

Open science monitor

2022

Commissioned by the Utrecht University Open Science Programme

Preface

This is the second version of the OS monitor on awareness, attitudes and behaviours in relation to open science practices. The monitor was conducted among employees at Utrecht University and UMC Utrecht in the spring of 2022 with the aim to gain insight in attitude and behaviours towards various open science practices, the opportunities these practices may provide for the scientific community and the barriers in implementing open science practices the employees may experience. With this monitor the university hopes to gain insight into what can be done to facilitate and support open science at Utrecht University.

New in this monitor are that UU staff in non-scientific roles were also surveyed in the monitor. In addition, two questions were added about the newest open science theme of "open education," 'open science teaching' and 'open educational resources'.

Acknowledgements

We would like to thank all the UU and UMCU academics who participated in this research during the summer of 2022. Without you, this report would not have been possible. Thanks to you, we can provide first insights in OS attitudes and behaviours at UU and UMCU, the barriers and opportunities academics experience in the transition to open science. These results allow for setting a baseline for OS monitors to follow. We hope that many more UU and UMCU academics will participate in the upcoming OS monitors. Special thanks to the open science platform, the track leaders, Utrecht University Library and Student & Academic Affairs Office and the Ethics committee of the Faculty of Social Sciences for help with preparing and distributing this OS monitor.

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Pre-registration: Write down study predictions or planned analyses (time-stamped) prior to of analyzing data, including registered reports. Pre-registration is used to ensure that hypotheses are formulated prior to analysis of data and that research and analysis are carried out according to that plan. (59)

Pre-prints: Full drafts of journal articles that are published prior to peer-review. They are open for feedback, citable, and are intended to accelerate the dissemination and uptake of new findings. Examples of platforms where pre-prints are uploaded are Zenodo, bioRxiv and PsyArXiv. (111)

Open access publishing: Publishing journal articles or books openly to make the content freely accessible to everyone to read and re-use. No journal subscriptions are required to access the document. (112)

Open data: Posting research data online freely accesible for others to see and use. Ideally open data should adhere to the FAIR principles, meaning that the data is Findable, Accessible, Interoperable and Reusable. Data can be posted "raw" (in the form it was collected) or "cleaned", (corrected for errors, transformed into scales or into coded themes, etc). Examples of data platforms are the Open Science Framework, DataverseNL, and YODA. (113)

Open research materials: Posting research materials online freely accessible for others to see and use. Examples of materials that can be shared are: Stimulus materials, survey questionnaires, participant instructions, experimental or intervention materials, lab or field research protocols. (114)

Open code: Posting code (or syntax) used to analyse or clean the quantitative data online freely accessible for others to use. In the case of qualitative data, transform the data into themes. Examples of sharing platforms are GitHub or Zenodo. (115)

Open source software: Posting research software online freely accessible for anyone to use, without universities or individuals having to pay a license or membership fee to access that software. Some open source software allows users to view and make adaptations to the source code of the software (for example R). (116)

Public engagement: Interaction with general, non-academic audiences, e.g., school visits, debates, public or cultural events, (social) media, or citizens contributing to data collection, data analysis or research agenda-setting (citizen science). (117)

Societal stakeholder involvement: Research and/or educational projects where academics, often from different disciplines, collaborate closely with non-academics from private or public sectors, to co-produce knowledge on a societal issue or challenge. (118)

Team science: Academics collaborate in a team where each team member has its own expertise. For example, one team member may be responsible for data collection, another team member is responsible for statistical analyses, and yet another team member is responsible for writing and communication. Team science is the opposite of one person being individually responsible for all aspects of a research or teaching project. (119)

Open science teaching: Implementing the principles and practices of Open Science in your student teaching and other education/supervisory activities. E.g. teaching on 'what does Open Science mean for you, 'how to share your data openly', or 'how to interact with stakeholders' (120)

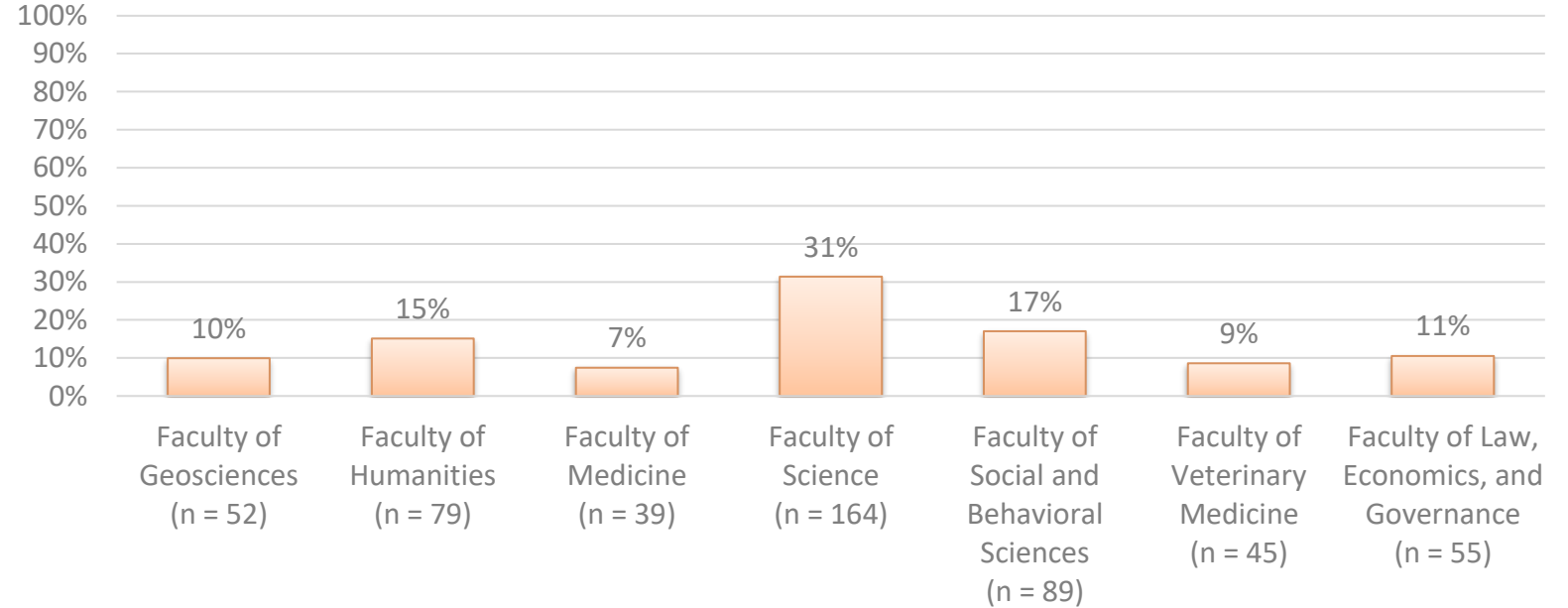
Open education resources: Posting teaching materials such as open access textbooks, presentations, assignments or instructional videos on (online) platforms/repositories, to use freely by others (121)

