

Postdoctoral researchers' perspectives on human resources development

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Abstract

Postdoctoral researchers are responsible for carrying out most of the research work in universities and research institutions, and they play a vital role in advancing knowledge and innovation. Yet, initiatives such as #IchbinHanna have brought something else to everybody's attention: postdocs are in crisis. Despite their importance, postdoctoral researchers often face challenging working conditions, such as limited job security, lack of career prospects, and a high burden on their well-being. In the following, we show survey data from postdocs of the Max Planck Society (Max-Planck-Gesellschaft, MPG) that highlight how these working conditions affect all aspects of a postdoc's life and harm both researchers and research. Finally, we point to future directions on how these conditions need to be considered in human resources to facilitate sustainable career development. We argue that in this way, German academia can continue to attract and retain talented postdoctoral researchers, contributing to research and innovation in various fields.

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1 The importance of postdoctoral researchers

Postdocs are highly skilled and educated individuals who have completed their doctoral studies and are seeking further research experience. Postdoctoral researchers are responsible for conducting experiments, analyzing data, teaching, and publishing research papers. They are involved in writing grant proposals and presenting their research findings at conferences and seminars. They also mentor graduate students and contribute to their training and development. Postdocs often work long hours, including weekends and evenings, to complete their research projects. This is because postdocs are essential for the success of research projects, and they are often the main drivers of research progress. They bring fresh ideas and perspectives

to the research team, and they have the skills and knowledge necessary to conduct complex experiments and analyses independently.

However, despite their essential contributions to the academic system, postdocs often face precarious working conditions, where they are saddled with short-term contracts, limited job security, high mobility requirements, and low pay. In addition, gender and diversity biases, competitive and abusive work environments, as well as work-life balance challenges hinder their professional and personal development.

To understand the issues at play across German academia and academia as a whole, we present data from the 2022 Max Planck PostdocNet Survey, one of the few datasets from Germany focusing on the postdoc phase (Russell et al., 2023). The Max Planck PostdocNet brings together all postdoctoral researchers across the 85 Max Planck Institutes throughout Germany and abroad, and the survey was completed by over 650 MPG postdoctoral researchers on a variety of topics such as demographic data, working conditions, career development, and mental health.

In the following, we use this data as a case study to highlight how these working conditions can create significant stress and uncertainty for postdoctoral researchers, making it difficult for them to focus on their research and professional development. As well, we highlight how institutions can remedy these maladies to ensure postdoctoral researchers are treated with fairness and equity while supporting them in their career development.

2 Postdocs are a diverse group of employees

Diversity is a key feature of the Max Planck Society, bringing in the best researchers across the world, regardless of age, gender, nationality, and circumstance. This diversity is clear when looking at postdoctoral researchers. The average age of an MPG postdoc is 35 years, and 49% of postdocs identify as male, 47% identify as female, and 4% identify as another gender or did not answer the question (Fig. 1a). Internationality is a predominant feature of the MPG postdocs with 75% coming from outside of Germany and 50% of postdocs coming from outside of the EU (Fig. 1b). This is very different from other research institutions in Germany: for instance, the Leibniz Institutes report that only around 20% of postdocs come from outside of Germany (Fiedler et al., 2022).

In many cases, the postdoctoral phase is also the time of starting a family and providing care work for others. In our survey, 27% of MPG postdocs are parents (Fig. 1c). The majority of parents in our sample are German men, which could indicate that it is more difficult to reconcile work and family for women in academia and when job mobility is required. Interestingly, 43% of postdocs report having caring responsibilities, including child care and family care, which demonstrates that nearly every second postdoc provides some form of care work in addition to their postdoctoral research work.

