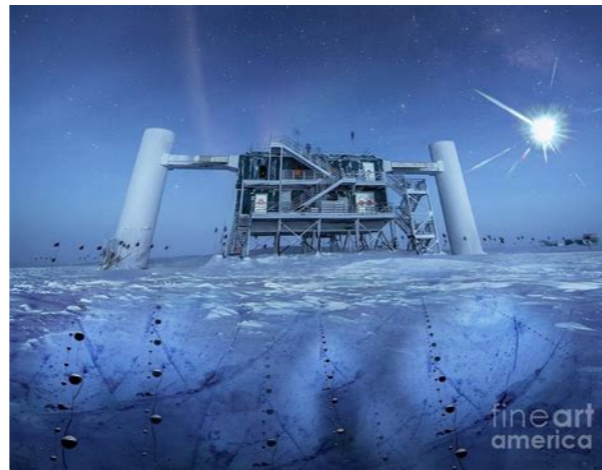


# The future of meetings in the particle astrophysics community

Deirdre HORAN, L. Tibaldo\*, E. Prandini\*, J. Biteau, G. W. Kluge & A. Nelles



# The future of meetings in the particle astrophysics community ([link](#))

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### Comment

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## The future of meetings in the particle astrophysics community

L. Tibaldo, E. Prandini, J. Biteau, D. Horan, G. W. Kluge & A. Nelles

Check for updates

A recent survey suggests that reducing the number of meetings and conferences is a viable way to address concerns about the effectiveness of the modern scientific collaboration process, its effects on the environment and the well-being of the community.

After the upheaval caused by the COVID-19 pandemic, researchers have started rethinking the role of in-person meetings in the scientific community<sup>1</sup>. Traditional in-person meetings are now recognized to have issues related to sustainability as well as accessibility and inclusivity<sup>2</sup>. On one front, scientific meetings contribute to climate change because they are an important source of travel-related greenhouse-gas emissions<sup>3</sup> – professional travel is evaluated to account for 16–47% of all greenhouse-gas emissions generated by astronomical research<sup>4–7</sup>, depending on how this is calculated and other factors. On another front, traditional in-person scientific meetings tend to exclude a part of the community, whether this is due to lack of access to funding and visas, limited time or capacity to travel for personal or professional reasons, or challenges for scientists with disabilities<sup>8</sup>. Nevertheless, in-person meetings also have undeniable benefits in terms of facilitating exchanges between scientists and networking opportunities. Together with so-called ‘Zoom fatigue’<sup>9</sup>, this pushed the community to return to in-person meetings when travel restrictions eased.

We performed an anonymous online survey in the particle astrophysics community from January to May 2023 to take stock of the perception of the current situation and to explore what people would prefer for the future organization of scientific meetings. Particle astrophysics is a cross-disciplinary research domain, mostly organized in large collaborations (with typical sizes of hundreds of scientists) built

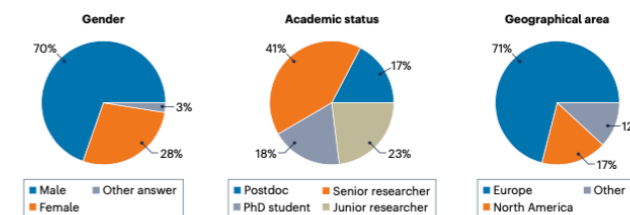
around observational facilities. The survey was run through the free, open-source platform Framafoms, and circulated through the mailing lists of more than a dozen large collaborations. We have confirmation of the circulation in the following collaborations: AMEGO, AMS-02, Auger, CTA, *Fermi*-LAT, HAWC, H.E.S.S., IceCube, LHAASO, MAGIC, RNO-G, SWGO, Telescope Array, Virgo and VERITAS. We collected 438 valid answers, which, to provide some context, corresponds to 26% of the 1,683 persons registered for the 2021 edition of the International Cosmic Ray Conference (ICRC). The ICRC is considered to be the largest gathering of the particle astrophysics community.

Figure 1 shows a breakdown of the fraction of respondents according to some categories that may have an effect on the interpretation of the results. Among the respondents, 70% identify as male and 28% as female, fractions that, in our experience, approximately reflect the composition of the community. For the following, we will not present results separately for respondents that do not identify as males or females because the sample is too limited (11 respondents). We notice some bias in academic status towards more senior members of the community. There is also a possible geographical bias, with a lack of responses from scientists outside Europe and North America.

### Conferences

We asked the respondents to consider only workshops, conferences and symposia that have at least 50 attendees. Furthermore, the questions were aimed at topical conferences in the particle astrophysics field. Therefore, the results that follow exclude any smaller conferences and conferences covering broader fields, such as general astronomy or particle physics conferences, and collaboration meetings, which are discussed separately below.

The respondents declared that they were interested in attending, either in-person or online, 0 to 10 conferences per year, with a median value of 3 conferences. The number of personal invitations to speak at a conference received per year also varied from 0 to 10, but with a median value of 1. Almost 40% of the respondents are invited to conferences



**Fig. 1 | Breakdown of survey participation by gender, academic status and geographical area.** For gender, ‘Other answer’ includes both people who indicated themselves as belonging to another gender and people who did

not wish to provide an answer. We define as junior (senior) researchers, those respondents who have held a staff, tenured or tenure-track position for less (more) than ten years.