Academic personel

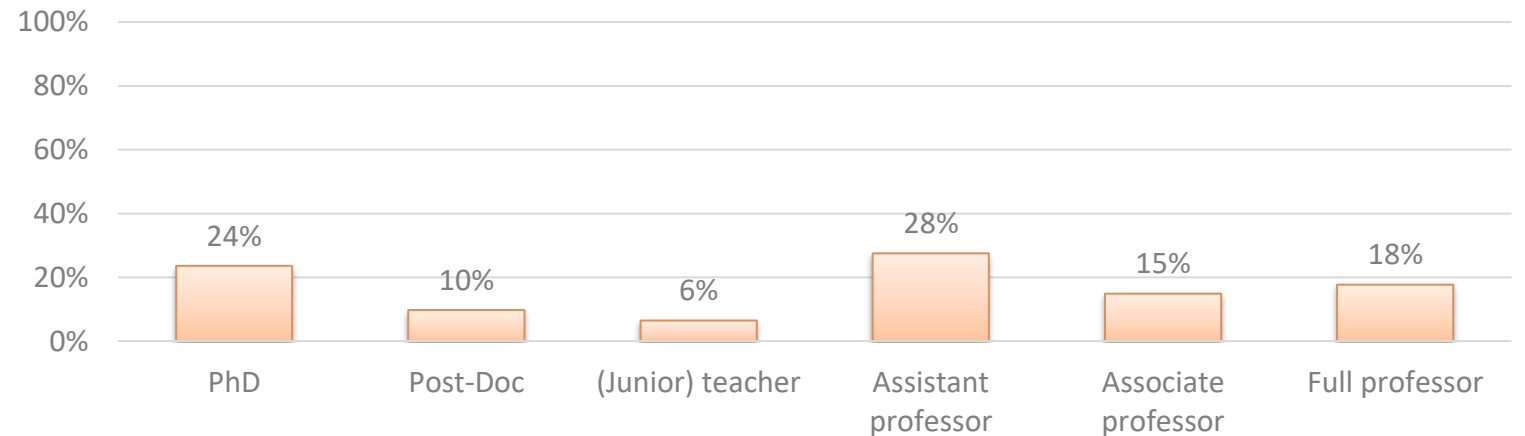
Sample Description

- 531 eligible respondents
- 18% OSCU member
- 45% male, 50% female, 5% non-binary/not-listed
- 70% Dutch
- 14% response rate (excluding UMCU)

Percentage of each Faculty in the Sample

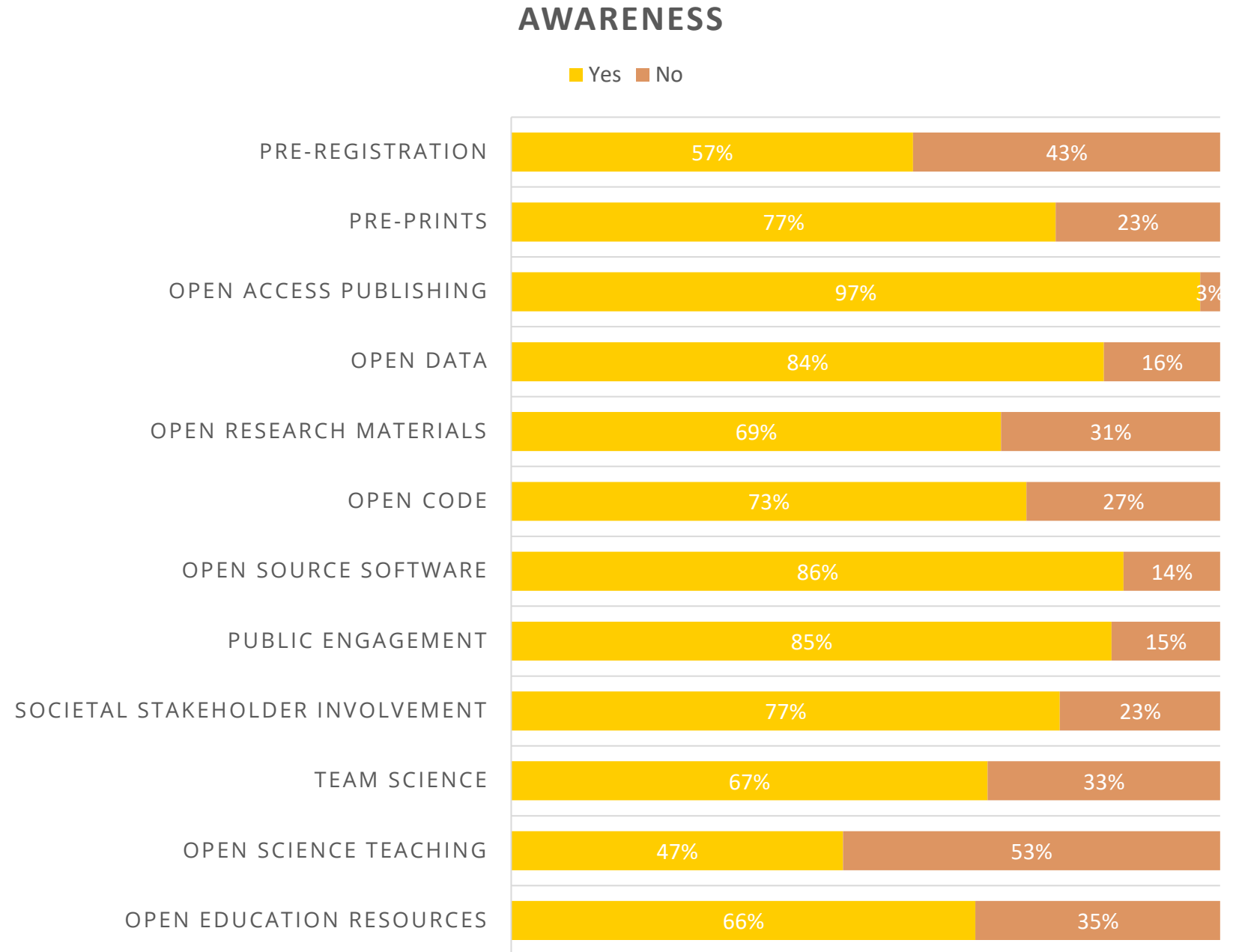


Percentage of each Position in the Sample



Awareness of Practices

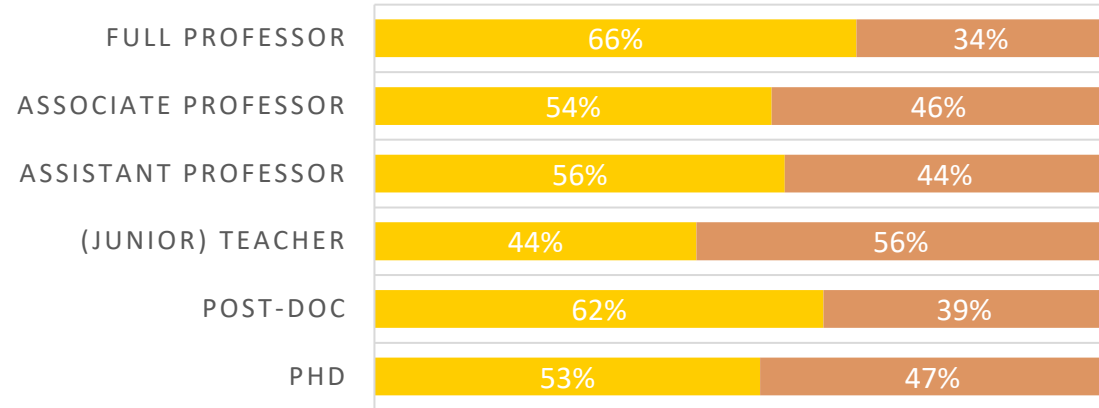
- Highest awareness for open access publishing (97%)
- Awareness was lowest for open science teaching (45%)



