaning, grocery shopping) and there were no significant differences between genders. Out of

[3] Teaching is usually not mandatory for postdocs at the MPG and is less common than at universities.

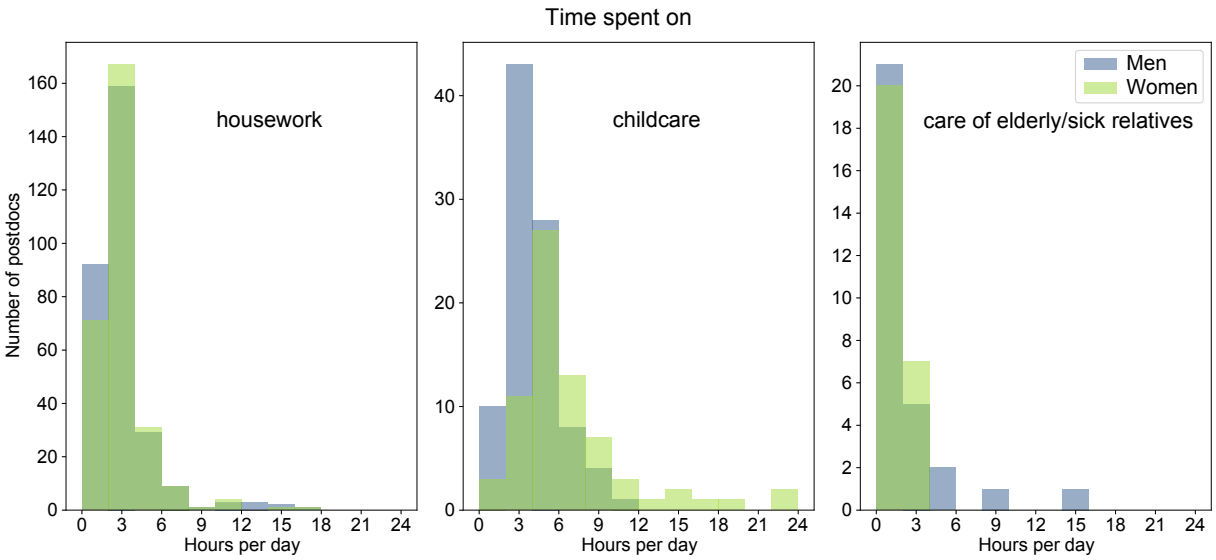

Figure E.2: The time spent for housework (left), childcare (center) and care of elderly or sick relatives (right) in hours per day, shown for male (blue) and female (green) postdocs. People responding "0 hours" were excluded from the analyses.

the 27% of postdocs who have children, the median time spent for childcare was 4 hours per day. About 9% of postdocs spent time providing care for sick or elderly relatives, the median time of which is about 1 hour per day. While we did not find significant gender differences for elder care, we observed that female postdocs spent significantly more time caring for children than male postdocs.

These numbers show the extent of care work postdocs are faced with in addition to their research work. However, this survey was conducted in 2022, when COVID-19 measures were already more lenient compared with the beginning of the pandemic. Consequently, we expect overall numbers in care work to have been even higher during 2020/21, due to the effects of the pandemic (e.g. lockdowns, closed schools and daycares, more sick days for themselves or children). Others have also argued that these effects will have lasting negative consequences especially for the careers of mothers in science (Torres et al. 2023). Due to the large gender disparity, special attention and ways to compensate researchers with caring responsibilities is needed beyond the end of pandemic regulations.

7.4 Worries and concerns caused by the COVID-19 pandemic

The COVID-19 pandemic caused worries and concerns for postdocs in many ways (Fig. E.3). The biggest stressor during this time was about the well-being of family or other loved-ones (at least often for 51%, at least sometimes for 83%) and being separated from

