



Malika Ihle, Dr

Reproducible Research Oxford Coordinator

RROx: “rocks”



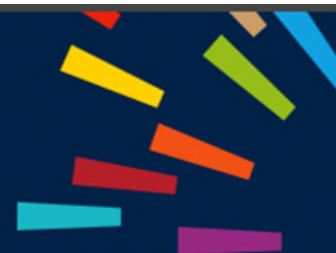
‘Open research at Oxford’ survey by Reproducible Research Oxford

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THE JOHN FELL FUND



Unhealthy research culture



Getting it published over
getting it right



Replicability crisis

Reproducible Research Oxford

1. Peer-to-peer training

(e.g. summer school, workshops, graduate programmes)

2. Community building

(e.g. grassroots initiatives, journal clubs, community discussions)

3. Liaising with stakeholders to inform design of incentives and policy

(e.g. House of Commons enquiry, University-wide survey)

<https://ox.ukrn.org/>

Transparency

Credibility

Replicability

Repeated independent studies likely to reach same outcome



Reproducibility

Same raw data +
Same question +
Same method =
Same conclusions

+

Reliability

Unbiased
Planned *a priori*

Accessibility



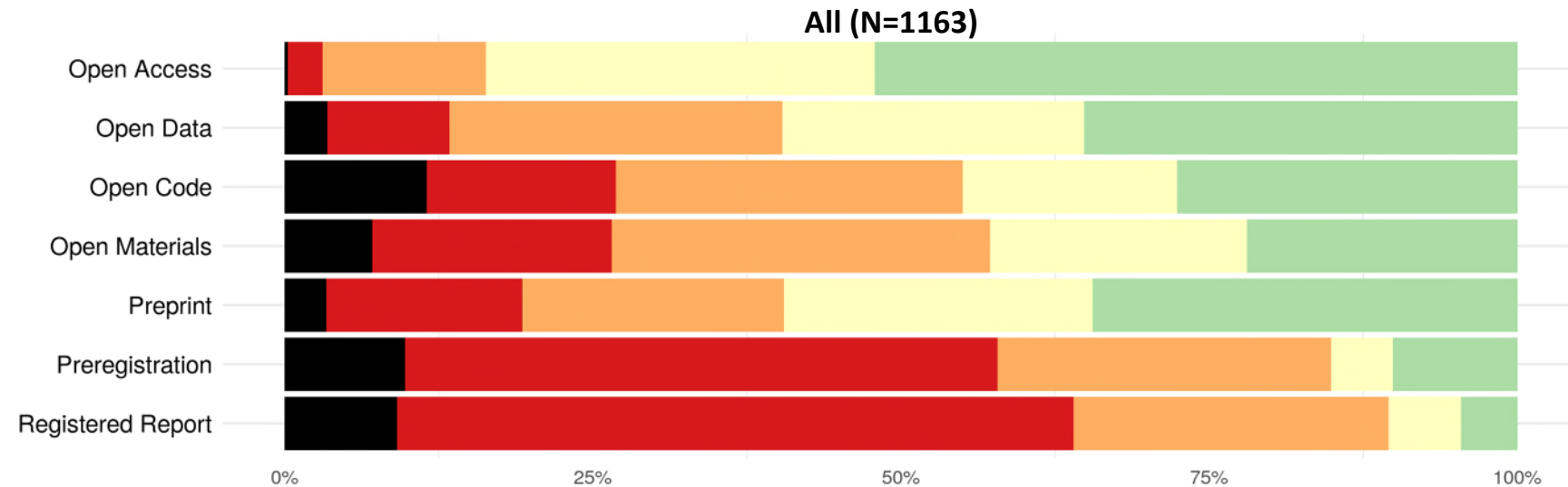
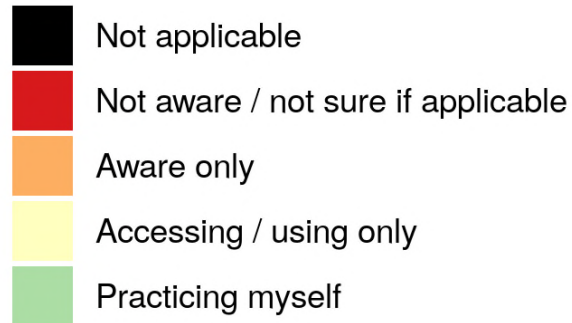
Confirmatory (5% false positive results) vs
exploratory analyses (>5%)

Survey "Open research at Oxford"

- Text CC BY 4.0 attribution: <https://doi.org/10.5281/zenodo.5845122> Malika Ihle, Dorothy Bishop & Laura Fortunato. (2022). Open research at Oxford survey.
- Round 1: Post-graduate research (PGR) students (Jan–March 2021)
- Round 2: **PGR students, research staff or fellows, research support staff, academics** (Jan–March 2022)
- Voluntary and anonymous
- N = **1,307** (8.8% of all University researchers)
- Attrition rate (22% on average) slightly increases from Medical Science Division (**MSD**), to Maths, Physics, and Life Sciences Division (**MPLS**), to Social Sciences Division (**SSD**), and to the Humanities Division (**Hum**).

Awareness

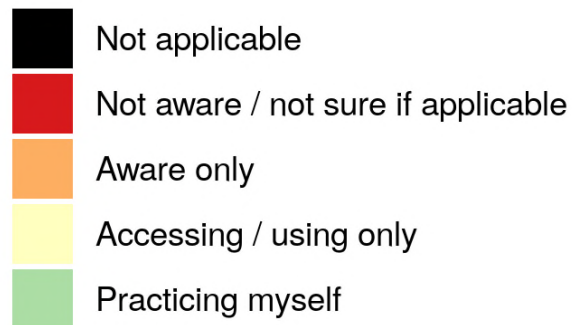
Which of the following research practices are you aware of, and which do you have experience with?