# Context

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- Upheaval of COVID-19 pandemic: rethink role of in-person meetings
- Traditional in-person meetings have issues related to:
  - sustainability
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- Travel-related greenhouse-gas emissions: 16-47% of all greenhouse-gas emissions generated by astronomical research
- A part of the community is excluded:
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  - limited time
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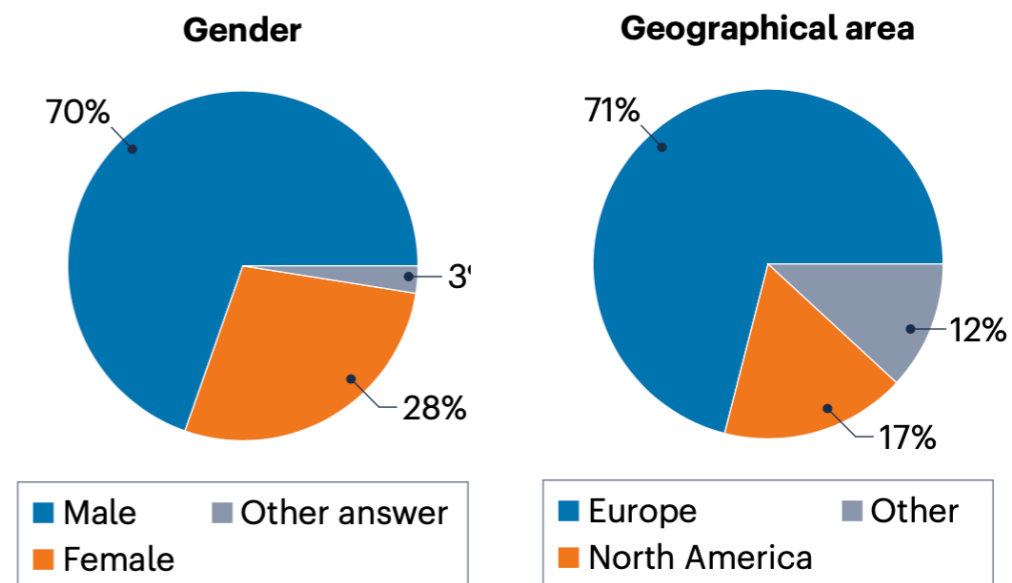
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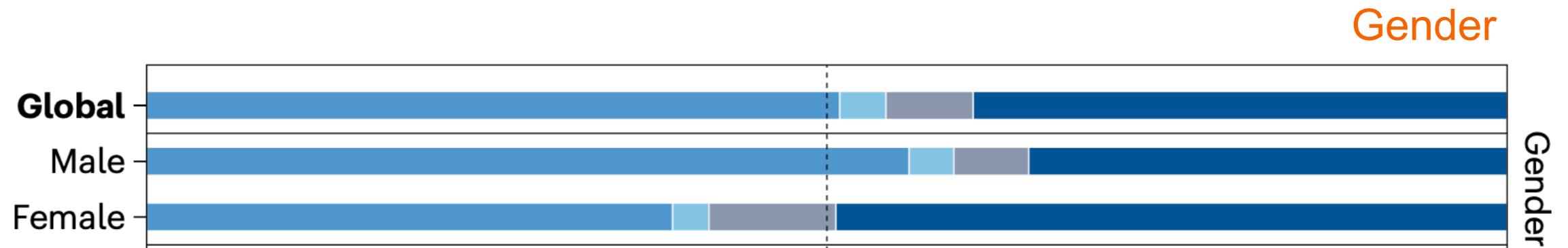
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- Who filled out the survey?
  - 70% male - 28% female
  - bias towards more senior members of the community (41%)
  - geographical bias:
    - lack of response for scientists outside of Europe and North America



# Perception of No. of Conferences

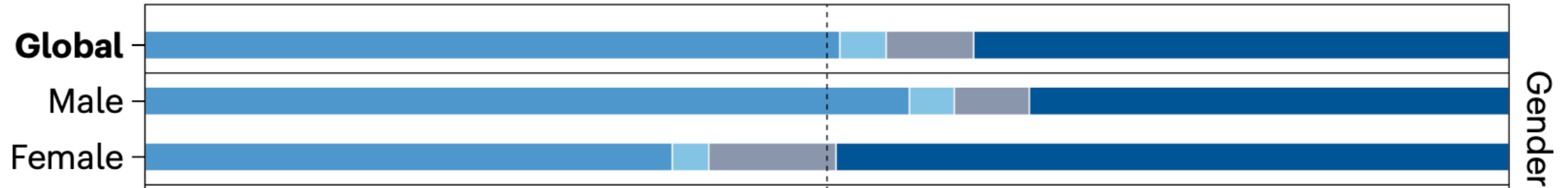
■ Appropriate   ■ Too few   ■ Unsure   ■ Too many