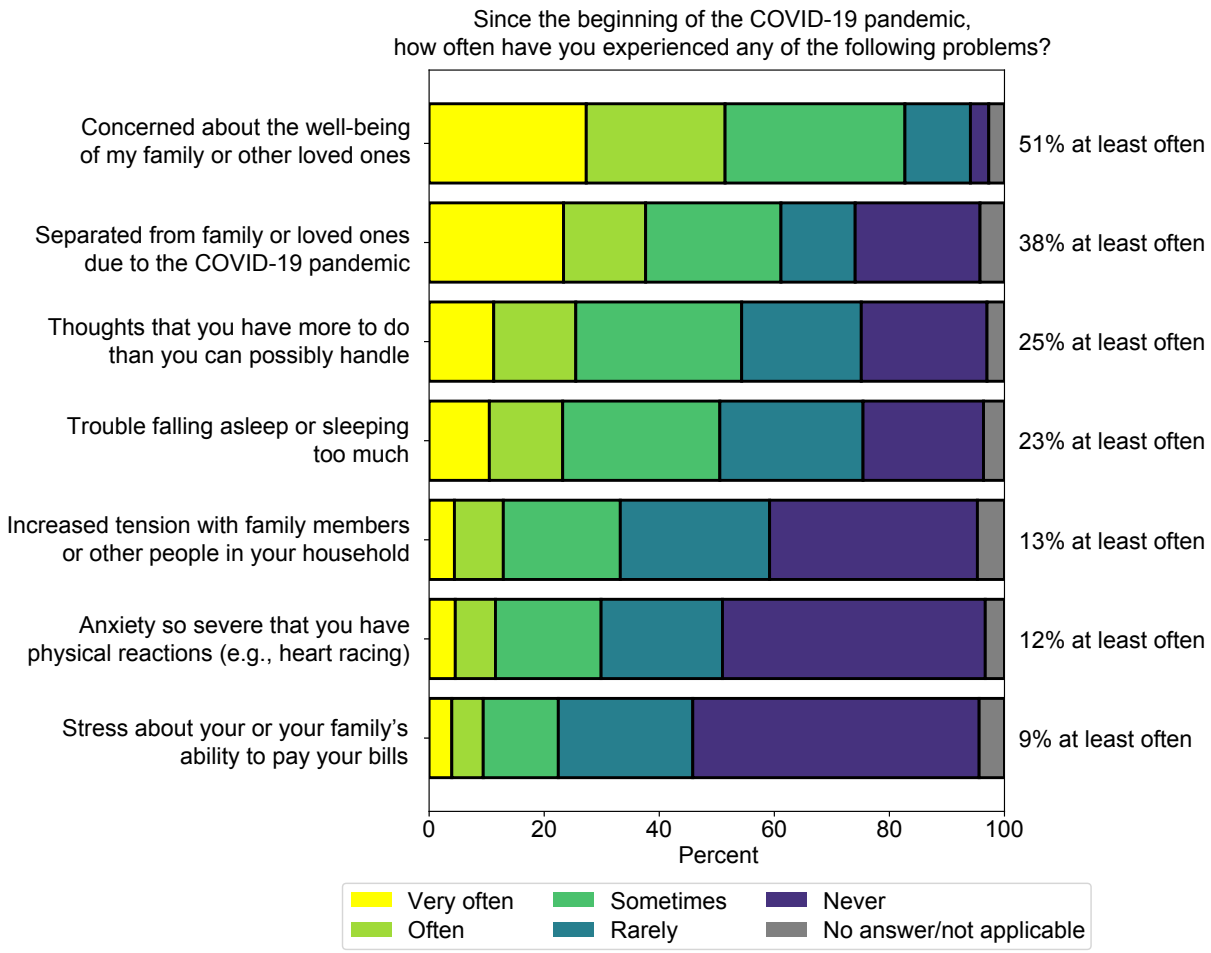

Figure E.3: How often postdocs experienced certain problems during the COVID-19 pandemic. The right-hand percentage is total respondents who selected "Very often" or "Often".

them (at least often for 38%, at least sometimes for 61%), though this affected disproportionately non-German postdocs. About 1 in 4 postdocs felt that they often had more to do than they can handle or had sleep problems. The pandemic caused severe anxiety for 30% of postdocs, increased tension with family members or other people in the household for 33% of postdocs, and stress about their family's ability to pay their bills for 23% of postdocs. Financial stressors were more often stressful for non-German postdocs, in particular for postdocs from outside of the EU/EEA (Fig. S.5). Postdocs who felt stressed by their financial situation also had most often severe physical reactions caused by anxiety, indicating great perceived distress.