Awareness and usage vary between practices and to some extent by Division.
Many respondents aware but not practicing.

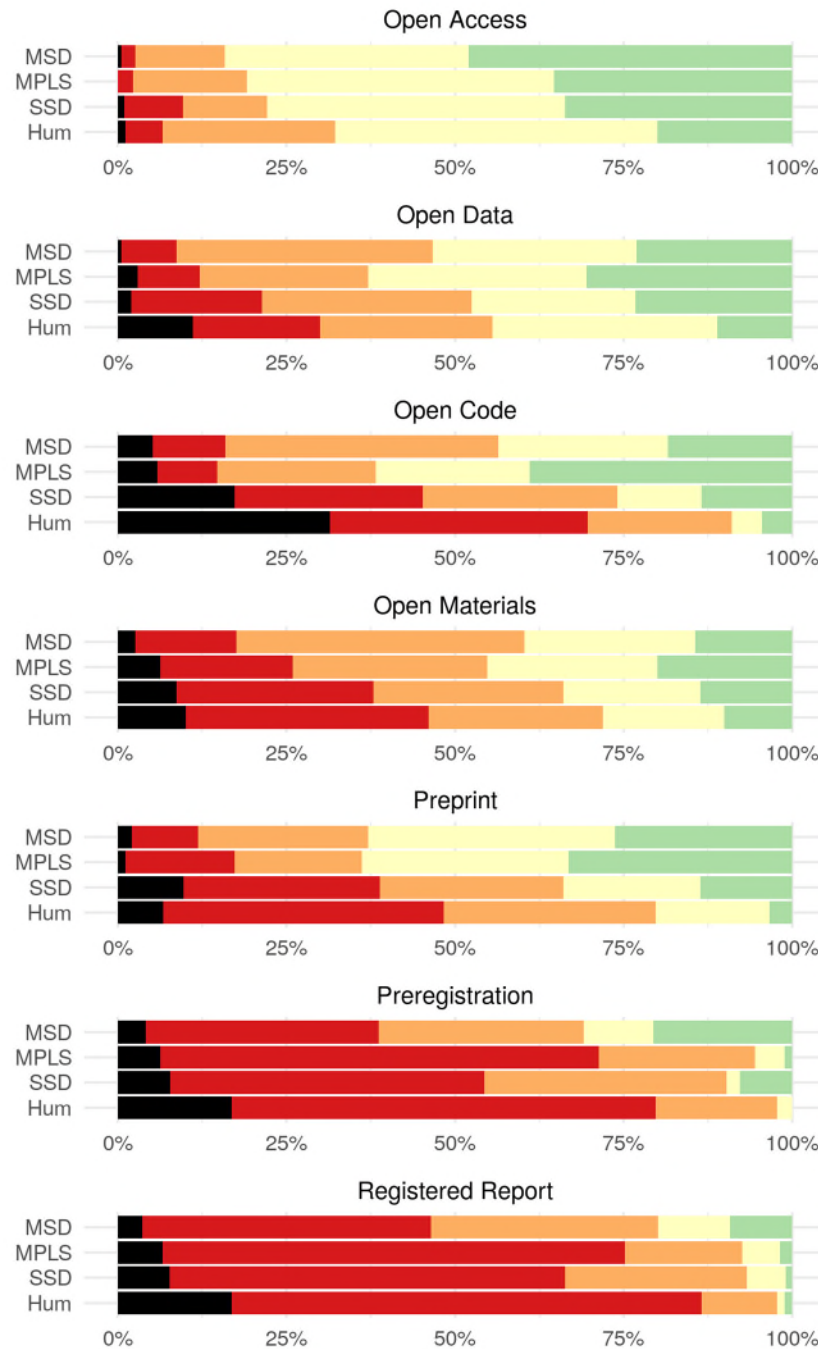
Awareness

Which of the following research practices are you aware of, and which do you have experience with?