Through this demographic data, we can already hone in on several important topics to consider. Due to the internationality of many MPG postdocs, many have little to no German language skills and may also be unaware of the various hierarchical and bureaucratic policies and regulations relating to administrative structures, leadership, and immigration. To learn all of these things while at the same time moving to a new country and performing high-level

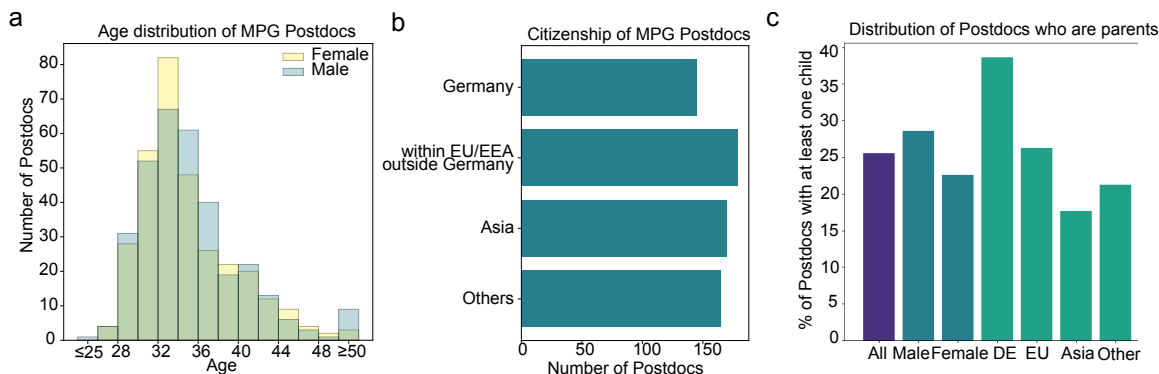


Figure 1: Key demographics of Max Planck Society (MPG) postdocs who participated in the Max Planck PostdocNet Survey 2022. a) Age and gender distribution across all postdocs in the MPG (note that to ensure anonymity, we excluded other gender identities due to low response rates), b) Distribution of postdocs across place of origin. We observed that place of origin was almost equally divided into four clusters with similar sample sizes: Germany (DE, $N = 145$), EU ($N = 179$), Asia ($N = 170$), and Other ($N = 165$), c) Percentage of postdocs who are also parents, stratified by gender and place of origin. Figure adapted from Max Planck PostdocNet Survey Report 2022 (Russell et al., 2023).

research can be a monumental and stress-inducing task. As well, because postdocs often must move far distances to complete their postdoctoral research, many must make incredibly difficult decisions about if they want to start a family or move their family.

Therefore, it is imperative that the MPG and other institutes construct robust international offices and parental policies to ensure smoother and less stressful transitions between Germany and the MPG. These offices should be established at an institutional level to make sure individual postdocs get the information and aid they need, which highly depend on the city/state the institute resides in and how long each postdoc will stay at the institute.

This discussion brings up a key point regarding the MPG’s Harnack Principle, which gives free rein to the directors at each institute to organize and run their departments. While this has proven to be an extremely effective tool for creating institutes, revolutionizing research, and making each institute incredibly unique, this can foster some uncomfortable heterogeneities when it comes to postdoctoral experiences. As we will see in the coming sections, the quality of mentoring and support, career development, and mental health can vary strongly between institutes.

3 Career aspirations and mentoring programs

Postdoctoral researchers are in a transient part of their lives, bridging the gap between their successfully defended Ph.D. and a more permanent part of their career. Therefore, it is imperative that these researchers gain adequate mentoring and career development training for the job that they aspire to.

When asked about these career aspirations, we find that about 75% of MPG postdocs would

like to work as a group leader or staff scientist in academia, whereas only about 50% would like a job in industry. Even though many postdocs would like to stay in academia, previous studies predict that only about 20% of postdocs will find a tenured position (Denton et al., 2022). Therefore, about two-thirds of the postdocs who say they would like to continue working in academia will eventually not find a suitable position. This garners an unremitting competitive atmosphere, and many postdocs become disillusioned with the promise of a position in academia, which contributes to the stress burden described above. Postdocs are often left to believe that they have to push themselves for longer working hours to attain a tenured position.