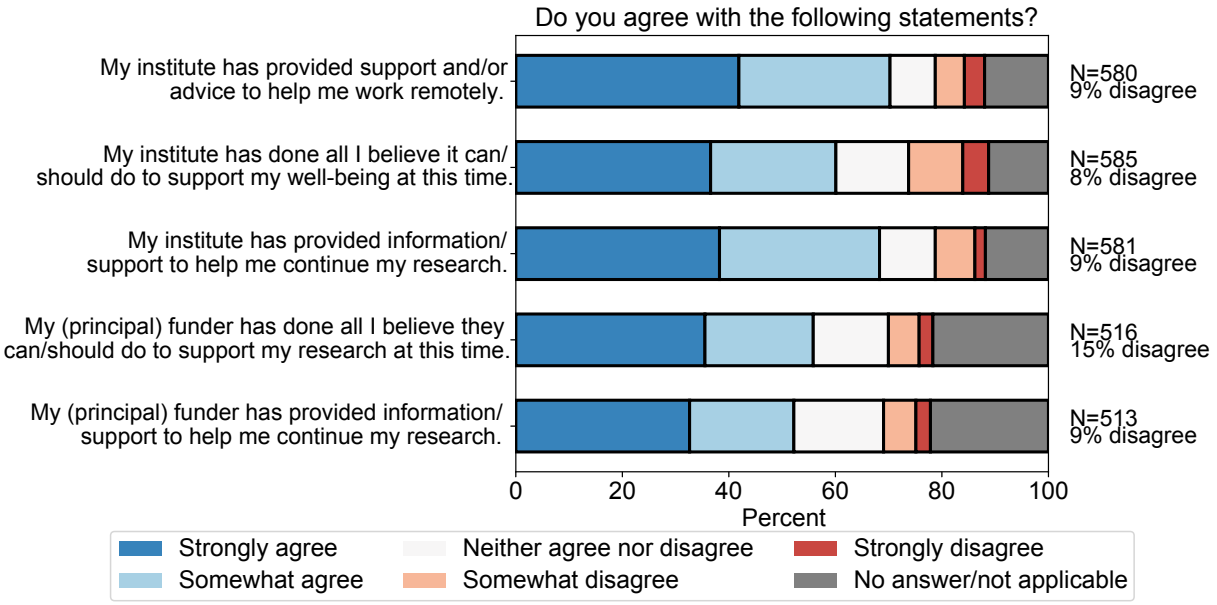

Figure E.4: Summary of support measures taken by the postdocs' institutes and (principal) funder during the COVID-19 pandemic. Note that not all postdocs have a principal investigator (PI) and answered "not applicable" to questions related to their PI.

7.5 Support from MPG

We investigated how postdocs felt their institutes and advisors supported them through the COVID-19 pandemic. Most postdocs experienced support to work remotely from their institute, though 9% did not (Fig. E.4). Overall, most postdocs feel they received support from their institutes (68% on information, 60% on well-being) and from their (principal) funder (56% and 52%). More than 8% of participants felt that their (principal) funder did not support them as much as they can/should have or failed to provide information/support to help the postdocs to continue their research.

Among the respondents, 15% felt their institutes did not support their well-being during the pandemic. In all questions, female postdocs reported twice as often that they felt not supported than male postdocs. Also, postdocs with children were twice as likely not to feel supported by their supervisors than postdocs without children.

7.6 Concerns about the future

We asked postdocs to what extent they are concerned about the future when the COVID-19 pandemic ends (Fig. E.5). Most postdocs expressed their concerns (significantly or to some extent) about their contract/fellowship coming to an end (63%), not having a