Reproducibility practices by position

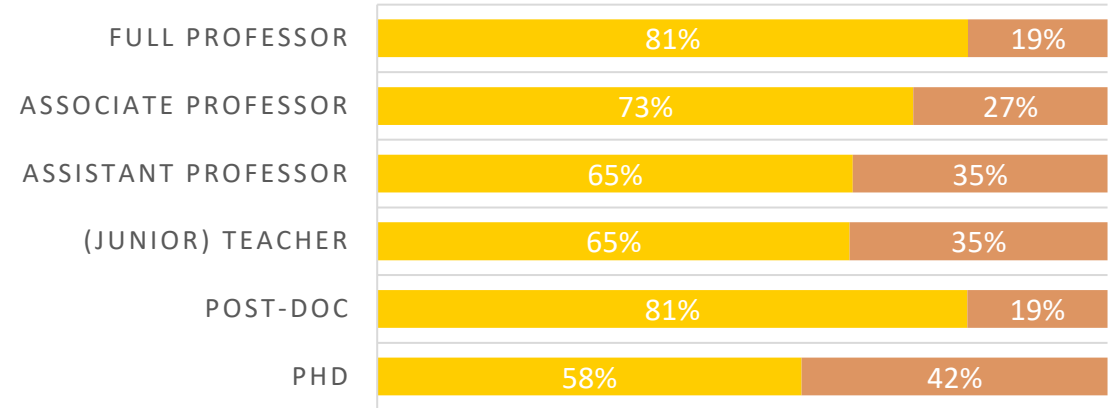
AWARENESS OF PRE-REGISTRATION

■ Yes ■ No



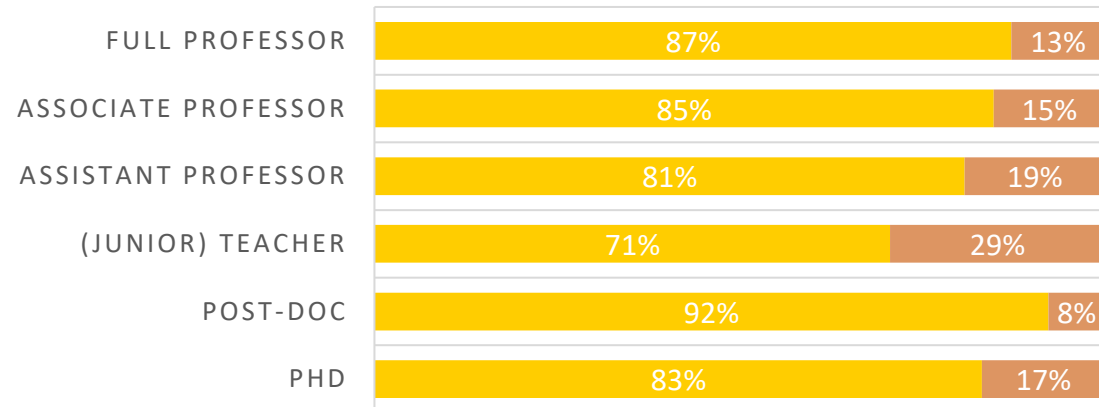
AWARENESS OF OPEN RESEARCH MATERIALS

■ Yes ■ No



AWARENESS OF OPEN DATA

■ Yes ■ No

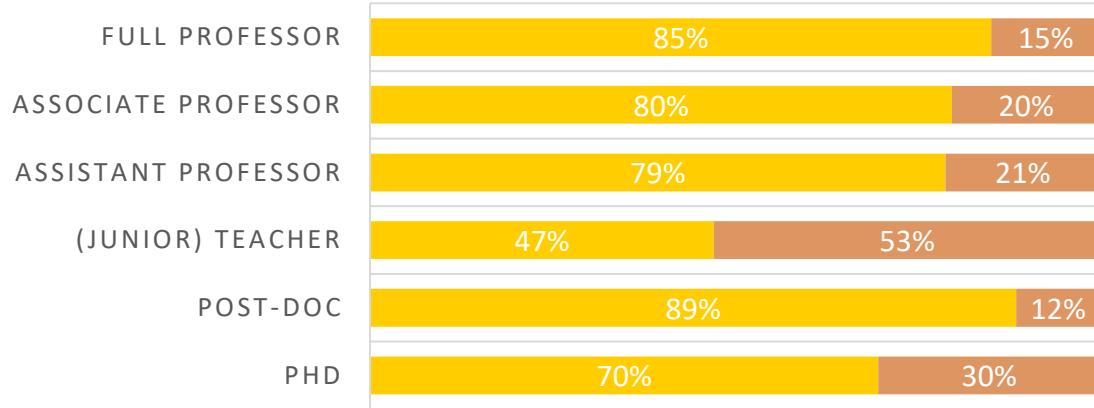


- (Junior) teachers are less aware of pre-registration and open data
- Post-docs are most aware of open data