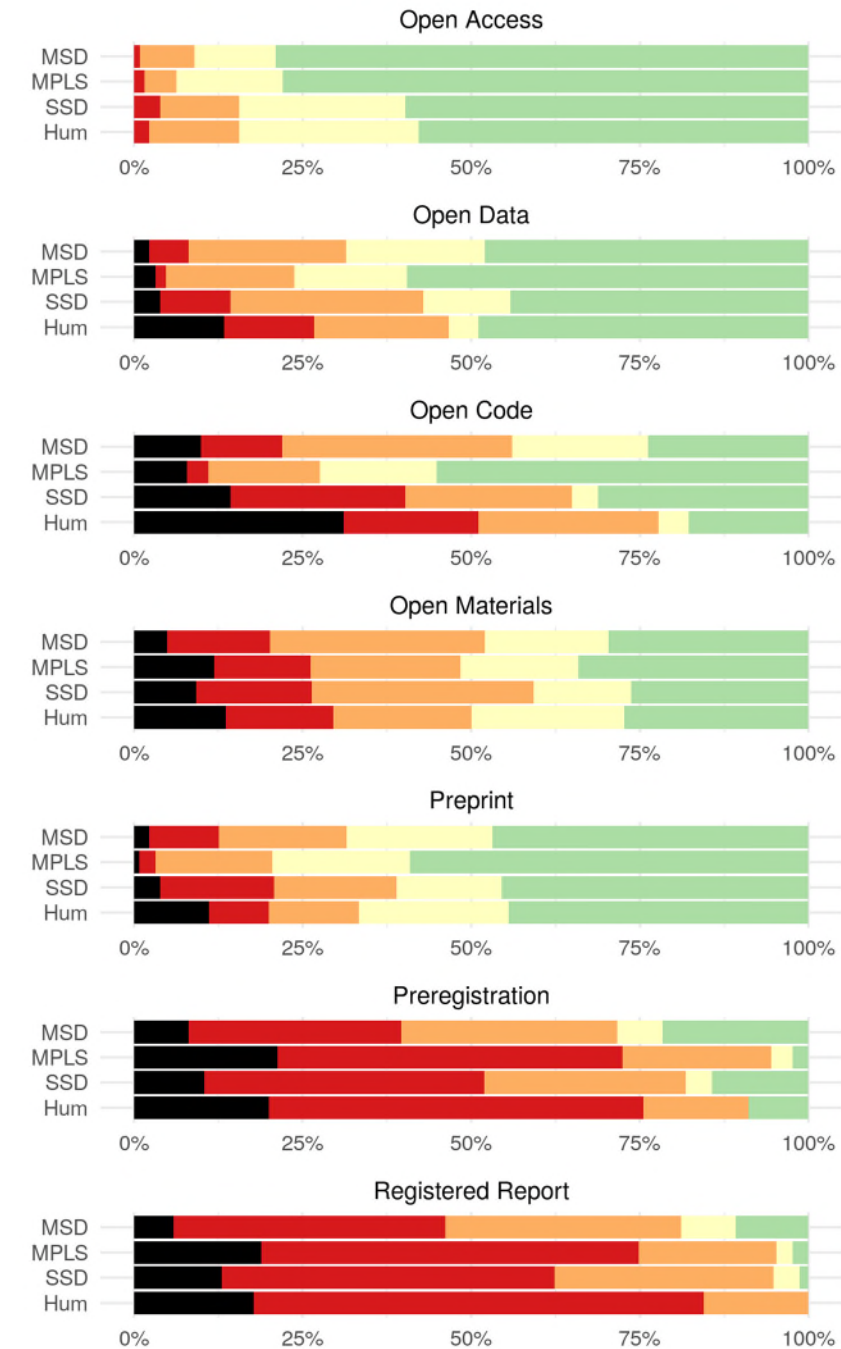


Awareness and usage vary between practices and to some extent by Division.
Many respondents aware but not practicing.

PGR students (N=662)

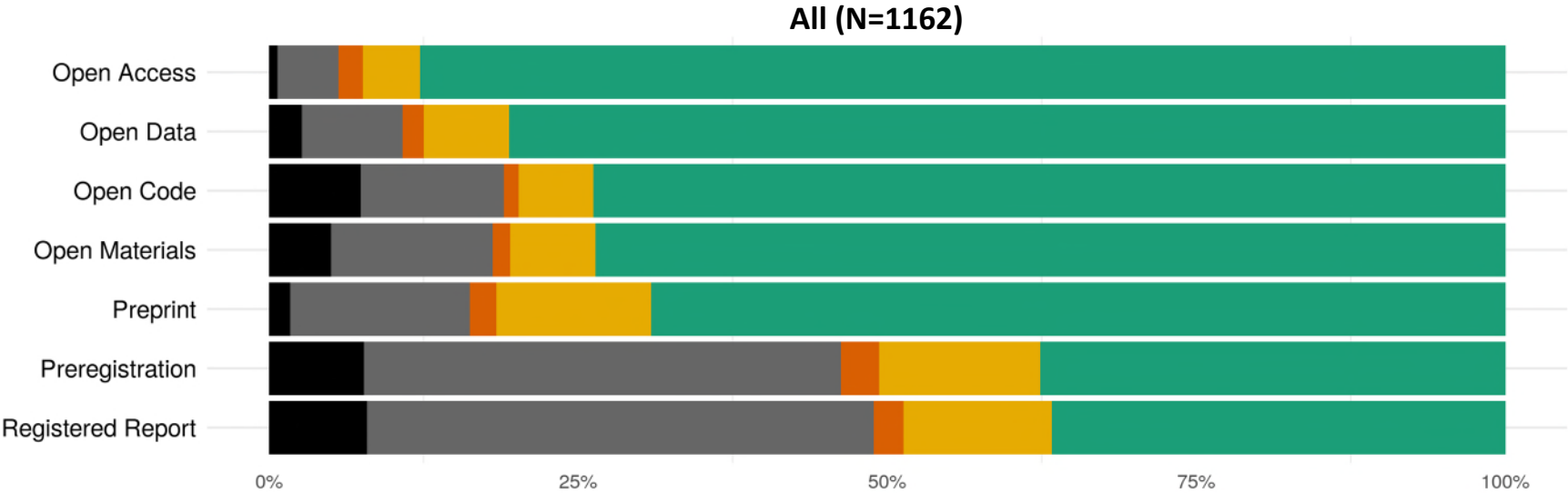
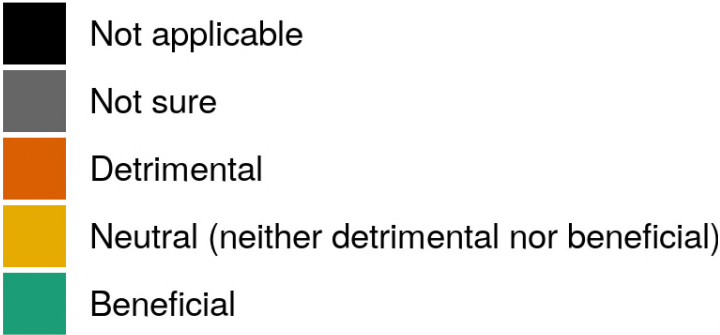