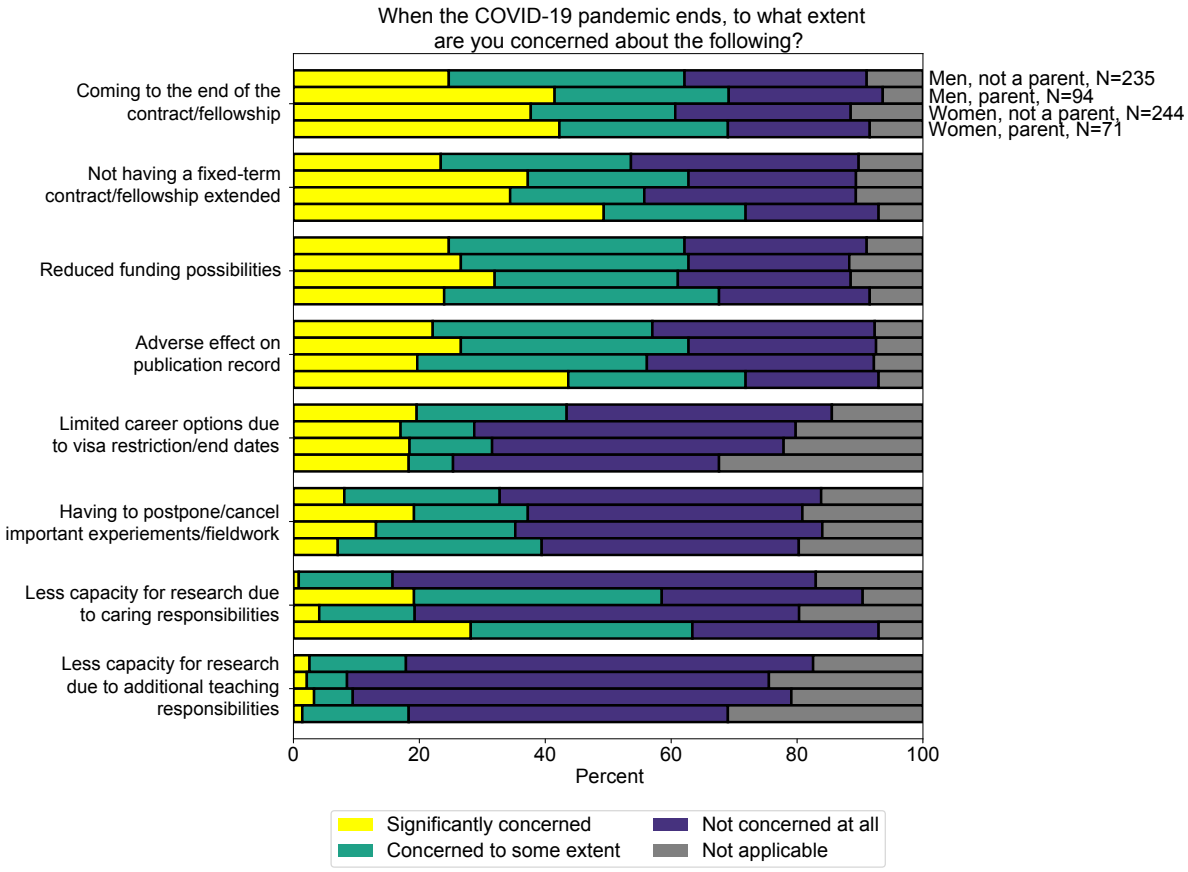

Figure E.5: How concerned postdocs are with certain issues following the end of the pandemic, stratified by gender and parental status.

fixed-term contract extended (58%), and adverse effects on their publication records (60%). These concerns are even higher among parents, both female (69%, 72%, and 72%) and male (69%, 63%, 63%). About 59% of male parents and 63% of female parents responded that they are concerned about reduced capacity for research due to caring responsibilities, compared with 16% of male non-parents and 19% female non-parents. Overall, postdocs were also concerned (significantly or to some extent) about reduced funding possibilities (62%), having to postpone/cancel important experiments/fieldwork (35%), and less capacity for research due to additional teaching responsibilities (13%). Limited career options due to visa restrictions/end dates is a concern for a large number of postdocs from Asia (58%) or other countries outside the EU/EEA (47%), while only 19% of German and 15% of EU postdocs are concerned about this issue.

Several postdocs (14%) answered our open question “What has already helped and what would be helpful in the future for your postdoctoral research work, and/or you personally to avoid backsliding due to the pandemic?” There were several recurring suggestions, the most common being contract/fellowship extensions (23 responses), remote work and

flexible working conditions (23), acknowledgement of the impact of the pandemic in future applications, e.g. by extending the eligibility for early career grants (12), and support for parents who had increased childcare responsibilities (11) (see Fig. E.6).

Figure E.6: A word cloud of the responses to the question: "What has already helped and what would be helpful in the future for your postdoctoral research work, and/or you personally to avoid backsliding due to the pandemic?" The more often a word occurred, the larger the font size appears in the figure. See Methods Section.