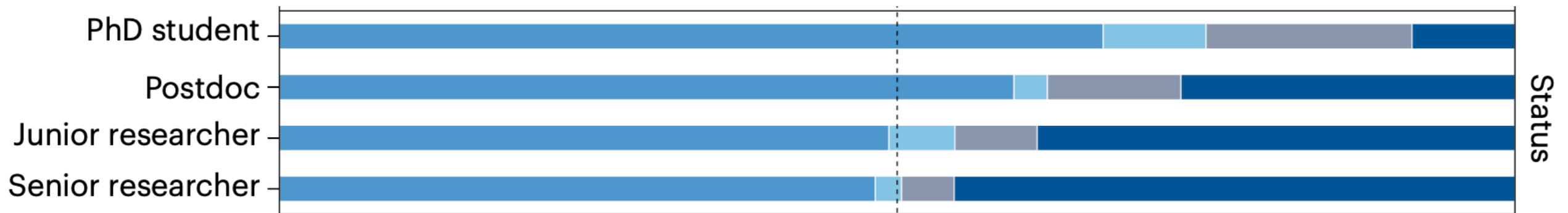
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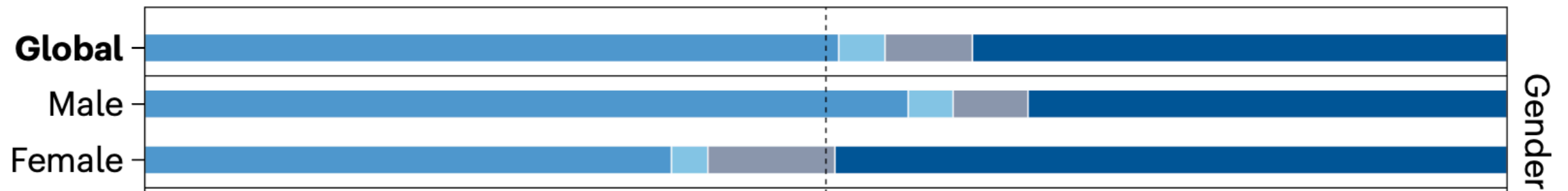
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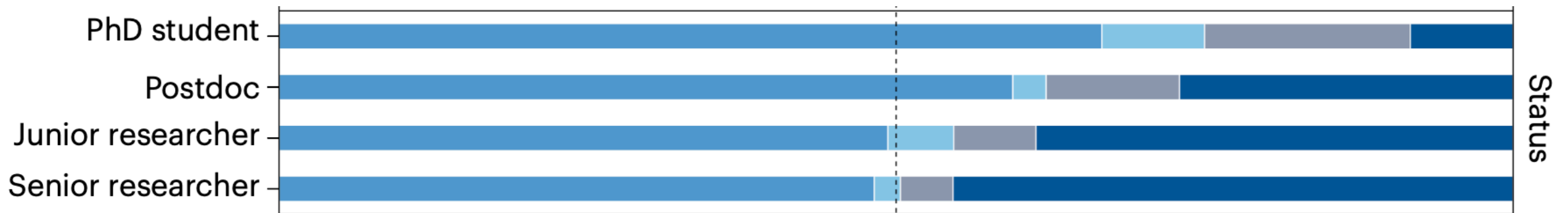
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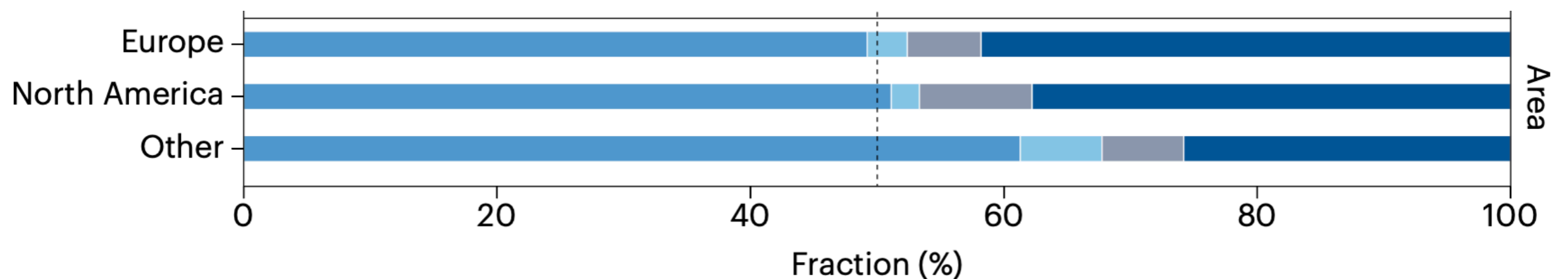
Gender