To get these tenured positions, a postdoc’s immediate supervisor is crucial for obtaining a tenured position, as they promote the postdoc’s career development, connect them to their research network, oversee the research, and usually write recommendation letters for the postdoc’s grant and job applications. In one of the genuine highlights of our survey, we find that many postdocs are satisfied with their mentor, with many expressing that their mentor is positive, shows care and compassion, listens, and explains things clearly. As well, 75% of postdocs would recommend doing a postdoc at the MPG (Russell et al., 2023).

Lastly, the MPG constructed the Guidelines for the Postdoc Stage in the Max Planck Society (Postdoc Guidelines), aimed at fostering a sustainable mentoring program to direct postdocs toward finding a route for employment in the future. The three pillars of this mentoring program are the mutual agreement, annual reviews, and a status review after 4 years. While these guidelines have good intentions, there is no accountability mechanism for these pillars, resulting in only about a third of postdocs completing these mentoring steps. As well, a third of postdocs do not even know what the Postdoc Guidelines are, a majority of which come from outside of the European Union. However, we note that postdocs want the guidelines to be mandatory, as over 70% of surveyed postdocs feel that mandating these mentoring processes would be beneficial to their career development.

Overall, there must be a shift in the total amount of jobs in academia, including more positions at the staff-scientist level. However, we must pursue a more comprehensive, accountable, individually-tailored mentoring program for postdocs so that their postdoctoral phase can be a rewarding space for research and career development. This can be fostered by the inclusion of postdoctoral coordinators at each institute, or by identifying someone at the institutional or sectional level who tracks and monitors the development and adherence of the mentoring programs.

4 Working conditions

In Germany, most of the positions (92%, (wissenschaftlicher Nachwuchs, 2021)) in academia are fixed-term employment, enabled by the *Wissenschaftszeitvertragsgesetz* (WissZeitVG). MPG Postdocs are usually funded either through contracts, which are typically short-term, or through stipends and fellowships that often lack social benefits. While contract holders receive social benefits such as government-mandated health care, unemployment insurance, and pension schemes, all stipend holders and most fellowship holders are not guaranteed these entitlements. To not fall short on these social securities, many fellowship- and stipend-holders pay out of pocket for them, although in most cases they earn less than postdocs with a contract, which adds to their

financial stress.

A major concern comes with the incentives for applying for fellowships and stipends. Many postdocs are forced or feel forced into taking fellowships or stipends because a) their advisors refuse to pay them any other way or b) the prestige of the fellowship alludes to an advantage that may help them obtain a research position further in their career. When stratifying the respondents of the 2022 PostdocNet survey by their demographic characteristics, we find an overrepresentation of non-German postdocs among both stipend and fellowship holders compared to German postdocs (Russell et al., 2023). While this can partly be attributed to the fact that certain fellowships are only open to researchers from outside of Germany, 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 foreign postdocs.

The majority of the MPG postdocs in our survey, however, are funded through a chain of short-term contracts (85% with 1-3 years contract duration), some of whom have been on such short contracts for more than 3 years (26%). This is antithetical to the Postdoc Guidelines of the MPG, which state that a postdoc's contract length should be directly tied to the length of the research project, usually constructed during a postdoc's mutual agreement meeting with their advisor prior to starting their postdoc. It is no surprise then that over 80% of postdocs feel that financial stability and job stability/security play a crucial role in choosing their next job position, regardless of the sector they want to work in.

Contrary to the claim that a high turnover in academic institutions enables innovation and productivity, there is evidence that precarious working conditions promote bad scientific practices and hinder scientific advances (Bradler and Roller, 2023; Rahal et al., 2023). Caused by the shortness of contracts and the high pressure to produce scientific output, early-career researchers cannot realize thorough, long-term research projects and are more drawn to short-sighted, low-risk research projects to secure the next contract extension. As well, this usually promotes rapid turnover in research groups, leaving the research group with a lack of continuity and transfer of knowledge. Under these conditions, research projects often take longer than planned or get discontinued altogether, which wastes public resources and hinders the research process.