Researchers (N=473)



Effect

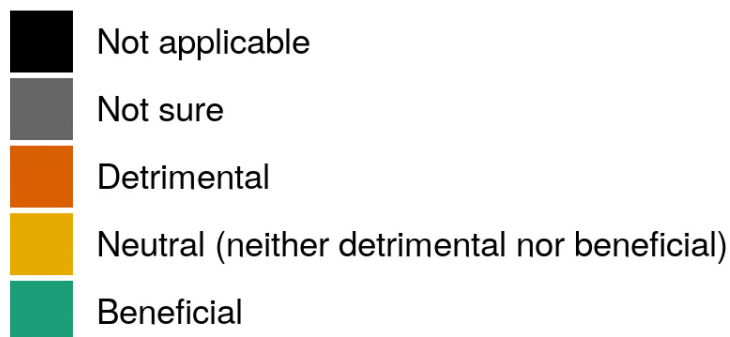
In your opinion, what would be the overall effect of widespread adoption of the following practices in your field of research?



Widespread adoption of Open Research Practices largely presumed to be beneficial, unless unaware of the practice(s)

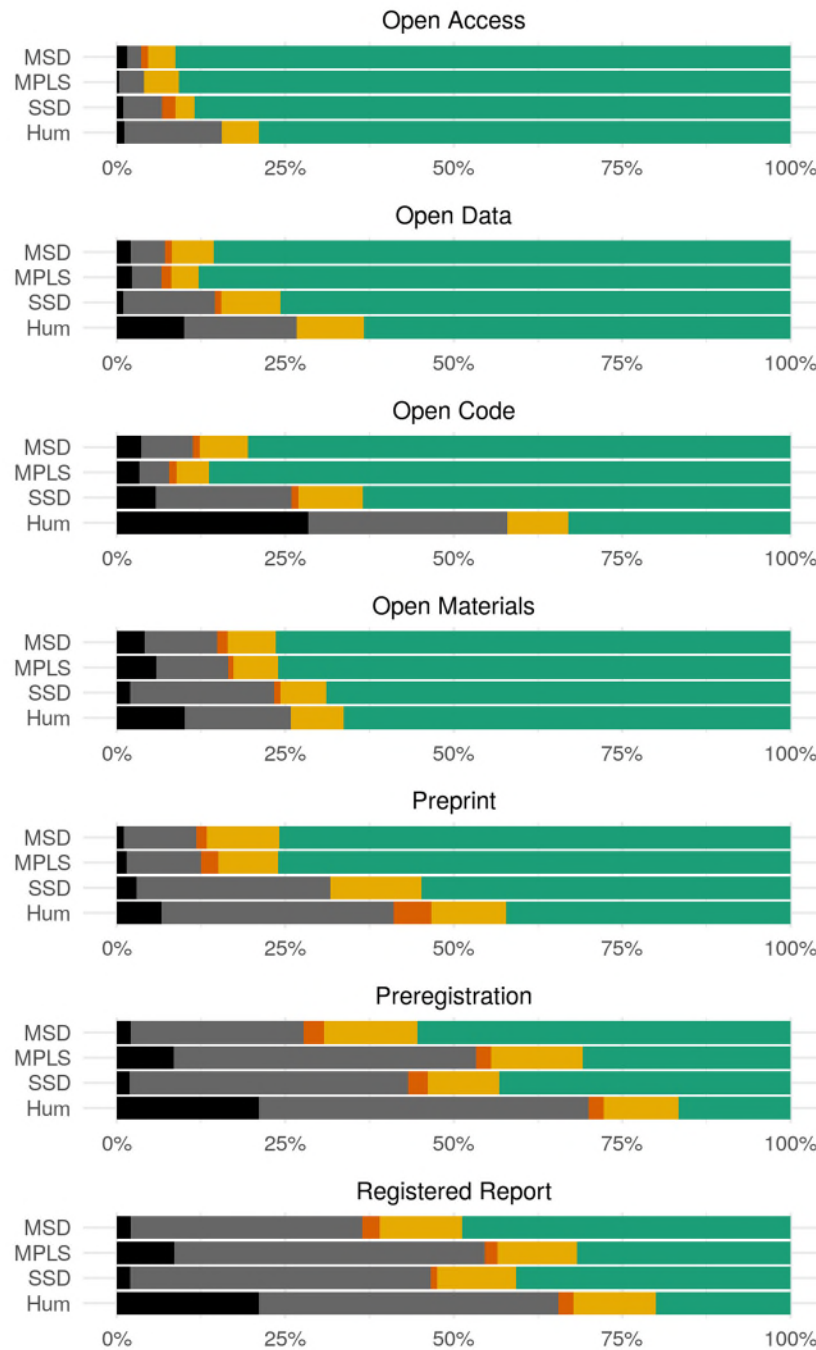
Effect

In your opinion, what would be the overall effect of widespread adoption of the following practices in your field of research?