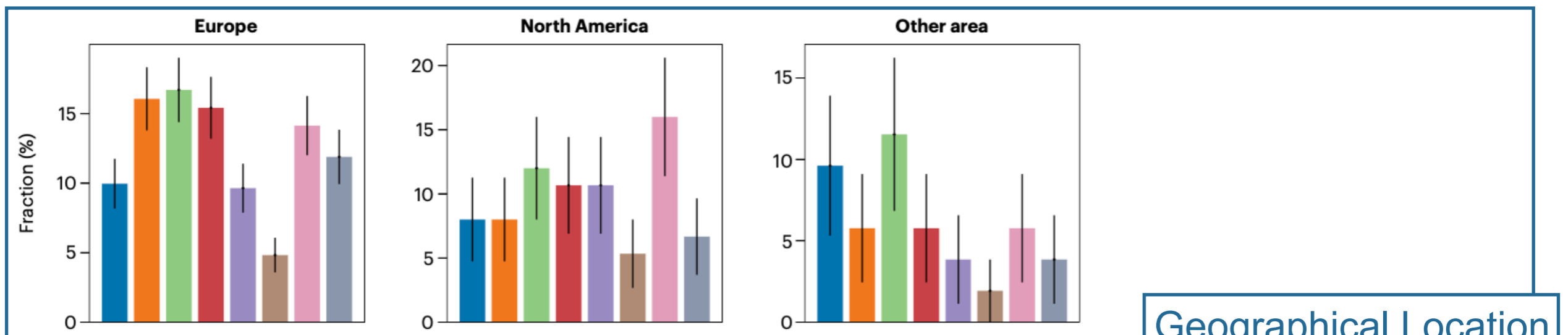
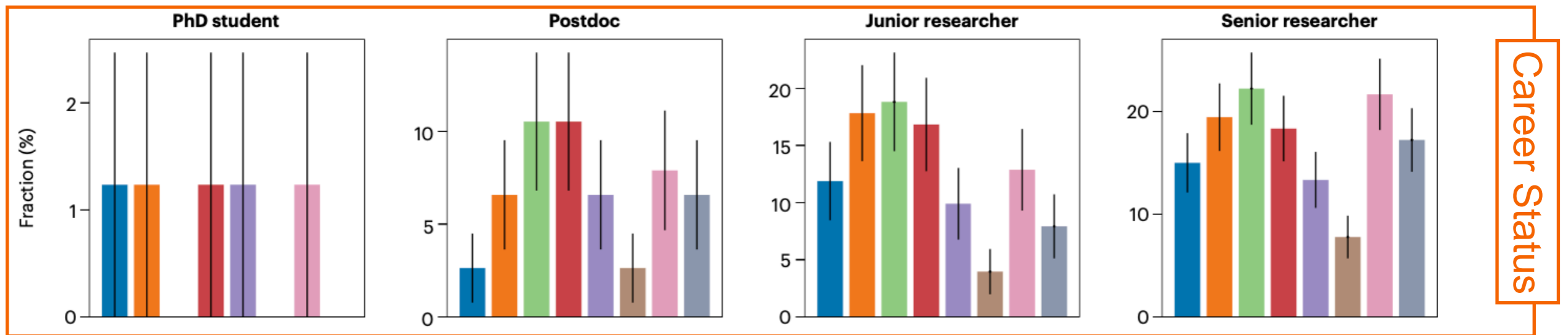
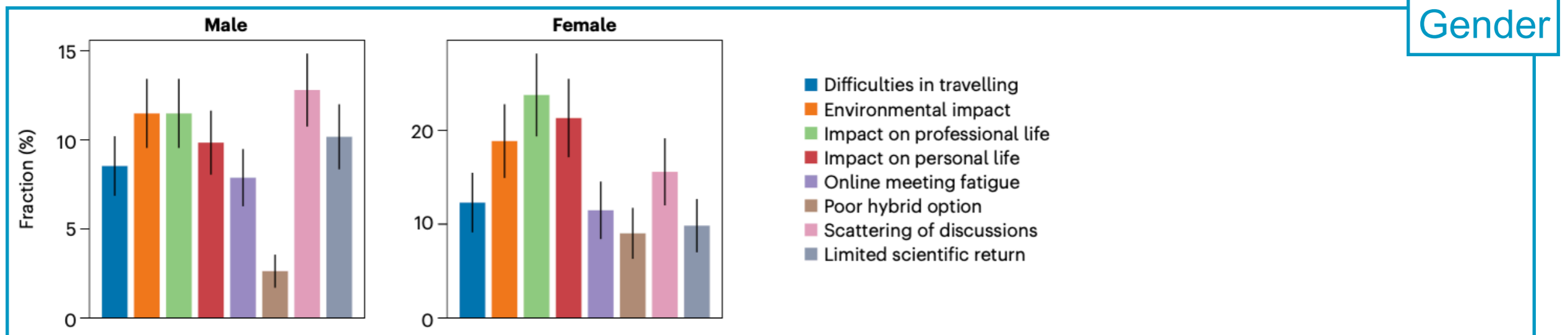
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