For the postdoc, the short-term employment leaves them scrambling to find another position quickly. A common practice of advisors is to give short-term extensions to postdocs towards the end of a contract, but many times, the postdoc is left in suspense about the requirements for obtaining an extension. Consequently, this can lead to a very high-stress situation and a problematic power dynamic with the supervisor, as, for example, German residency permits are tied to a contract. As one postdoc commented in the survey: “[My supervisor] intentionally promoted uncertainty about whether extensions are possible. In [their] opinion, this motivates researchers. For me, it resulted in increased stress that led to depression.”

Human resources departments should thus create good working conditions that enable and support high-quality science which is necessary for the success of early career researchers. This can include ensuring that contract durations are aligned with the scope of the research projects, offering broader career perspectives within and outside of academia, and going as far as advocating in front of political decision-makers for more permanent scientific positions to create long-term perspectives for postdocs, as well as to manage workload and enable fluctuation of the workforce across research institutions.

As well, HR departments should work to increase the satisfaction of international postdocs by

providing stipend/fellowship holders with social benefits that are standard for other employees, such as health insurance, paid time off, child care, and retirement benefits. In addition, non-German postdocs need to be thoroughly informed about the differences between contracts and stipends/fellowships before deciding to apply for either option. Finally, external stressors such as residency permits need to be disentangled from nontransparent decision-making processes about contract extensions that also offer the potential to be misused to enforce pressure by the superior.

5 The postdoctoral phase - a mental health crisis

Postdocs' working conditions are innately coupled with a large amount of uncertainty, insecurity, and personal responsibility, which can lead to a high burden of stress. Even before the COVID-19 pandemic began, several studies have shown the worrisome state of mental health for postdocs and doctoral researchers even before the first lockdowns (Majev et al., 2021; Olsthoorn et al., 2020; Yalcin et al., 2023).

Like physical health, mental health should be the top priority for any employer as part of their duty of employee care. Our data show that the situation of postdocs is quite unique in comparison with other academic employee groups, in that they are often faced with the combined burden of demanding working load, caring responsibilities, and the uncertainty of their career prospects. These inherent stressors of the postdoc phase need to be appropriately addressed in measures to maintain mental health and work performance.

We find that 55% of postdocs report at least mild depressive symptoms and 48% have at least mild anxiety (Fig. 2a-b). The problem does not seem trivial, as also more than 1 in 5 postdocs (22%) are moderately to severely depressed, which typically requires medical attention, including psychotherapy and/or medication (Ärztliches Zentrum Für Qualität In Der Medizin (ÄZQ), 2022). Notably, this number is almost three times higher than the prevalence of depression in the German population (Heidemann et al., 2021).

We find that higher workloads correlate with higher depression levels, as approximately one-third of postdocs who work longer than 50 hours per week express moderate to severe depression symptoms (Fig. 2c). This shows that institutes should implement exhaustive measures to prevent burnout and promote a healthy balance between work and leisure time. This could start by incentivizing postdocs to take their holidays and work within the agreed hours or use compensatory time if experiments require longer than usual work days.

Unsurprisingly, we also find that work is the largest stressor for postdocs, with 73% of respondents saying that they are bothered by stress at work. Postdocs who are not employed on a contract exhibit worse mental well-being than the average across all postdocs (Fig. 2d). Postdocs also work very long hours, with over 80% of postdocs reporting that they work more than 40 hours per week, independent of their contractually agreed work hours (39 hours per week in most cases).