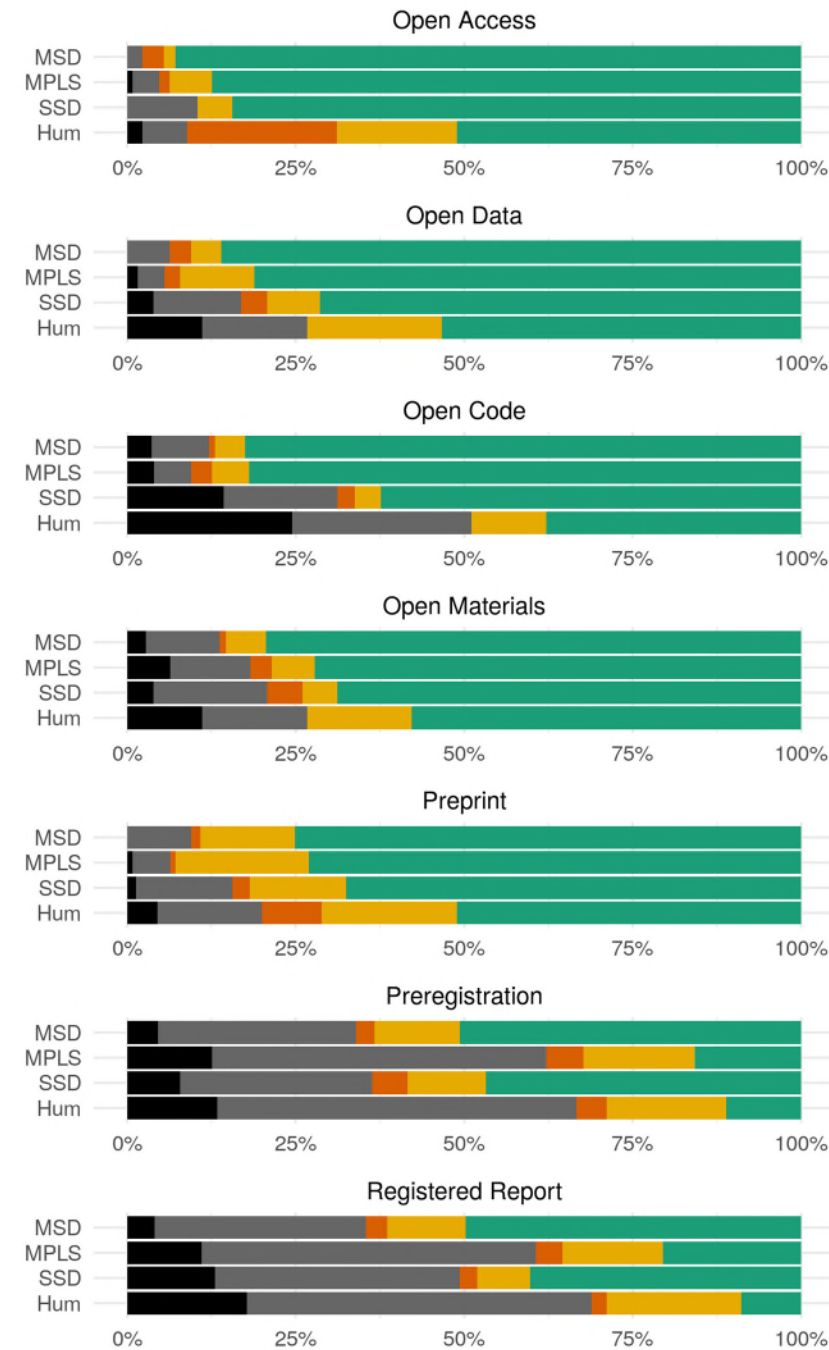


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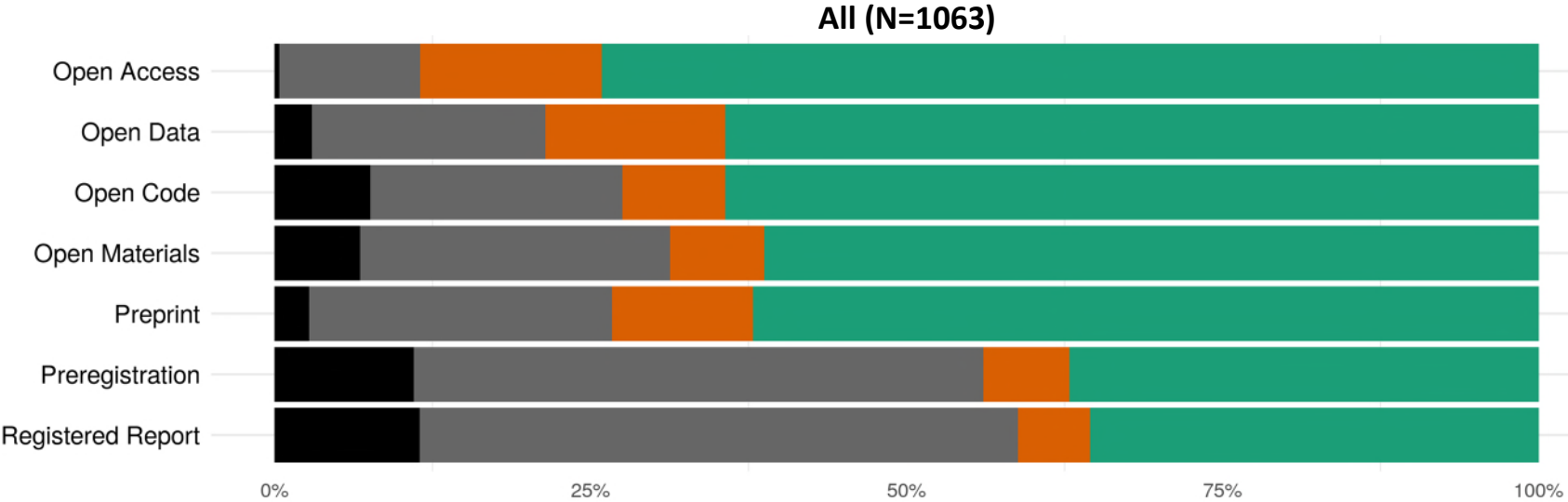
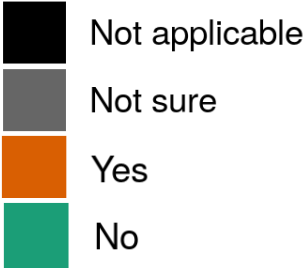


Researchers (N=473)



Downsides

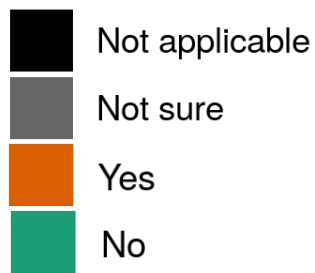
In your view, are there *any* downsides to widespread adoption of the following practices in your field of research?