Transparency practices by position

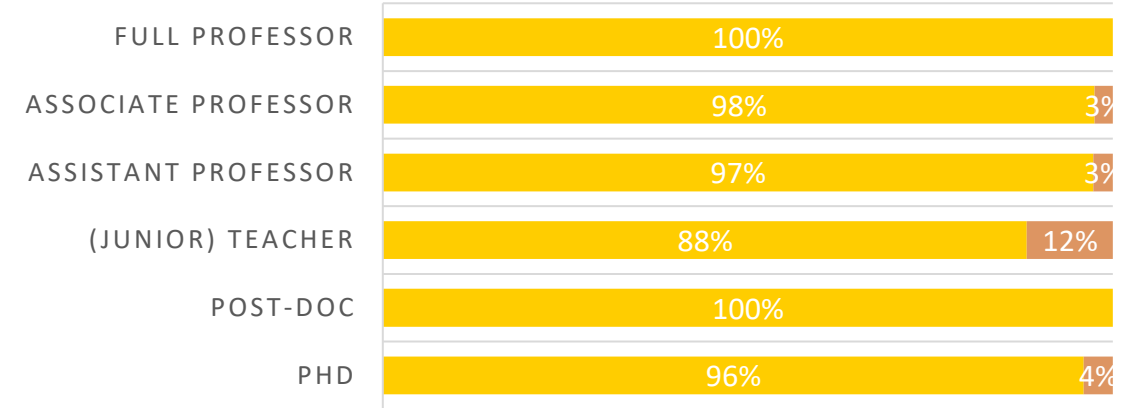
AWARENESS OF PRE-PRINTS

■ Yes ■ No



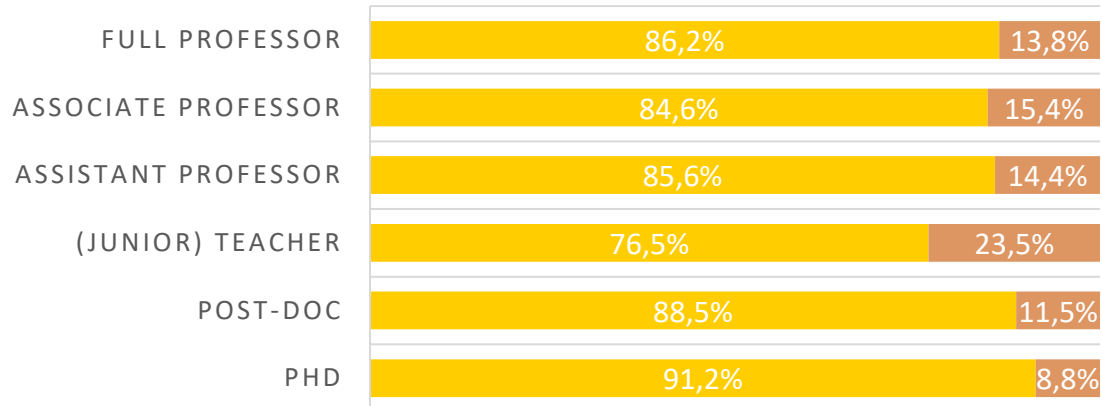
AWARENESS OF OPEN ACCESS PUBLISHING

■ Yes ■ No



AWARENESS OF OPEN SOURCE SOFTWARE

■ Yes ■ No

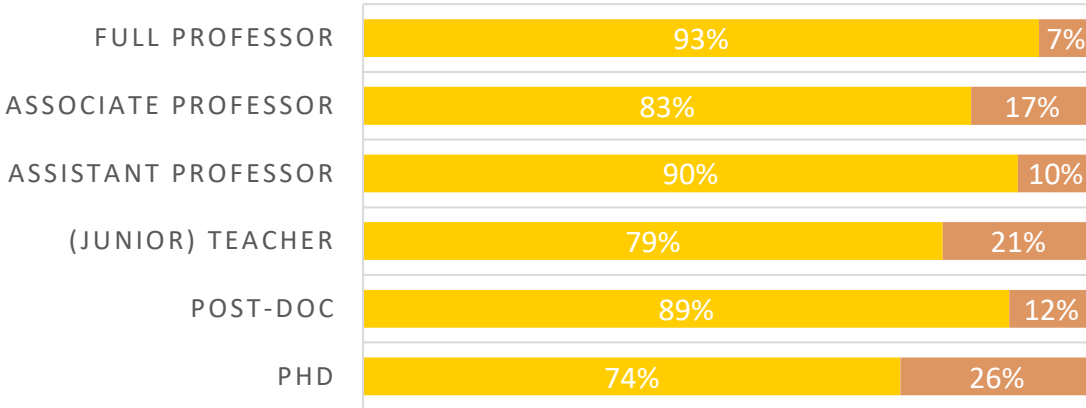


- (Junior) teachers are least aware of transparency practices
- 30% of PhD candidates is not aware of pre-prints

Collaboration practices by position

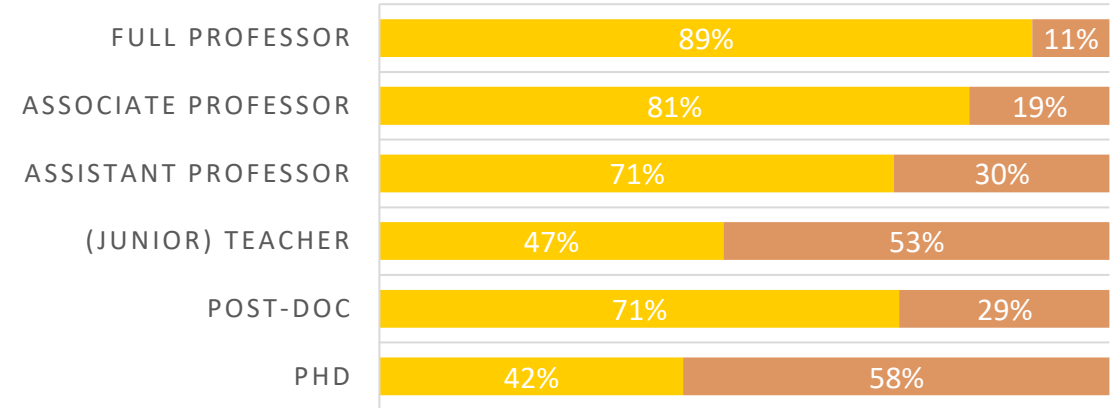
AWARENESS OF PUBLIC ENGAGEMENT

■ Yes ■ No



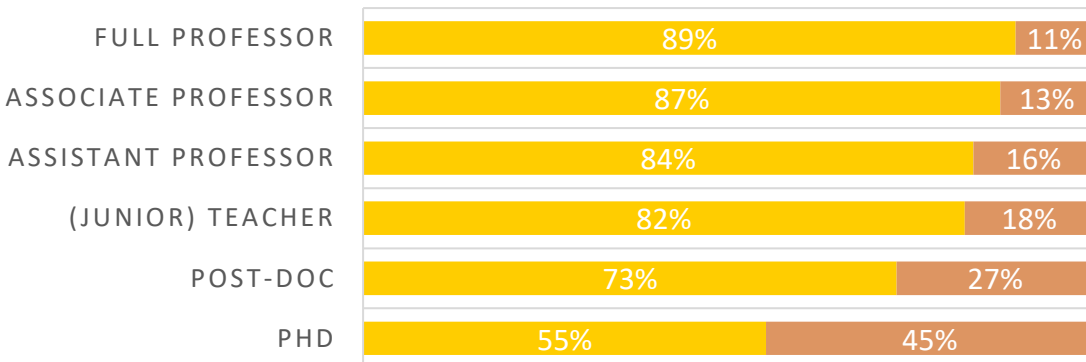
AWARENESS OF TEAM SCIENCE

■ Yes ■ No



AWARENESS OF SOCIETAL STAKEHOLDER INVOLVEMENT

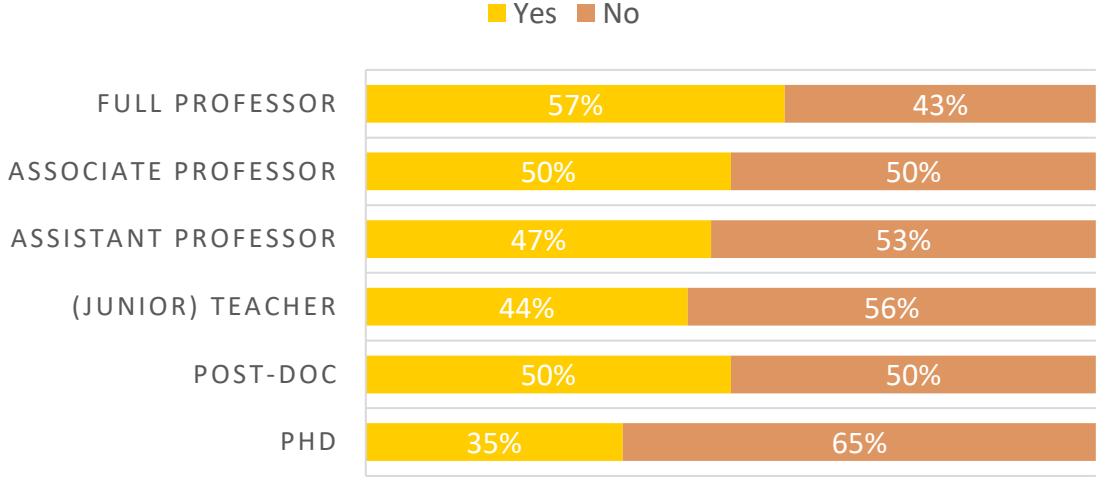
■ Yes ■ No



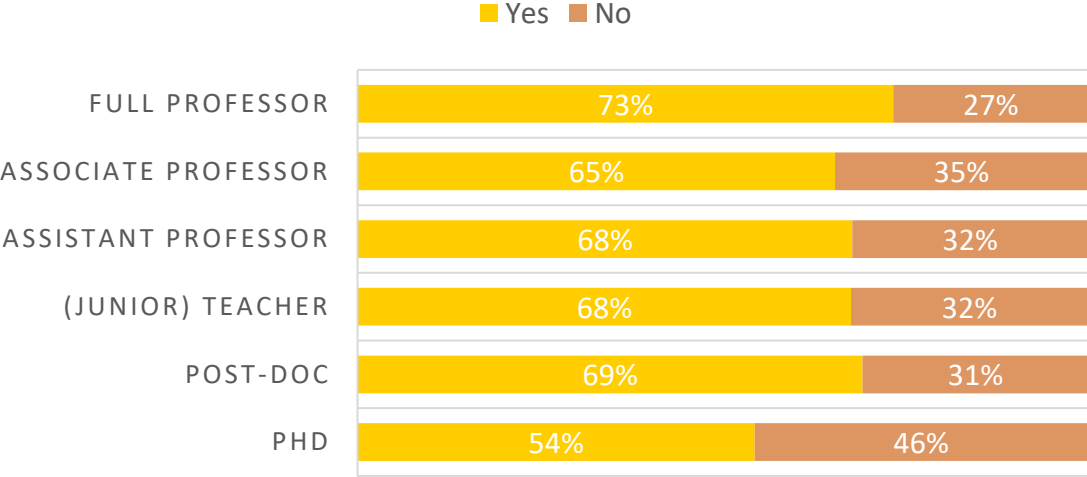
- More than half of the (Junior) teachers and PhD candidates are not aware of team science
- Almost half of the PhD candidates is not aware of societal stakeholder involvement