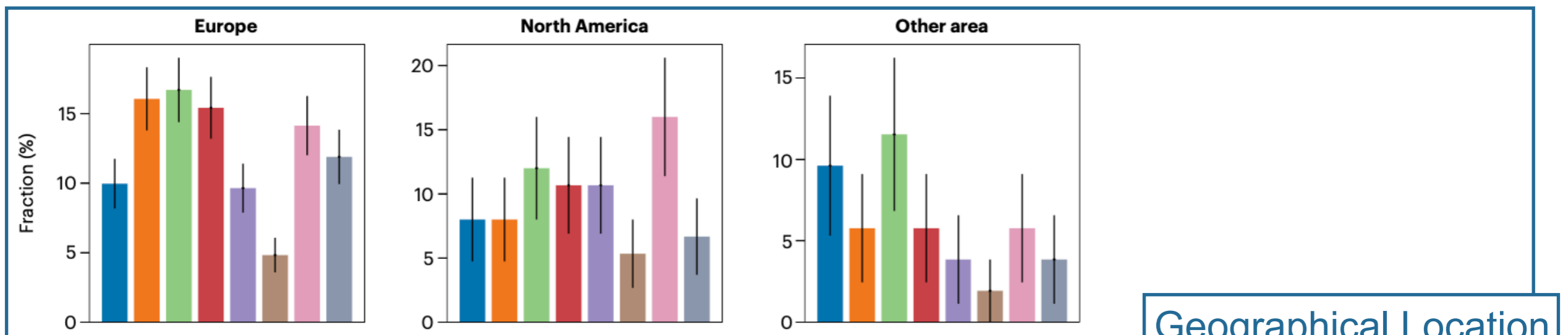
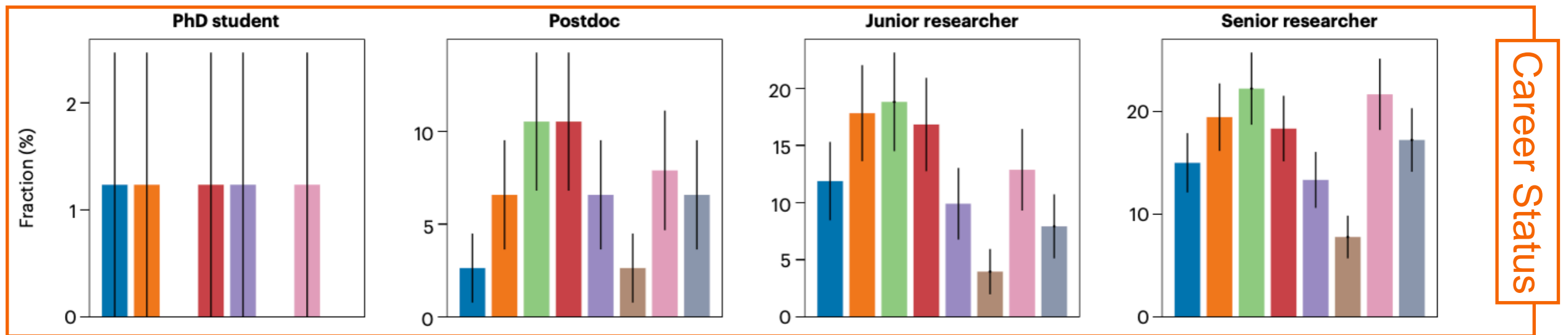
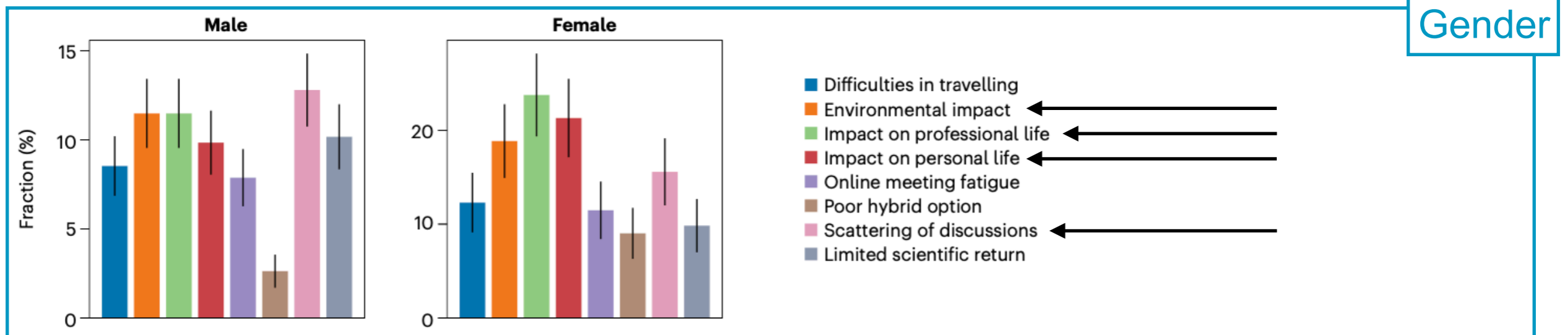
Geographical Location