Most respondents thought there was no downside associated with each ORP (unless unaware of it). OA and data sharing are less favoured.

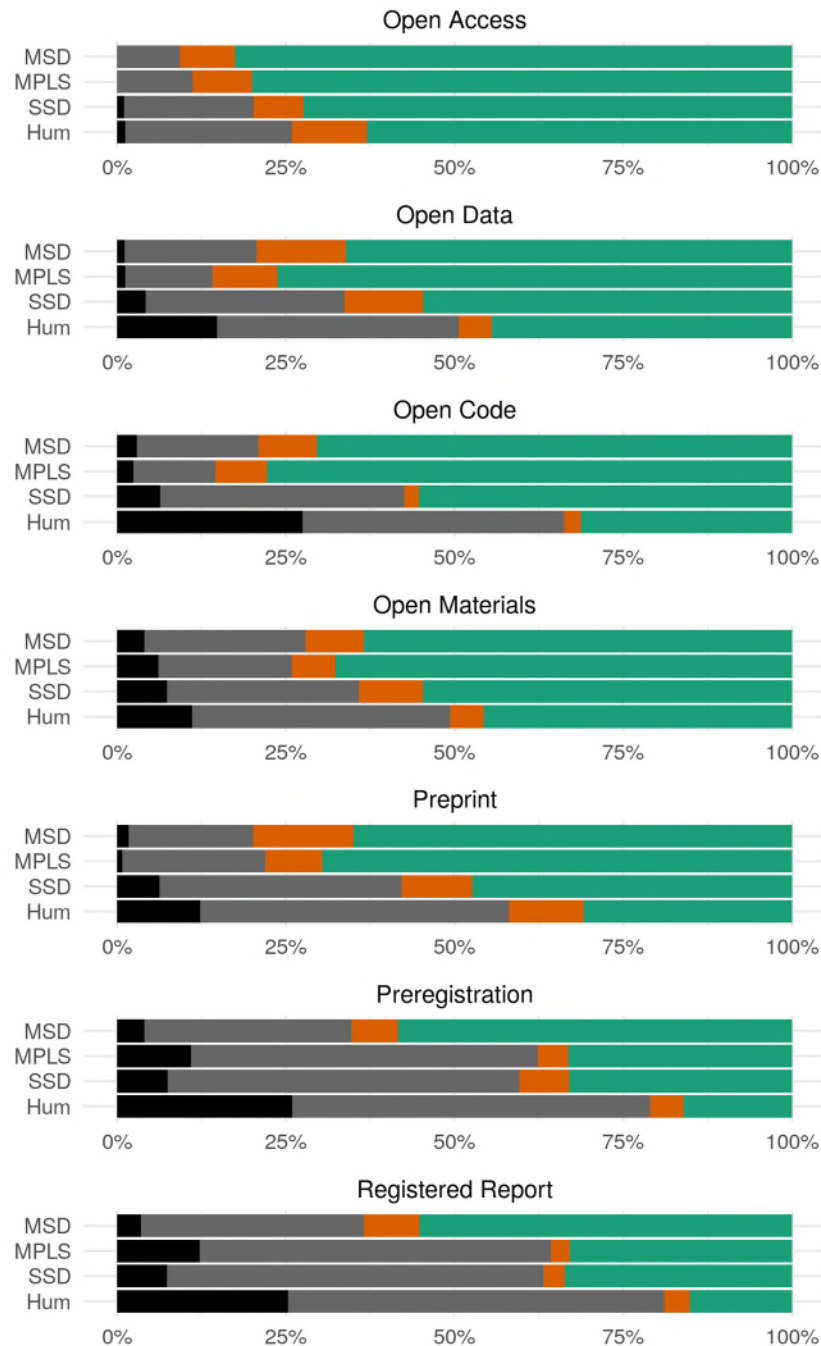
Downsides

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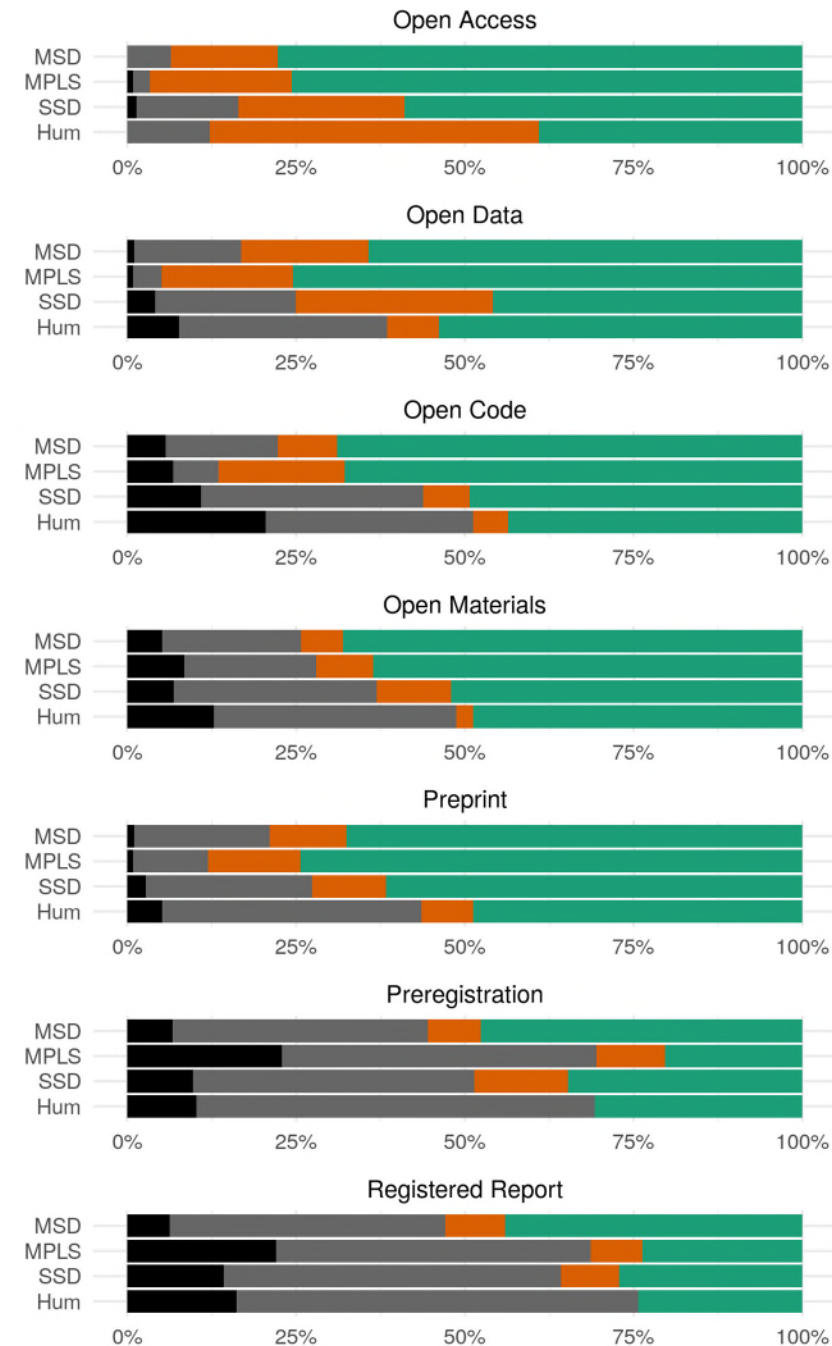


Most respondents thought there was no downside associated with each ORP (unless unaware of it). OA and data sharing are less favoured.

PGR students (N=601)



Researchers (N=435)



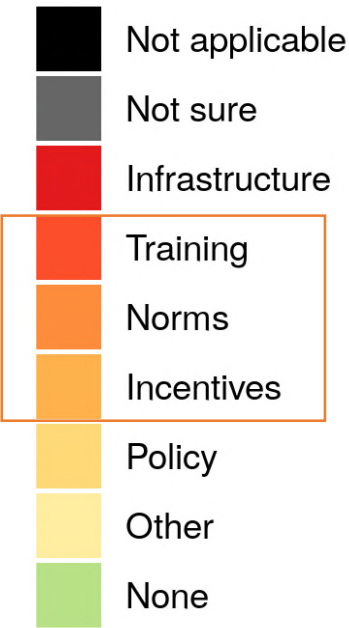
Practice	Downsides
Open Access publishing	<ul style="list-style-type: none"> - Financial cost → inequalities between researchers/fields/institutions - Predatory behaviours from publishing companies → lowers review quality - Loss of income for scholarly society, authors, or publisher of books or monographs
Data sharing	<ul style="list-style-type: none"> - Ethics, safety, or security concerns - Lack of control over the validity of reuse, misrepresentation, misuse - IP concerns, fear of scooping, lack of recognition for data collection, no citation norms - Not useful if no metadata standards or in proprietary file formats
Code sharing	<ul style="list-style-type: none"> - IP concerns, fear of scooping, lack of recognition; ethical, safety, security concerns - Lack of peer- review → propagate low quality research
Material sharing	<ul style="list-style-type: none"> - Ethics, safety, or security concerns; IP concerns, lack of recognition; Lack of control over the validity of reuse, misrepresentation, misuse - Cost of maintenance; lack of equitability in access
Preprint	<ul style="list-style-type: none"> - No peer-review → misleading readers - Extreme growth of literature - Race to publish first → lowers quality of research - Prevent formal publishing; Interference with double-blind peer-review - Duplicate versions → problem with updating citation
Preregistration; Registered Reports	<ul style="list-style-type: none"> - Disincentive or impede exploratory research - Impede flexibility in protocol Preregistration = practical impossibility or irrelevant practice? - Not applicable to all fields - Registered reports: Delay start of data collection