While a mental health crisis can affect everyone at any point in their lives, we confirm data showing that women are more affected by depression and anxiety than men, and mothers face the worst situation (Russell et al., 2023). We consistently find that mothers are most unhappy, depressed, anxious, and stressed by care work and their work as postdocs. They also report

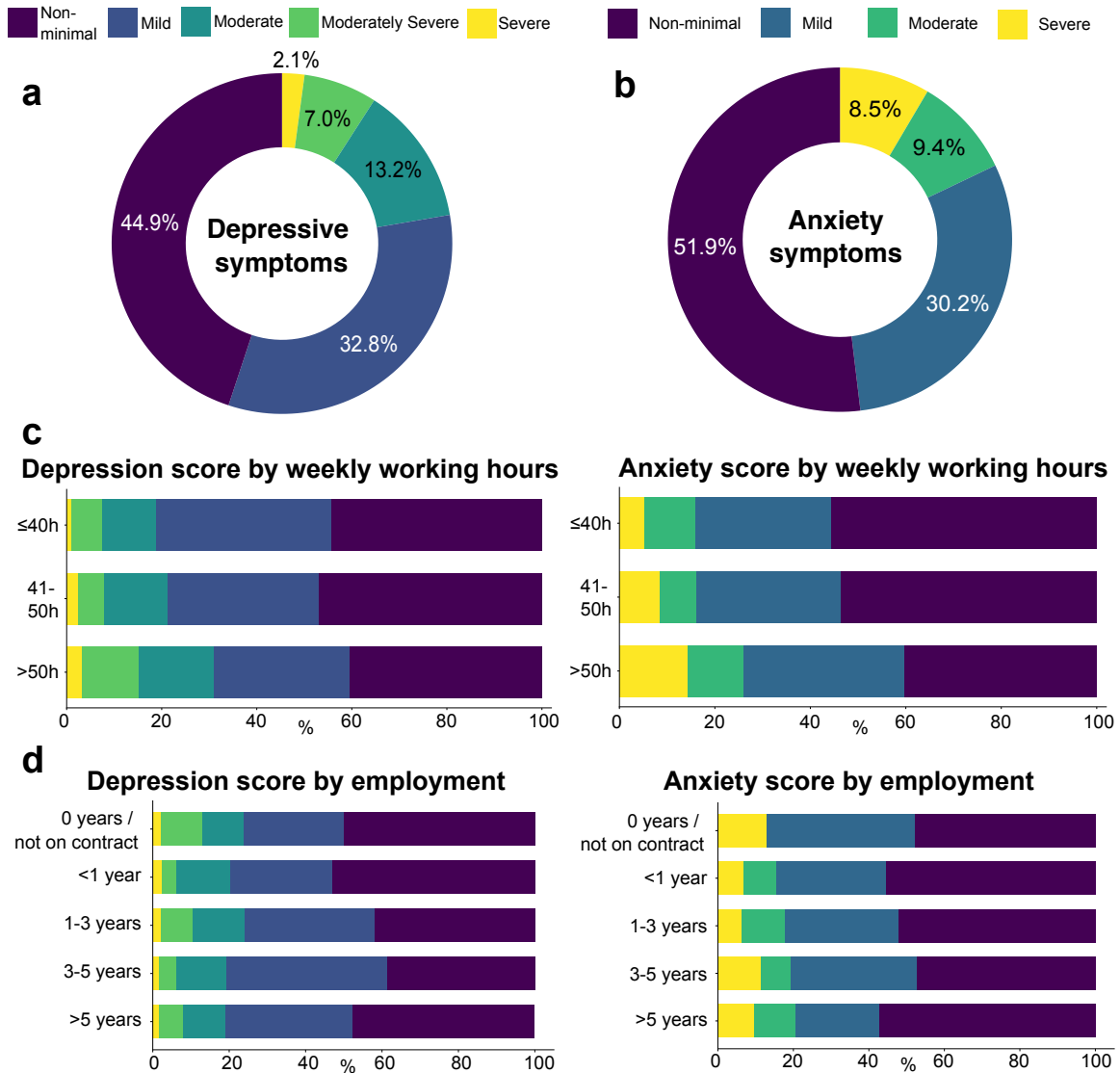


Figure 2: Relationship of a) depressive symptoms measured using the Patient Health Questionnaire (PHQ-8) and b) anxiety symptoms measured using the Generalized Anxiety Disorder screener (GAD-7) with c) reported working hours per week and d) employment situation. Figure adapted from Max Planck PostdocNet Survey Report 2022 (Russell et al., 2023).