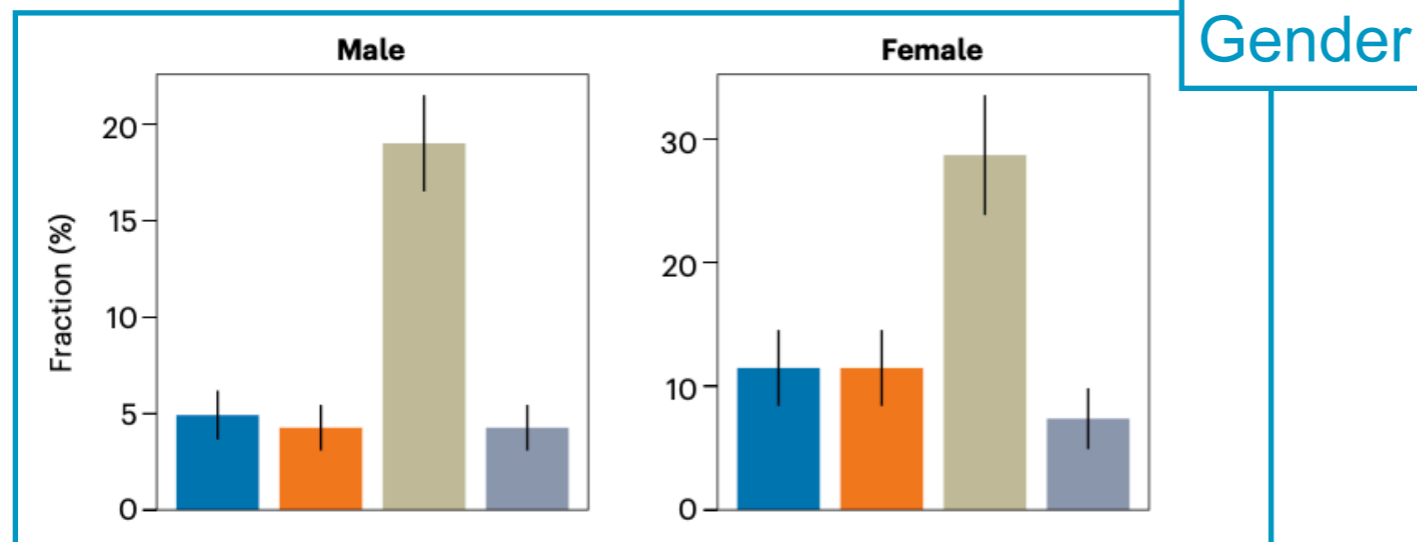
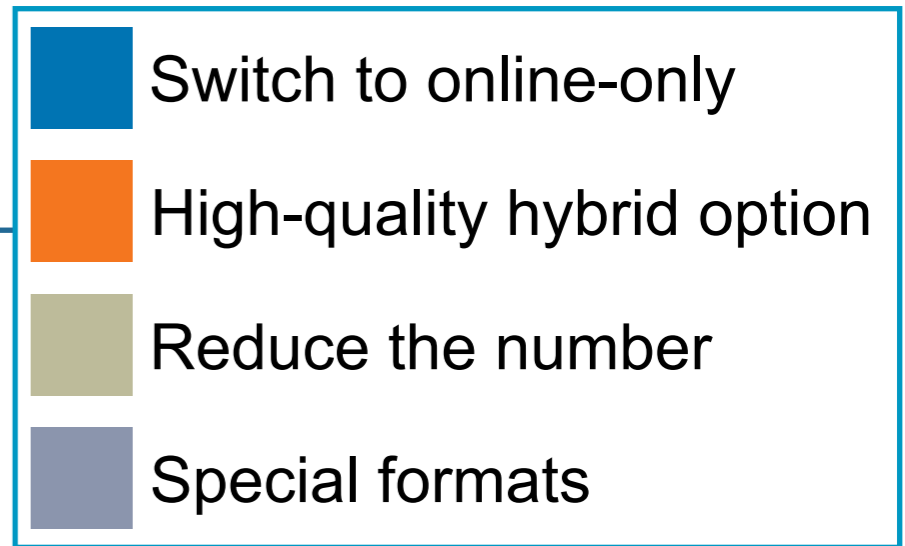
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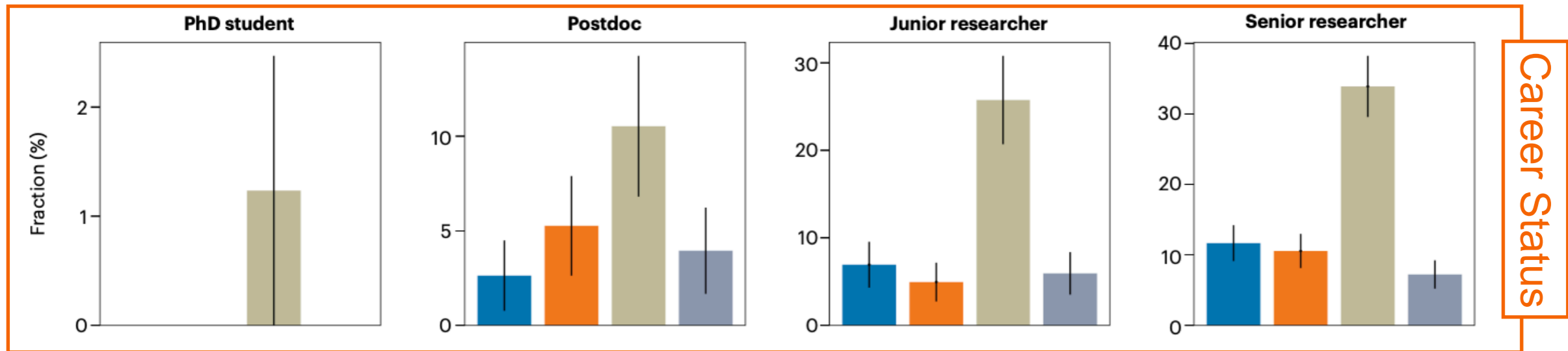