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Appendices

A Methods

A.1 Working Conditions

The information about the contracts TVöD are extracted from the Offentlicher-Dienst website. We excluded respondents that did not know their contractual relation with the MPG from the stratification analyses. We do not present percentages in the Stipend section due to the low number of respondents. However, we believe that the count data should be shown to describe the situation of stipend holders.

A.2 Mental Health Screeners

We aligned our mental health section to the Emotional Health construct (Salsman et al. 2013). Based on the research underlying this construct, domains like negative affect (depression, anxiety) and happiness are not two opposite poles but can rather be interpreted as two unipolar axes that span a multidimensional space, along with other domains such as stress and social support.

We used two common clinical screeners for depressive symptoms and anxiety symptoms that are also often used in epidemiological studies. For depressive symptoms, we used the Patient Health Questionnaire with 8 questions (PHQ-8) and for anxiety we used the questionnaire for Generalized Anxiety Disorder (GAD-7).

A.3 Word clouds

Free text data was analyzed by depicting in a word cloud the more frequent terms. For this analysis, more than 50 answers were required. The word cloud was obtained with the *Wordcloud* Python package. The text was processed by eliminating the special signs and eliminating all the capitalization in each word. A set of stopwords was defined to eliminate words which did not add much meaning to a sentence. They can safely be ignored without sacrificing the meaning of the sentence. For example, words like *the*, *she*, *have*, etc. Subsequently, the cleaned text was used to obtain the word clouds.

B Supplementary Figures

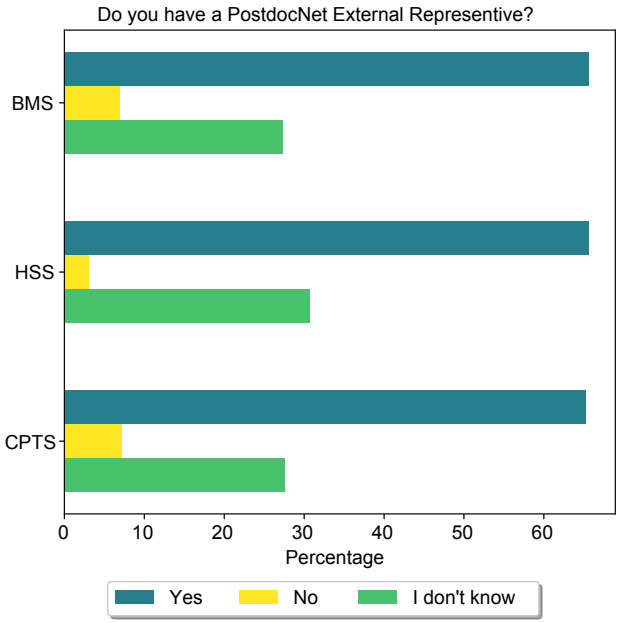

Figure S.1: Percentage of postdocs who know if they have a PostdocNet External Representative, stratified by section.

