

Appendix

I. ECR discussion – hearing from the participants



Graphic recording of the discussion by Marianna Poppitz.

Discussion structure and pre-conference online survey

During this session, we aimed to hear from the participants about their experience as ECRs in Berlin. We structured the discussion around four main topics, and we asked the participants to share their experiences via an online survey before the conference. The participants who took part in the online survey ranked the topics based on importance and relevance as follows:

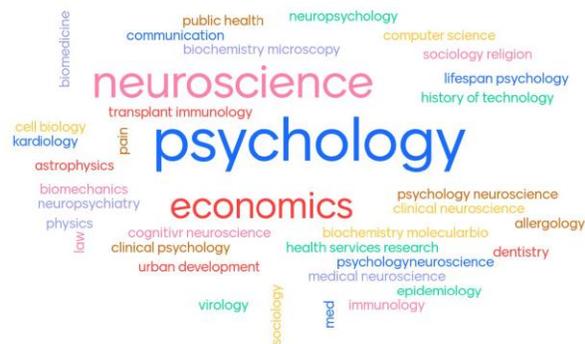
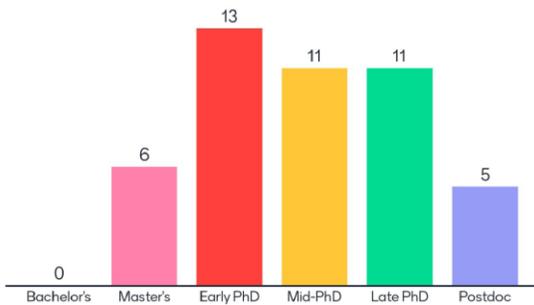
1. Publication pressure for ECRs
2. Supervision for ECRs
3. Metal health challenges in academia
4. PhD training programs and structural challenges

Many participants raised the topic of interdisciplinary research, so we decided to include it in the discussion.

To hear from everyone, we relied during the discussion on live polls via Mentimeter. For each of these topics, we shared some participants' quotes from the pre-conference survey, asked the audience multiple questions via Mentimeter, and offered a space for open discussion. The discussion was captured using visual notetaking by Marianna Poppitz.

Who was our audience?

Around 150 participants attended the conference and around 50 actively took part in the discussion. Most of them were PhD students, and some are master's students or postdocs. The audience's scientific background was very heterogeneous and included many fields such as medicine, biomedicine, physics, and law but neuroscience, economics, and psychology were the most common.



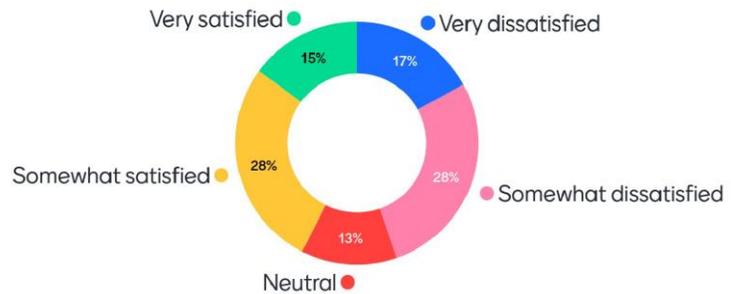
Career stages and scientific fields of the participants.

Publication pressure

75% of the participants are required to publish their work to earn their PhDs. Most participants believe that publication pressure is high, stressful, and harms their PhD experience and scientific work. Many reported that publication pressure forces researchers to produce low-quality science. Under pressure for publishing, scientists might follow shortcuts that compromise quality and enhance publishability, such as p-hacking. During the open discussion, participants asked why universities are shifting from monograph-based dissertations to publication-based dissertations. One participant suggested that universities should ensure sufficient resources for conducting scientific studies with good quality and adequate sample sizes before making publication mandatory. Some indicated that publishing their work during PhD will positively impact their future careers by preparing them better for their next job. In summary, while most of the participants appreciate the value of publishing scientific work, they believe that it should not compromise the quality of their science. 57% of the participants think that publishing should not be a requirement for earning a PhD.

Supervision for ECRs

A satisfying relationship with the supervisor is an essential aspect of a successful and rewarding PhD. We asked the participants how satisfied they are currently with their relationship with supervisors. They were almost equally distributed around the center (figure).



Participants' satisfaction with their relationship with supervisors.

When asked about what they wish from their supervisors, the participants' comments demanded more commitment and involvement from their supervisors. Many feel that their supervisors are difficult to reach and do not have enough time or resources to support their students. Some comments wished for more wholesome supervision, where the supervisor provides career support beyond the limited scope of the PhD project. On the other hand, the participants were grateful for their supervisors when they give students freedom and space, are supportive, do not micromanage, are reachable, and are invested in their team's well-being.

During the open discussion, a student in her late PhD advised earlier students to prioritize supervisors over scientific projects. Another participant wished that students get the chance to know their supervisors more and connect with them beyond their shared scientific work.

Mental health in academia

Compared to the general population, graduate students are six times more likely to experience depression and anxiety ([Evans et al., 2018](#)). 63% of the audience feel that their work has, in general, a negative impact on their mental health.