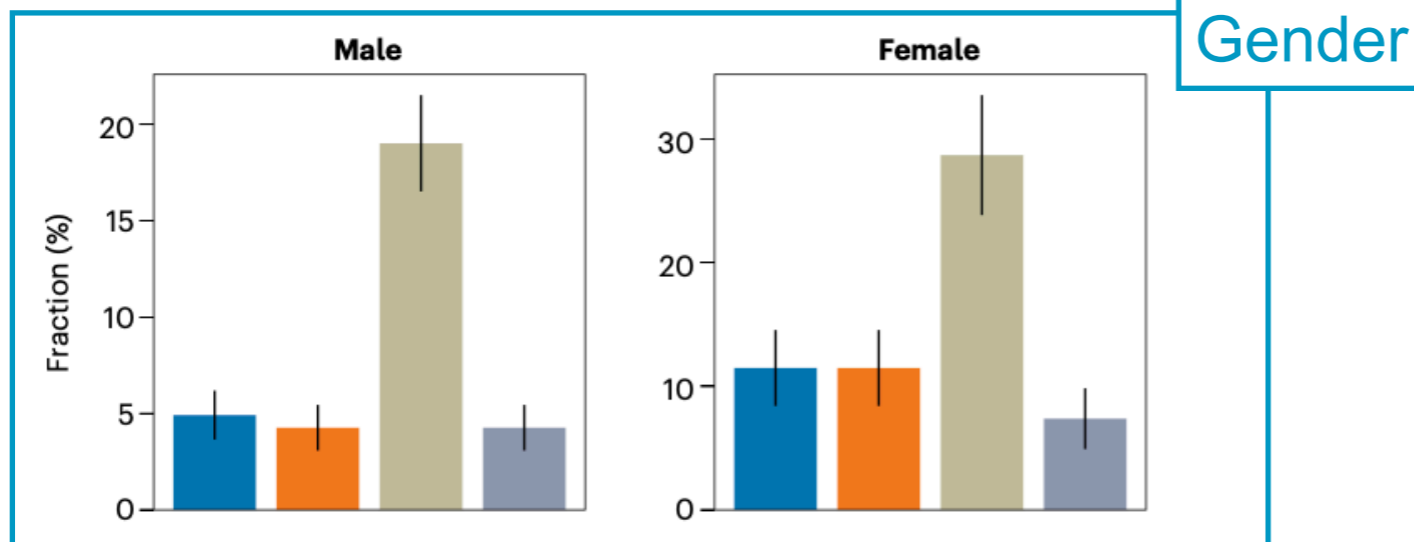
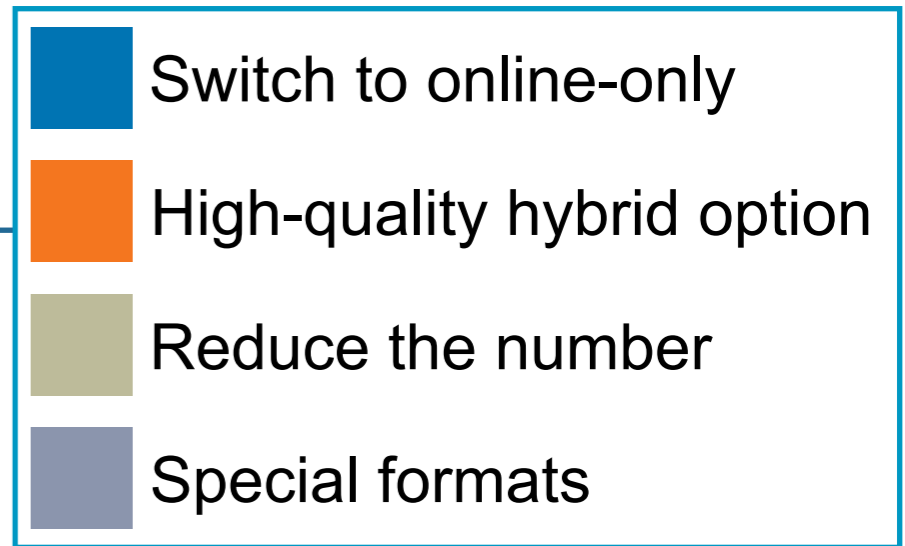
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# Solutions favoured