more personal conflicts (e.g. with their partner) and participate the least in social events in their leisure time. Mothers also felt least supported during the COVID-19 pandemic and were less likely to have their contract/fellowship extended during this time.

Given the alarming prevalence of mental health problems among academics, HR departments should thus ensure that all postdocs have easy access to health care, mental health support, and other healthcare resources in a language that they are familiar with. In acute mental crises, mental health support has to be tailored to the individual needs of the postdoc, who should be able to access professional psychological counseling services fast and easily to receive the appropriate help. Initiatives like the Mental Health Awareness Week and the Mental Health First Aiders program, which the PostdocNet has co-established at the MPG, are well received among all employee groups at the institutes and aim for a shift in culture regarding the still prevalent stigma of mental illness. In sum, mental health support needs to provide exhaustive preventive measures, tailored case-to-case support, and relief from stressors inherent in academia to be successful.

6 Experiences of antisocial behavior

As much as a good mentor can positively push a postdoc's career, a bad relationship with a mentor can have lasting personal and professional consequences. Unfortunately, power abuse in academia is no exception, and the results of our survey paint a picture of its extent. Following a zero-tolerance strategy for misconduct and power abuse is the basis for creating safe workspaces that reflect beneficially on the work atmosphere, work performance, and the employees' mental health. It is therefore essential that HR departments implement effective policies to prevent and act against all forms of antisocial behaviors, such as bullying, discrimination, and harassment.

In our survey, we find that antisocial behavior at work is prevalent. We find that 30% of postdocs have experienced some form of antisocial behavior in the workplace, including bullying, being pressured, and physical or sexualized violence (Fig. 3a). As well, we find that 12% of postdocs observe discrimination monthly, while 6% of postdocs experience discrimination themselves on a monthly basis (Fig. 3b). The most common reasons for discrimination are for their nationality/ethnicity, gender identity, and parental status. Unsurprisingly, we also find that people who have experienced antisocial behaviors at work have significantly higher depression and anxiety scores. Women are 2.4 times more likely to have experienced antisocial behavior than men.

While we did not acquire data on reporting of antisocial behavior, from the comments that respondents left on the survey, we assume that many postdocs do not actually report any harassment and bullying. There are many reasons why, but there are two main ones inherent in the structures that the academic system creates: 1) they do not want to burn bridges with the perpetrator who might be a substantial part of their research network, especially if this person is their advisor, and 2) they do not know who actually to report it to. The former reason is more common. Advisors control much of a postdoc's life. For instance, their employment situation is directly tied to their immigration status, making it extremely difficult to report their advisor and not face consequences down the line - even if the report has been made anonymously. As stated before, many postdocs will not find jobs in academia, causing a competitive atmosphere. Burning