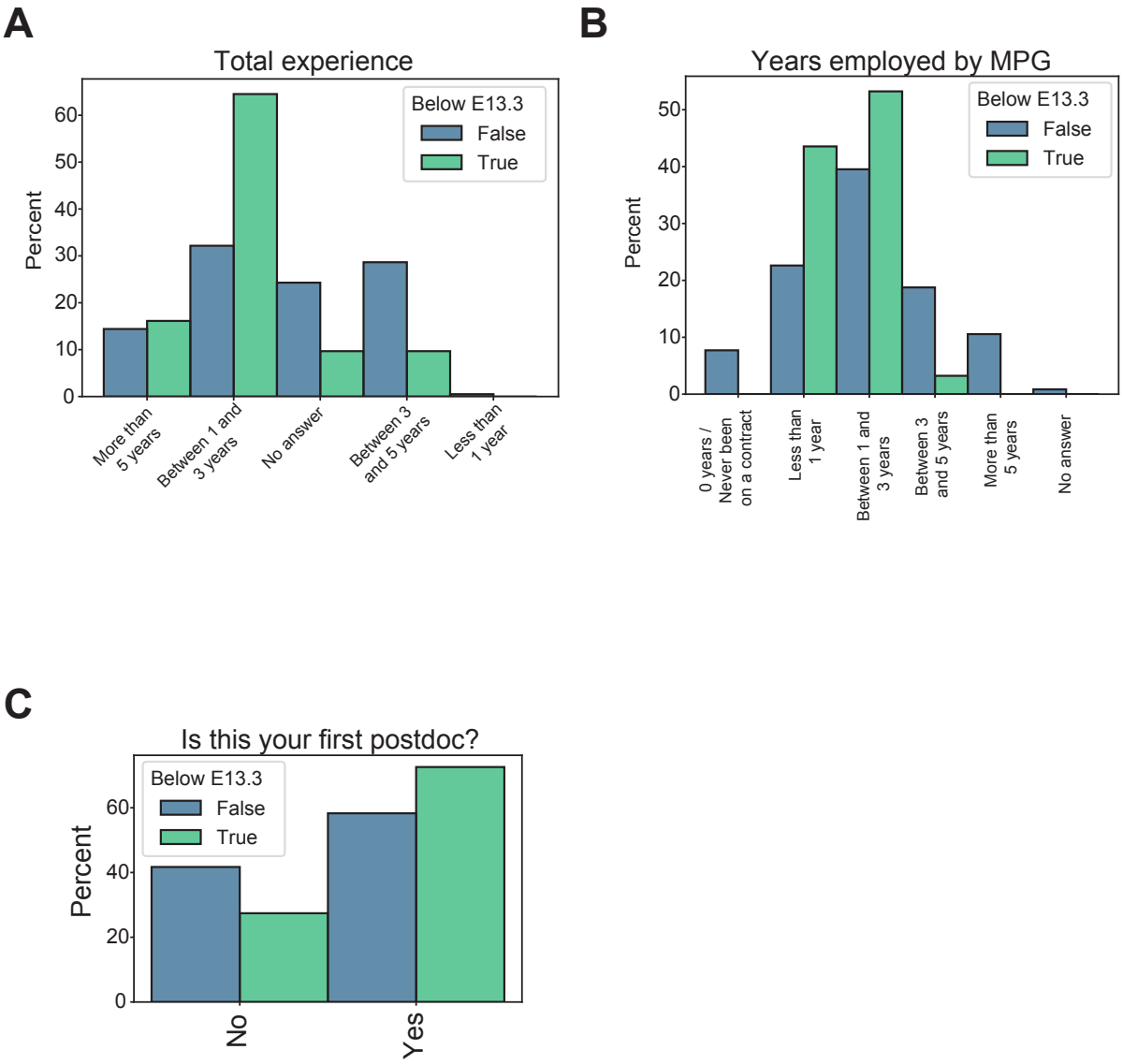

Figure S.2: Previous work experience of contract holders below E13.3 and not below E13.3 A) Total work experience, B) Number of years employed by the MPG, C) First-time postdocs versus postdocs that already have previous postdoc experience