Education practices by position

AWARENESS OF OPEN SCIENCE TEACHING



AWARENESS OF OPEN EDUCATION RESOURCES

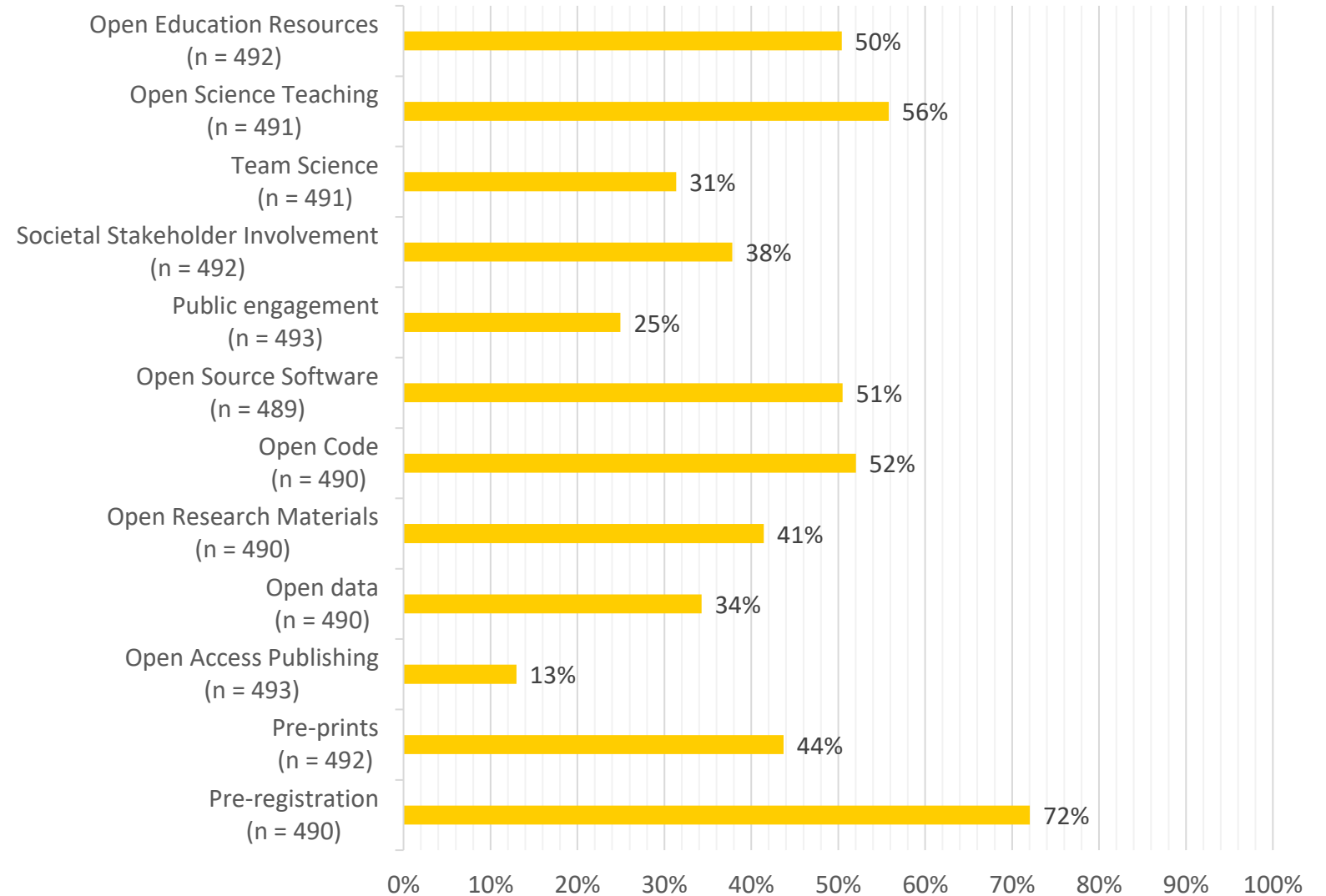


- PhD candidates are least aware of open science teaching and open educational resources

Behaviors

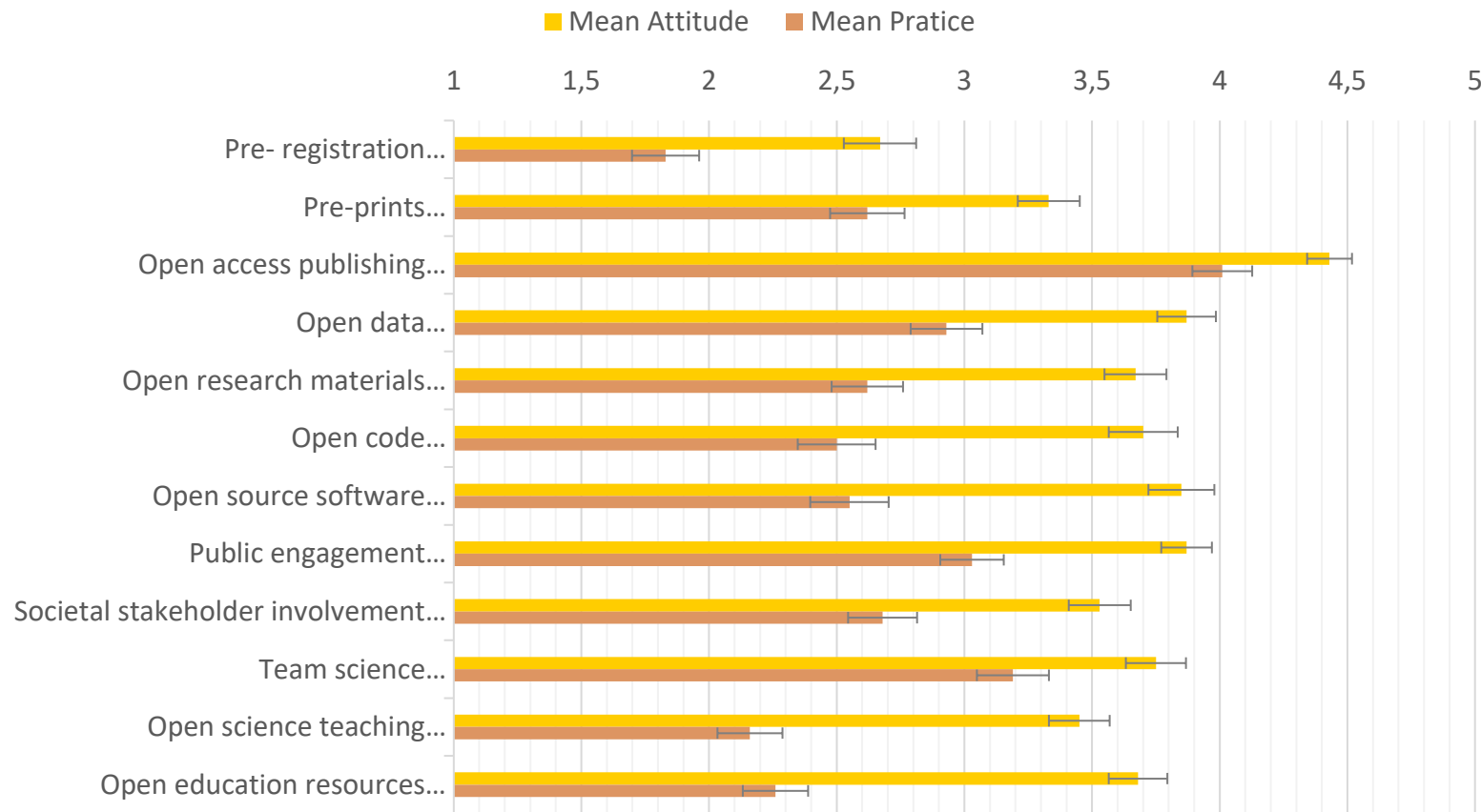
- Pre-registration has never been applied by 72% of the respondents (highest percentage)
- Most respondents have published open access