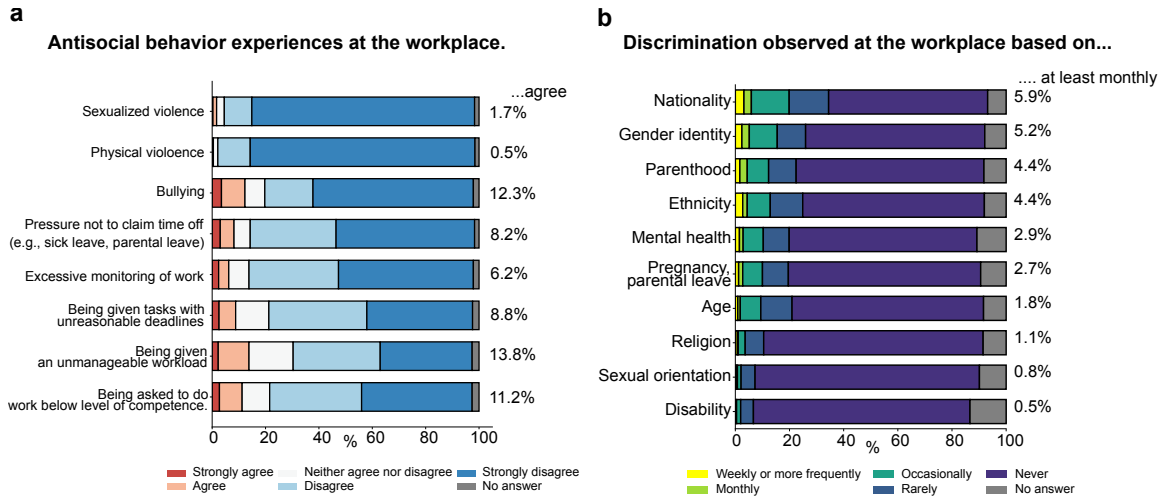


Figure 3: a) Experiences of antisocial behavior at the workplace. Percentage on the right hand side of the plot corresponds to the percentage of respondents who answered either agree or strongly agree. b) Responses to the question “During the last 12 months, how often have you observed a situation in your work environment in which one or more individuals were treated differently and/or with contempt/condescension because of the following characteristics?”. Figure adapted from Max Planck PostdocNet Survey Report 2022 (Russell et al., 2023).

bridges with your advisor would make it also very difficult due to the power of recommendations in obtaining a job. To the second point, many postdocs come from outside of Germany and thus may not know the language or reporting structures, which can be very complex. Therefore, because of these two factors, much of the bullying and discrimination go unreported, and thus, much of the power structures which lead to these behaviors propagate.

To implement such a zero-tolerance policy, we recommend including mandatory training for superiors on respectful workplace conduct and good leadership behavior, as well as a clear process for reporting and investigating incidents that do not neglect the inherent power dynamics in academia. The latter often discourages postdocs from reporting an incident, as they fear retaliation for filing their report. Regular employee surveys and leadership quality reviews could complement these measures to foster a healthy work atmosphere.

7 Conclusion

We have outlined the various factors that impact researchers and the research itself during the postdoc phase. The interconnectedness of these factors highlights the need for human resources development to consider them in an integrated way and at multiple levels of action (political, institutional, individual) to improve the postdoc experience. We highlighted that precarious working conditions, lack of permanent jobs in academia, a competitive academic atmosphere, and unresolved mental health issues manifest unhealthy power dynamics between postdocs and their advisors, causing harm not only to researchers but to research itself.

We recommended several key steps that human resources departments can take to ensure the postdoctoral phase is fruitful for all sides, such as the following:

1. Ensure contract lengths for postdoctoral researchers are aligned with the scope of a realistic research project timeline;
2. Make life less stressful for international researchers by providing basic social benefits such as health insurance and pensions for those on fellowships and stipends;
3. Provide more support to caregivers, such as flexible work schedules, contract extensions, additional funding, and access to eldercare and on-site childcare services;
4. Incentivize postdocs to take their holidays and work within the agreed hours or use compensatory time if experiments require longer than usual work days;
5. Create accountability measures to ensure mentoring programs are adhered to; and,
6. Construct clear processes for reporting and investigating incidents that do not neglect the inherent power dynamics in academia.

To ensure quality science and to facilitate career development the overarching goal must be to move away from a highly uncertain and competitive work culture that has a strong selection bias against researchers from underrepresented groups and perpetuates power dynamics that may result in abuse and misconduct. We see human resource departments and postdoc supervisors as key players in creating inclusive, safe workplaces that act against systematic biases to increase representation and diversity in German academia with the world's most talented researchers.

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