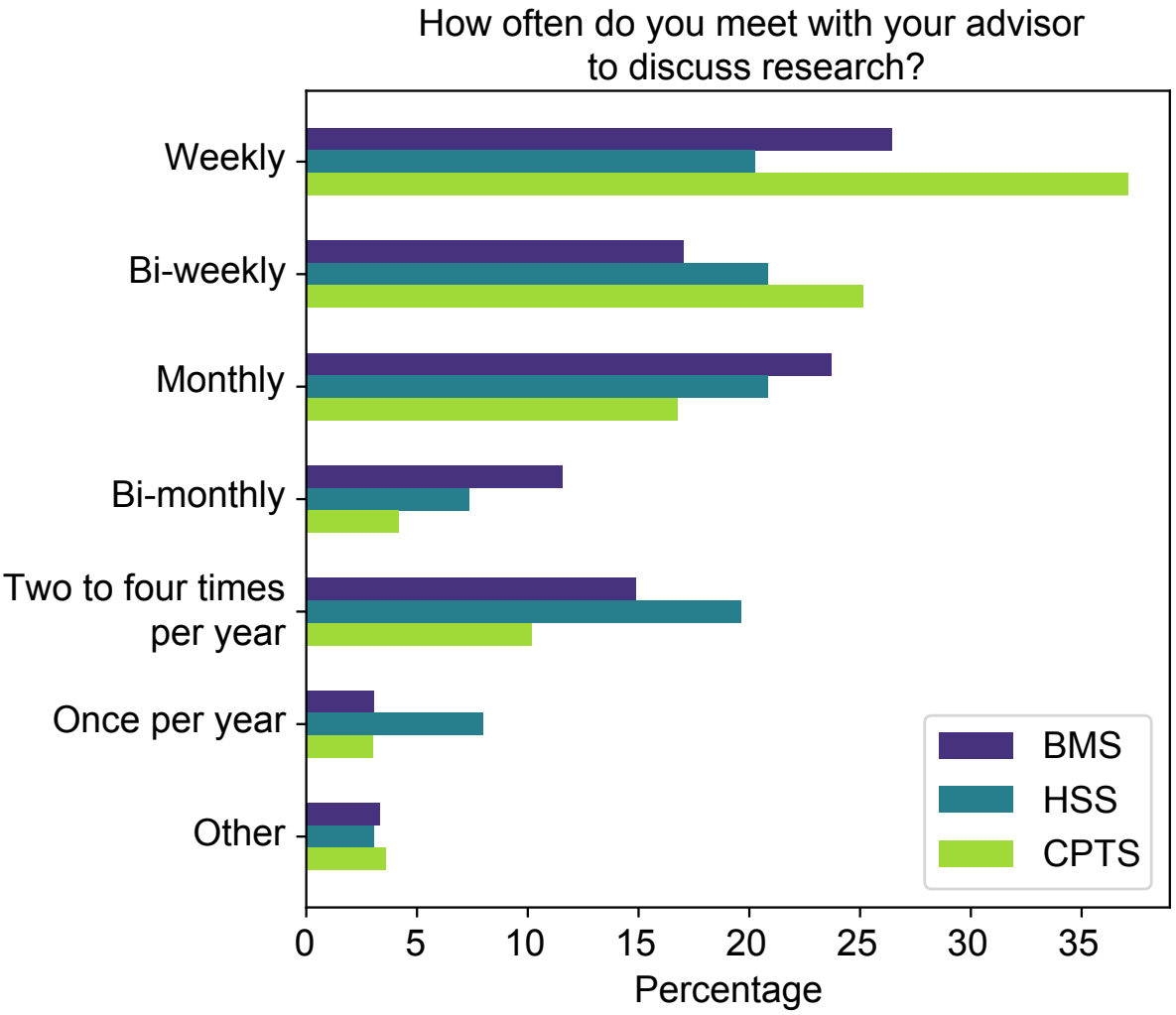

Figure S.3: How often postdocs meet with their advisors regarding research, stratified by section.

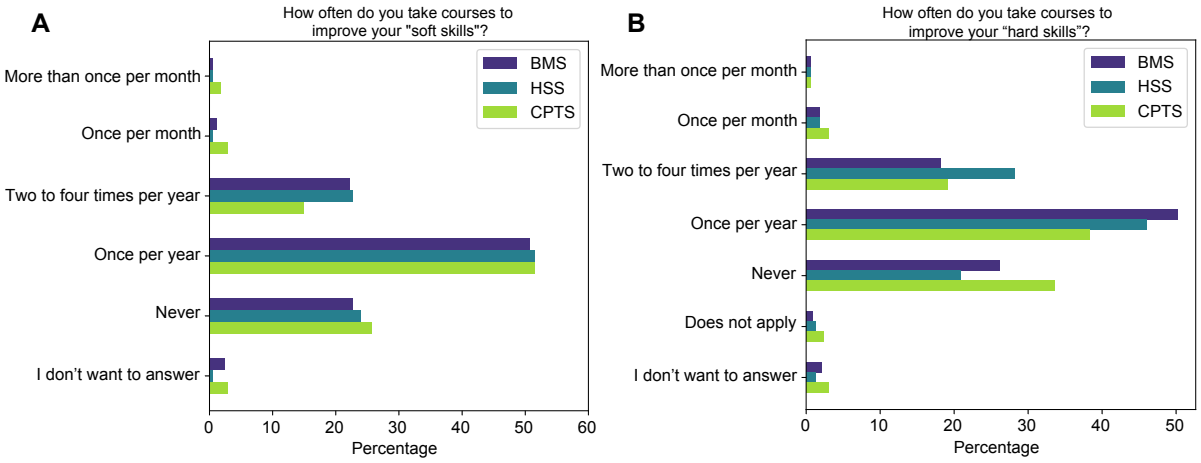

Figure S.4: How frequently postdocs take courses or participate in workshops on A) "soft skills" and B) "hard skills". "Soft skills" are defined as courses/workshops related to someone's personal development, whereas "hard skills" are defined as courses such as data analysis, programming, use of certain set-ups, devices, application of experimental protocols, etc.