Percentage of Respondents that Never Applied Practice



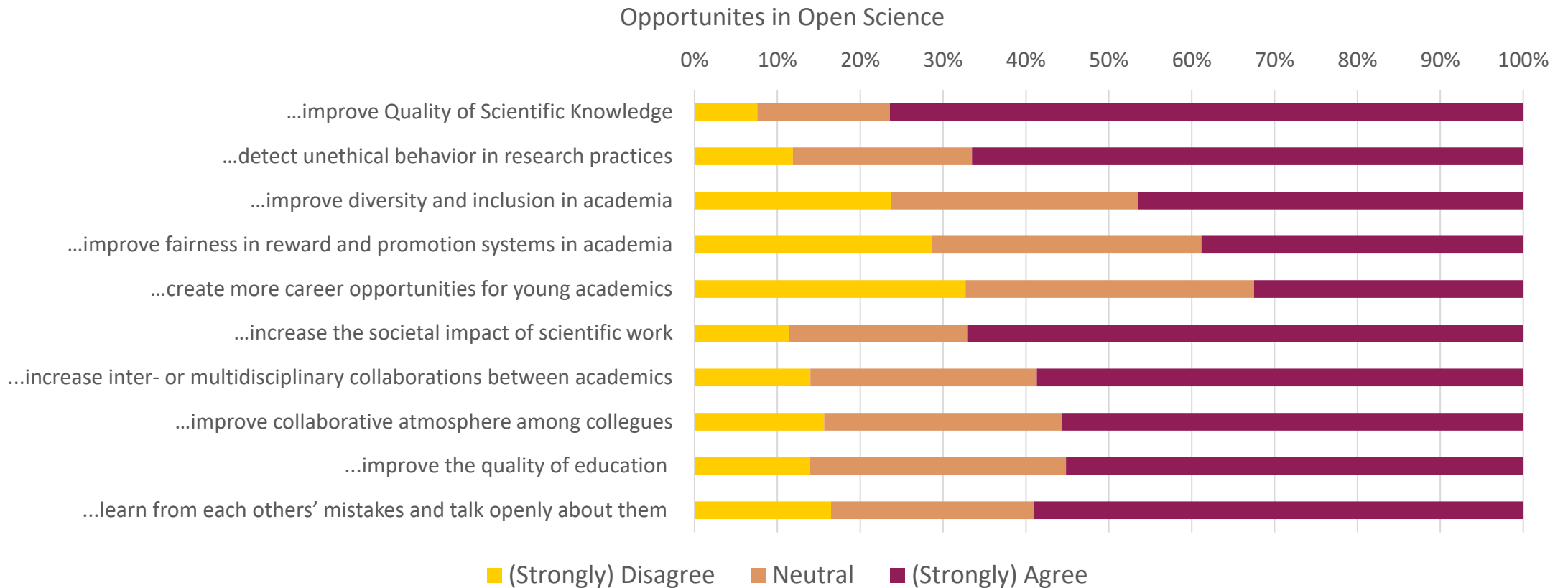
Attitude-Behavior Gaps for Each Practice

Means of Practices and Behaviors for each OS
Practice with 95% CI



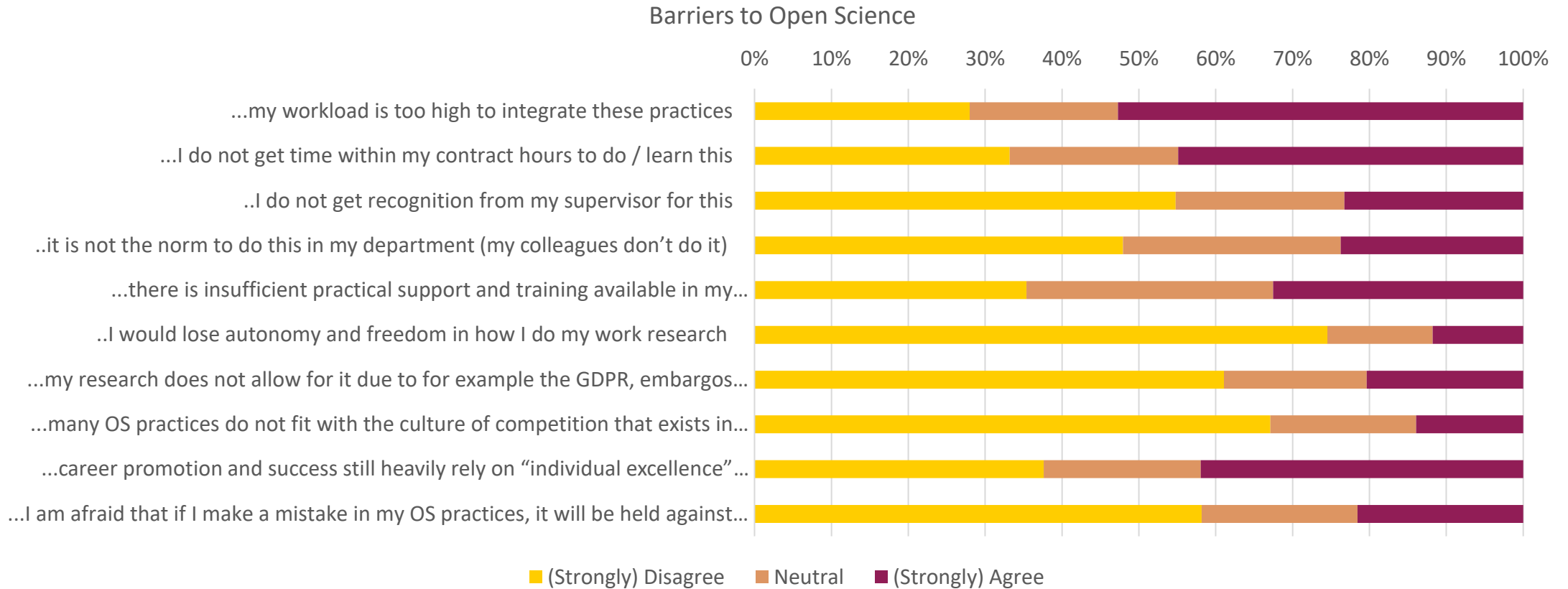
- All attitude-behavior gaps were statistically significant ($\alpha = 0.05$).
- The largest estimated attitude behavior gap was observed for Open Education Resources ($\eta^2 = 0.539$).
- The lowest estimated gap was observed for Open Access Publishing ($\eta^2 = 0.075$).