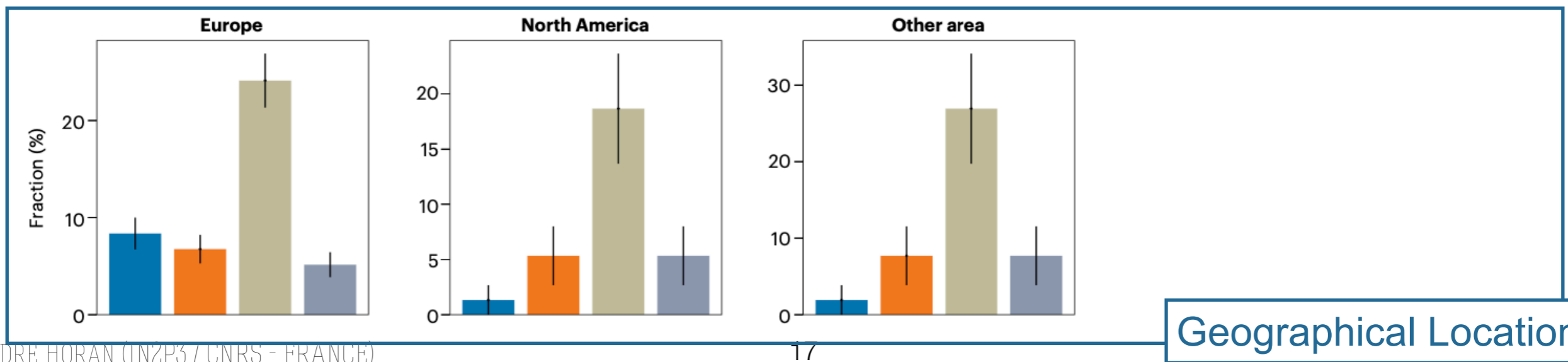
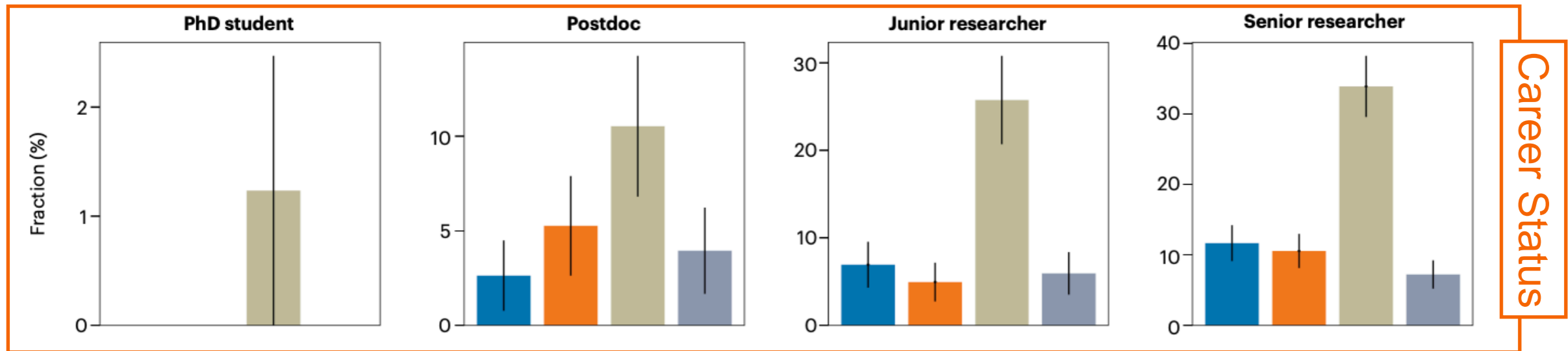
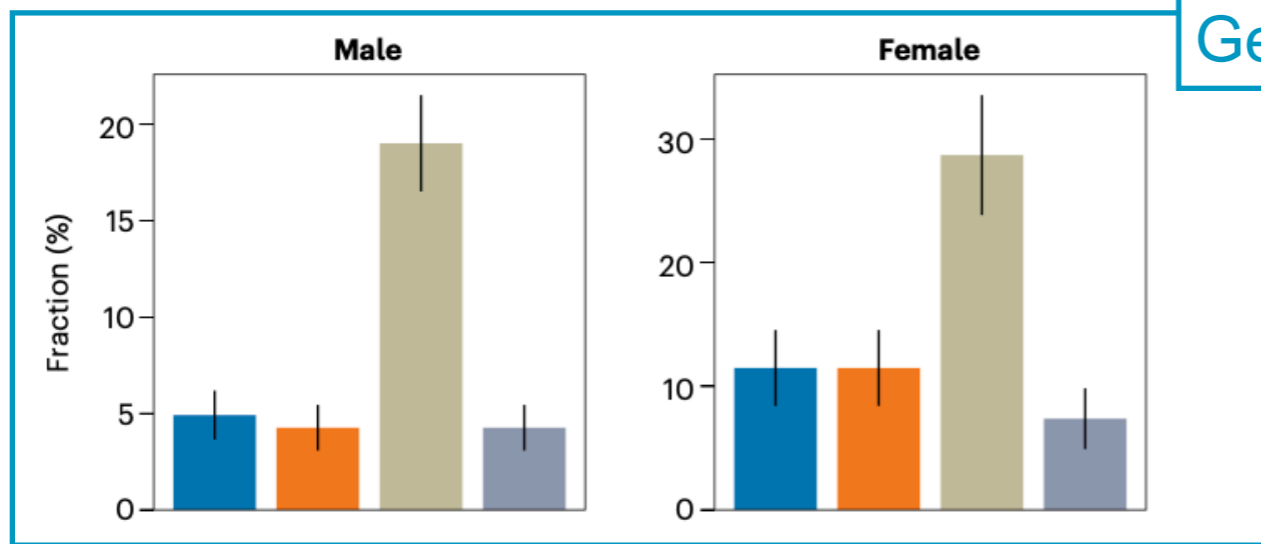
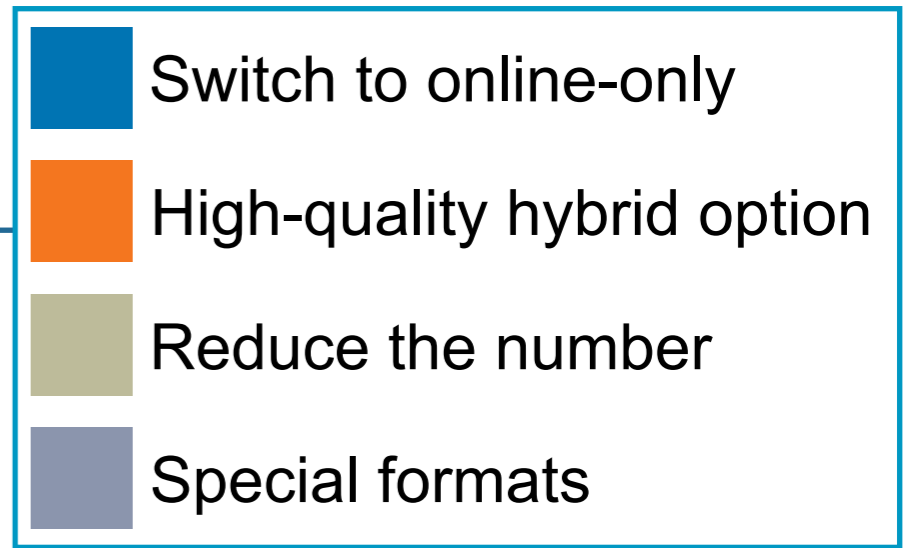


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**Thank you for your attention !**