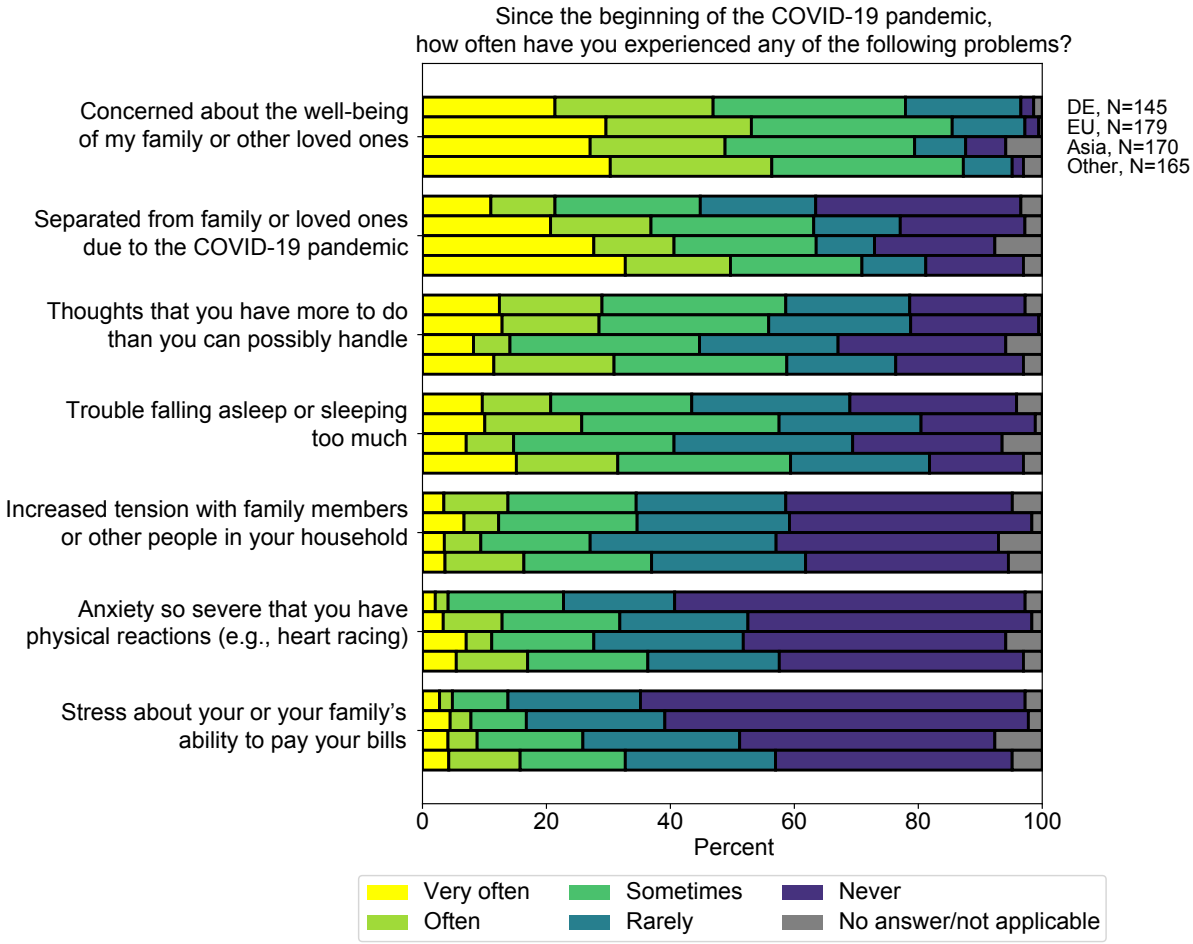

Figure S.5: How often postdocs experienced certain problems during the COVID-19 pandemic stratified by nationality.

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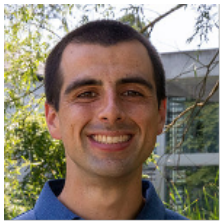

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