Opportunities in open science



- Improving quality of scientific knowledge is seen as the biggest opportunity of open science
- Creating more career opportunity is seen as least as an opportunity of open science

Barriers in open science



- A too high workload is seen as the biggest barrier for open science
- Loosing autonomy and freedom is least seen as barrier for open science

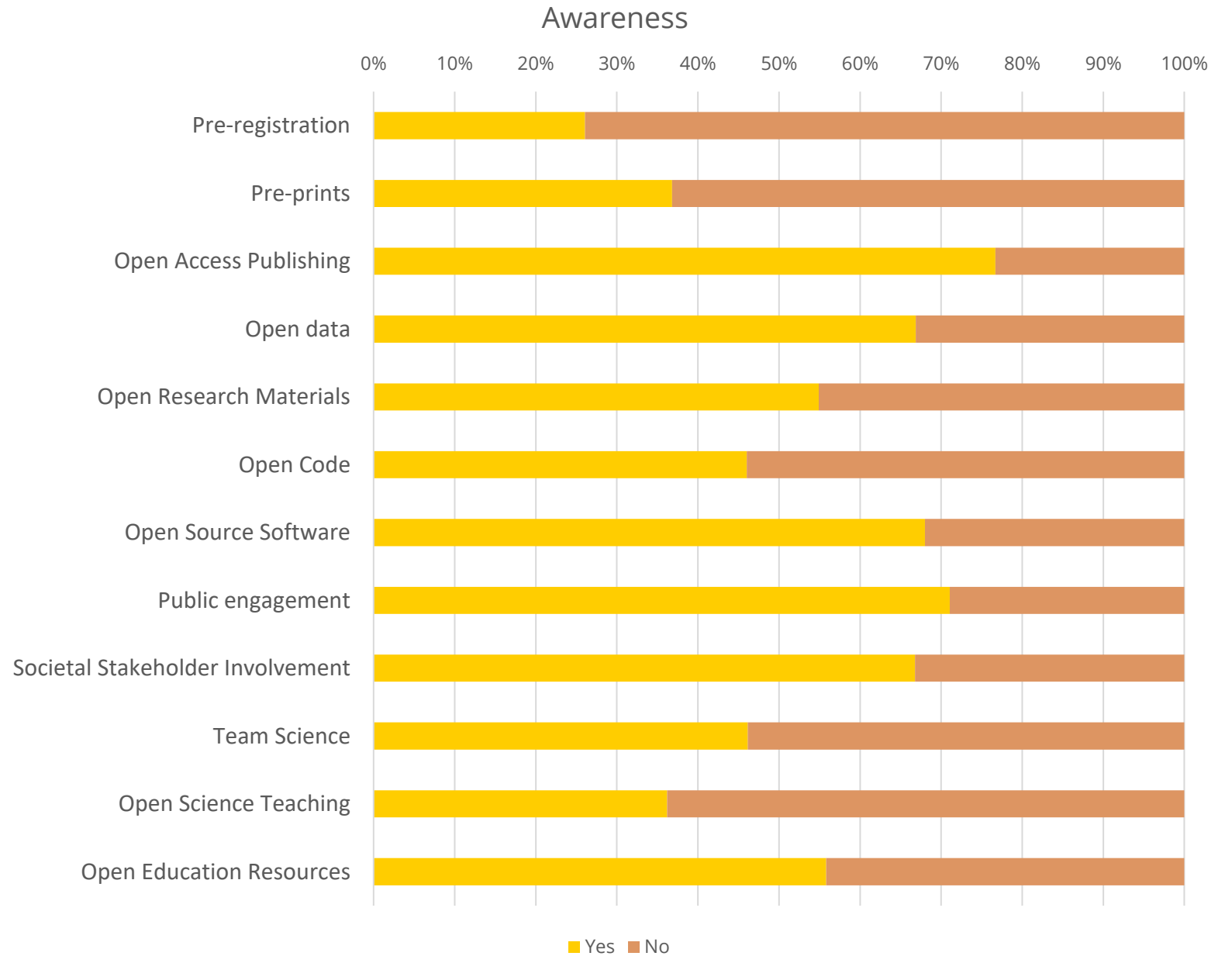
Support staff

Sample Description

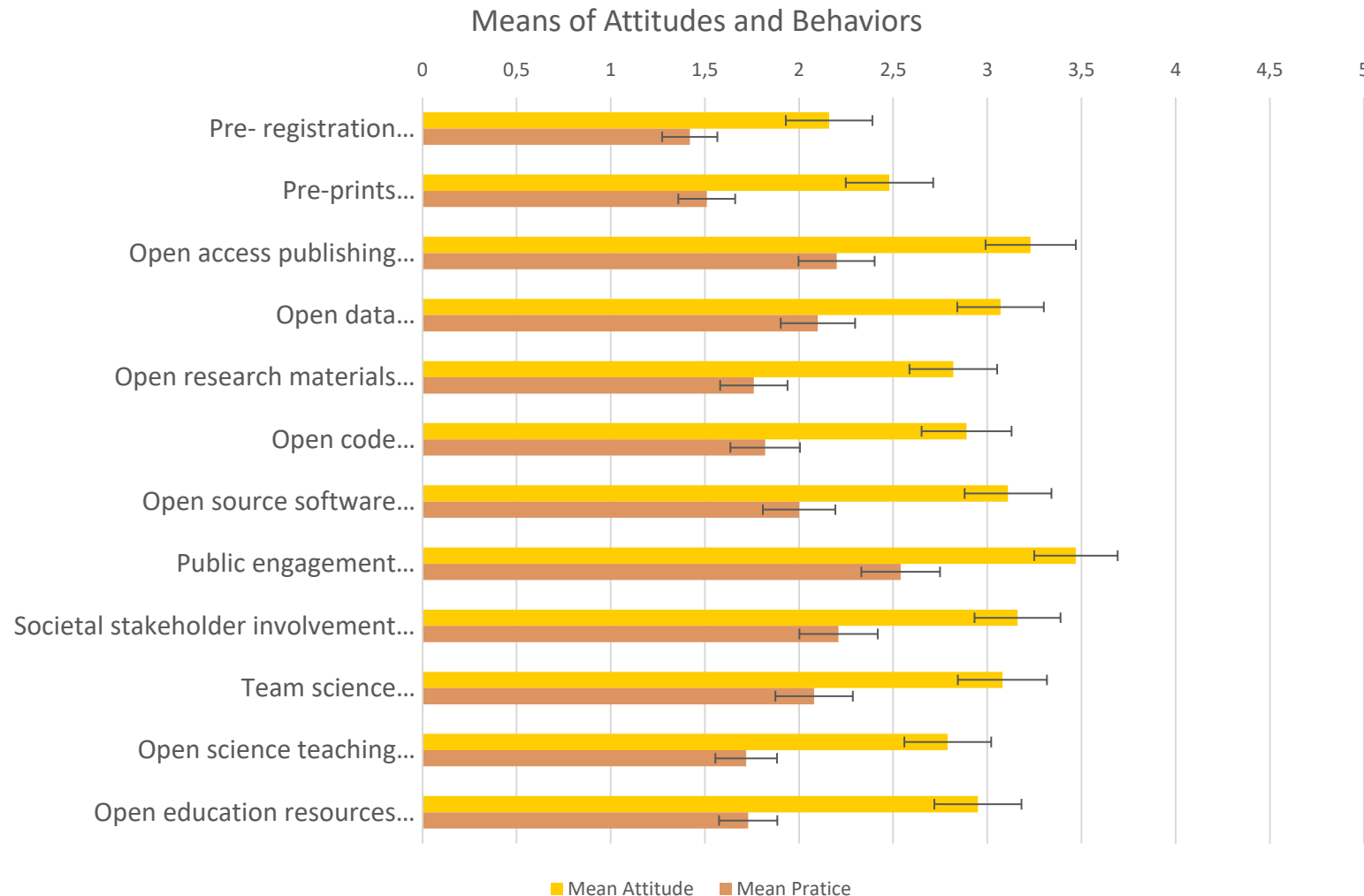
- 558 eligible respondents
- 13% OSCU member
- 60% female
- 70% Dutch
- 14% response rate (excluding UMCU)
- 36% UBD, 6% UBU