The main stressors about work were: inadequate supervision, uncertainty about the future, high publication pressure, lack of self- and work-appreciation. In contrast, when asked about what they enjoy about their work, participants pointed to factors such as flexible working hours, learning new skills, the genuine interest in science, and the contribution to scientific knowledge.

In the open discussion, we talked about imposter syndrome in academia, a psychological pattern of self-doubts and inadequacy feelings despite evident success. Other issues were raised around the effect of PhD life on pre-existing mental conditions and the plausibility of starting a family during a PhD.

PhD training programs and structural challenges

Only 35% of the participants are enrolled in a structured PhD program. When asked about the effect of PhD programs on the duration of PhD studies, 44% think that structured programs shorten the duration required to obtain a PhD, while 40% think it does not affect it, and only 16% believe that a structured program prolongs the PhD duration.

When asked about difficulties within PhD programs, participants mentioned challenges with time management and balancing courses requirements and PhD project work. On the contrary, as advantages for structured programs, the participants stressed the benefit of connecting with other students, building

networks, staying updated about conferences and events, and better soft skills development. The audience was divided in half when asked if structured PhD programs should be mandatory.

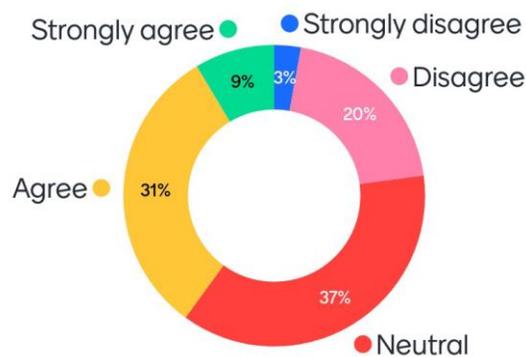
During the open discussion, participants pointed out that universities should offer more structured programs, but doing unstructured PhDs should always be available. Instead, they recommended mandatory courses and learning materials for all students, such as good scientific practice and statistics courses. One student shared her experience that a structured program can guide students through bureaucracy and put them on the right track to start their studies.

Interdisciplinary research

In the pre-conference online survey, many participants showed interest in discussing interdisciplinary research and how to connect with fellow students from other fields of study. 66% of the participants are involved in interdisciplinary projects, while 93% believe that interdisciplinary research is necessary. When asked whether ECRs are not effectively supported to engage in interdisciplinary projects, the opinions varied but shifted toward insufficient support (figure).

During the open discussion, a student pointed out that interdisciplinary projects might be overwhelming, especially when the student is responsible for managing collaboration between two supervisors from two far fields. Another participant added that interdisciplinarity might obscure the scope of scientific projects and render publishing more difficult.

In summary, despite some challenges, the participants highly value interdisciplinary research and wish for more interdisciplinary projects.



Participants' agreement to the statement: "ECRs are not effectively supported in engaging in interdisciplinary research projects."

II. Participants' opinions

We gathered here some of the participants' opinions as they stated in our surveys.

Publication pressure

"After publishing the first paper this year, I looked for a follow-up topic to work on for the next few months. It put a lot of stress on me because I was single-mindedly focused on what kind of topic was the most publishable. Things changed when I started to think about what topic would be helpful for the research community and would benefit my PhD thesis instead. The publication pressure diverts our attention from what really matters to super short term goals that rarely benefit us or the broader community."

"Sometimes you are just unlucky with your project (no output), that's why publishing should not be a requirement. unless the duration of the PhD is prolonged."

"And the ones that are not amazing remain in the file drawer?"

This is a great point. They are necessary too, for all the reasons that have been shared in these two days. but maybe since the chances of publishing these not so great results/ negative findings are low, we are pushing PhD students into a dark corner by enforcing publications on them? And also maybe we as PhD students don't always produce studies that are good enough to publish and that's okay?"

"I think one of the most prevalent problems is publication pressure and that scientists are almost only evaluated on the basis of their publication record. The "rating system" should also take into account different measures, e.g. good teaching, preregistration of studies, open access publishing (could get rise evaluation more than publishing in non-open access journals), sharing code, etc."

Supervision

"As a researcher, I try to work as independently as possible. However, over the years I have felt that some important aspects of academic life are either unplanned or if there is a vision, it is not communicated. For example, the real purposes of research projects (even if they are bound to fail), long-term career planning when starting a PhD. Without good supervision and leadership, it often seems as if all researchers, including senior scientists, are only trying to do whatever they can to survive in a highly competitive environment. This leads to several problems such as lack of teamwork and long term successes."

Lack of network and structure

"Without a structured PhD program and without being employed at a university or institute, I have no network or structures to advise and support me during my PhD. The university provides no training (not even on the very basics of good scientific practice), no career advice, and no opportunity to connect with other PhD students and early career researchers working on similar topics. In my experiences the challenges mentioned in the previous question (publication pressure, mental health, training, and supervision) are much worse when faced alone and without support structure; yet this is the case for most external PhD students."

Mental Health

"Also concerning failure culture and mental health: we should be talking more often about struggling and our failures among our colleagues in our teams. When you think that only you are struggling but no one else, it's not good for your confidence, well-being, and self-image"