Awareness of Practices

- Highest awareness for open access publishing (77%)
- Awareness was lowest for preregistration (26%)

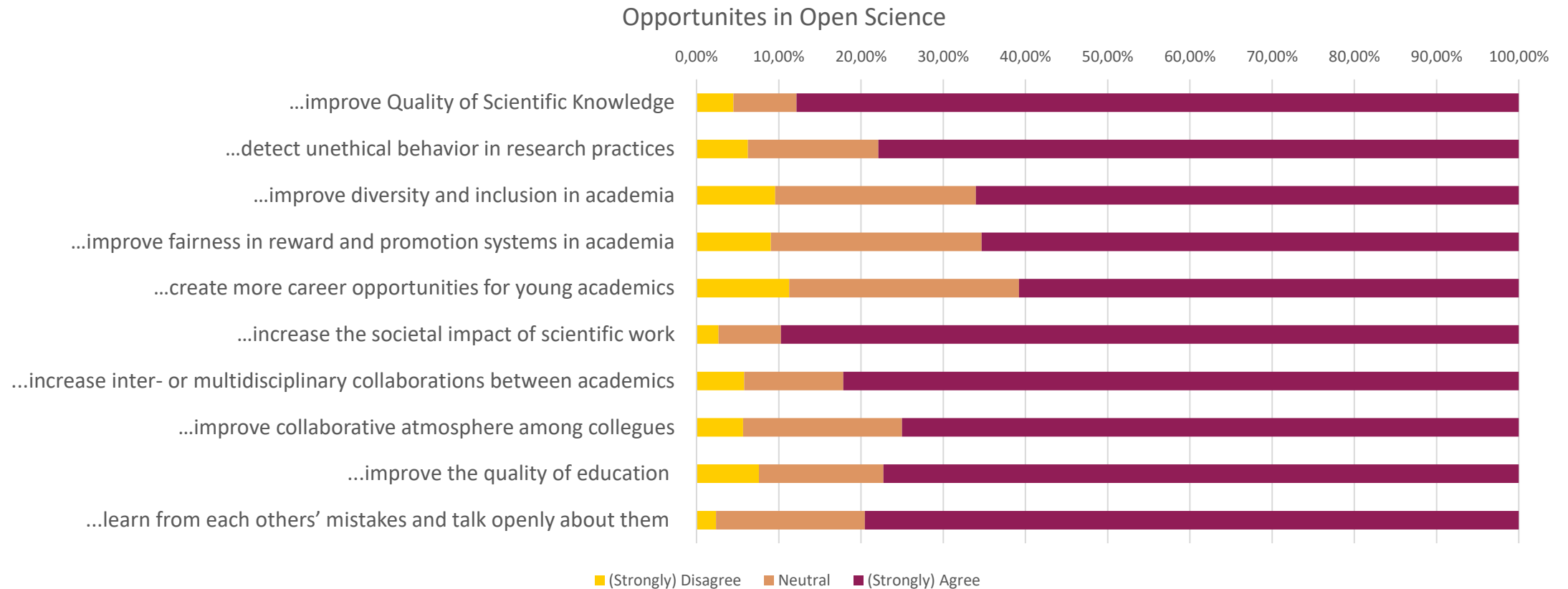


Attitude-Behavior Gaps for Each Practice



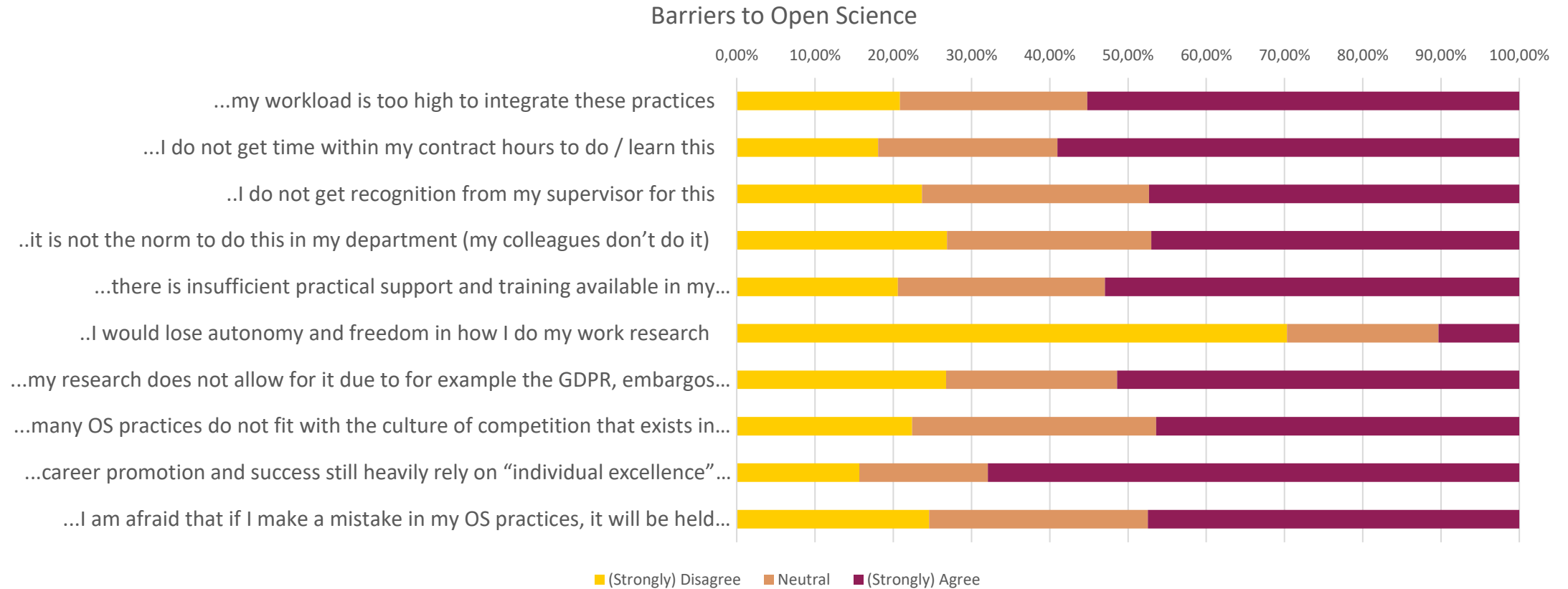
- All attitude-behavior gaps were statistically significant ($\alpha = 0.05$).
- The largest estimated attitude behavior gap was observed for Open Education Resources ($\eta^2 = 0.439$).
- The lowest estimated gap was observed for pre-registration ($\eta^2 = 0.286$).

Opportunities in open science



- Increase the societal impact of scientific work is seen as the biggest opportunity of open science
- Creating more career opportunity is seen as least as an opportunity of open science

Barriers in open science



- A too high workload is seen as the biggest barrier for open science
- Loosing autonomy and freedom is least seen as barrier for open science



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shaping tomorrow