Changing research culture

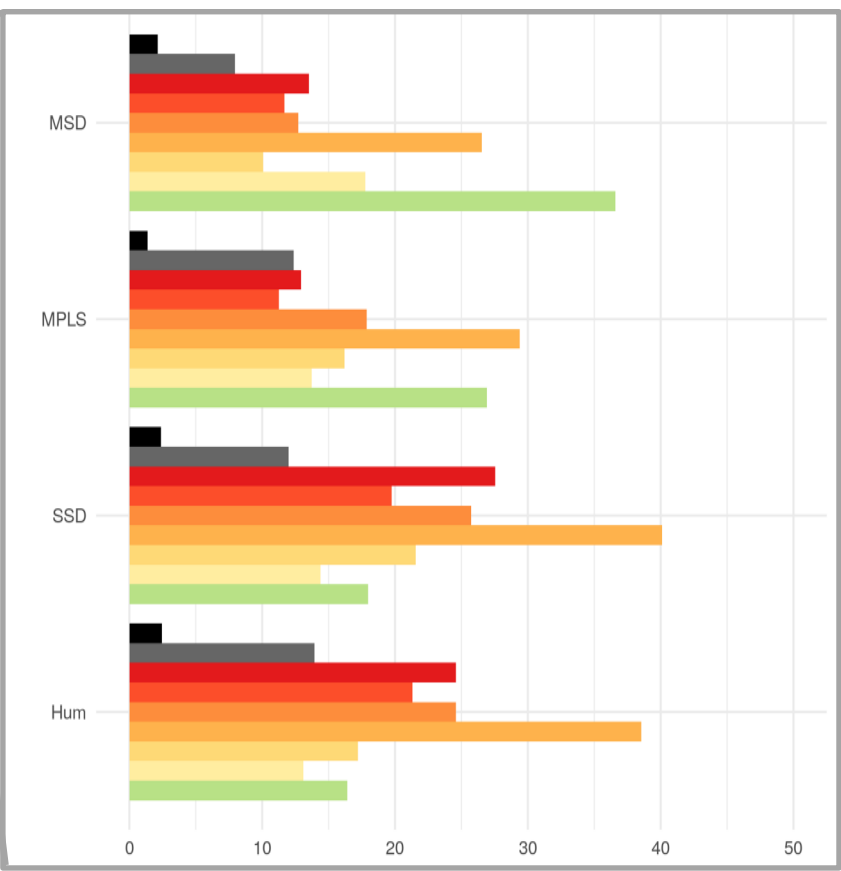
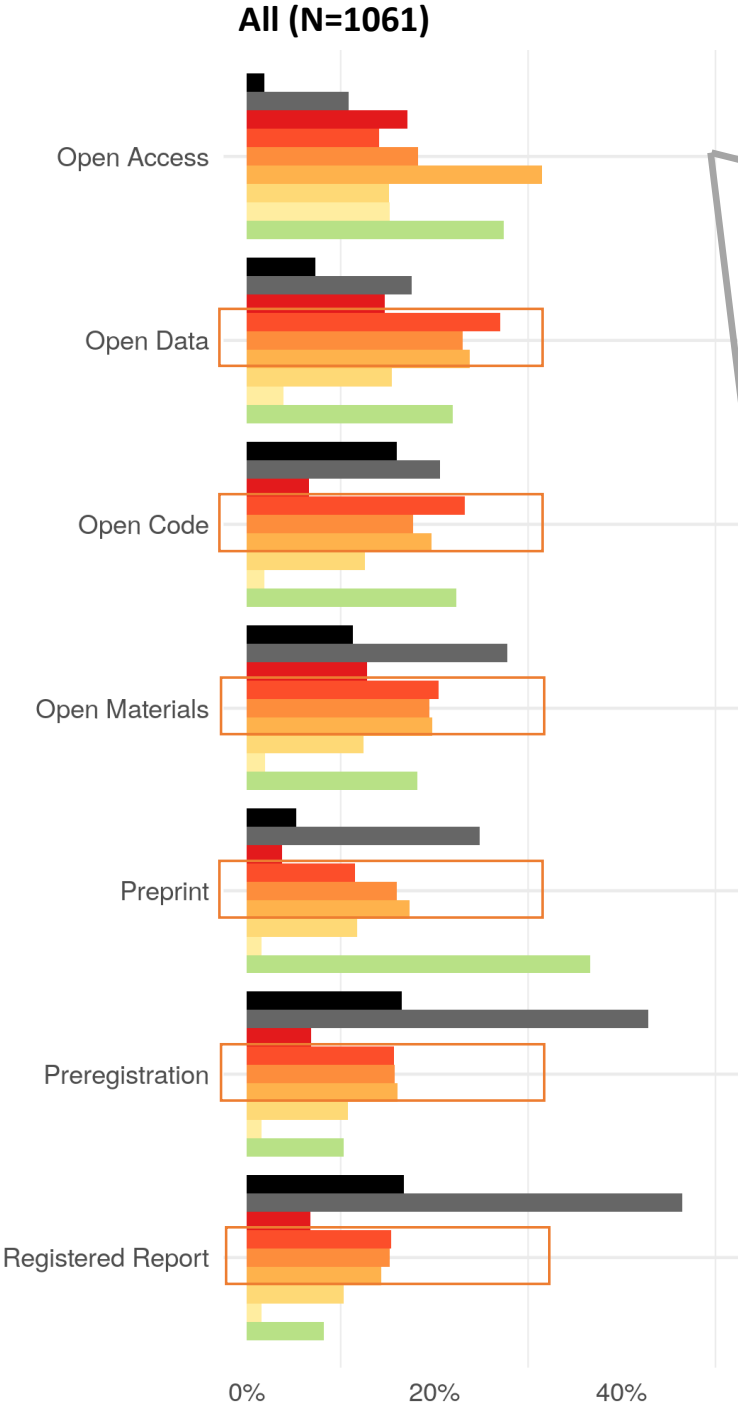


Barriers

Do you face any barriers in adopting the following practices and, if so, what are they?



Most respondents thought there were barriers to adoption of ORPs, especially a lack of training, norms, and incentives, followed by a lack of policy and infrastructure.



Recruitment criteria

To the best of your knowledge, to what extent **are** the following criteria used for recruitment in your field of research at Oxford?

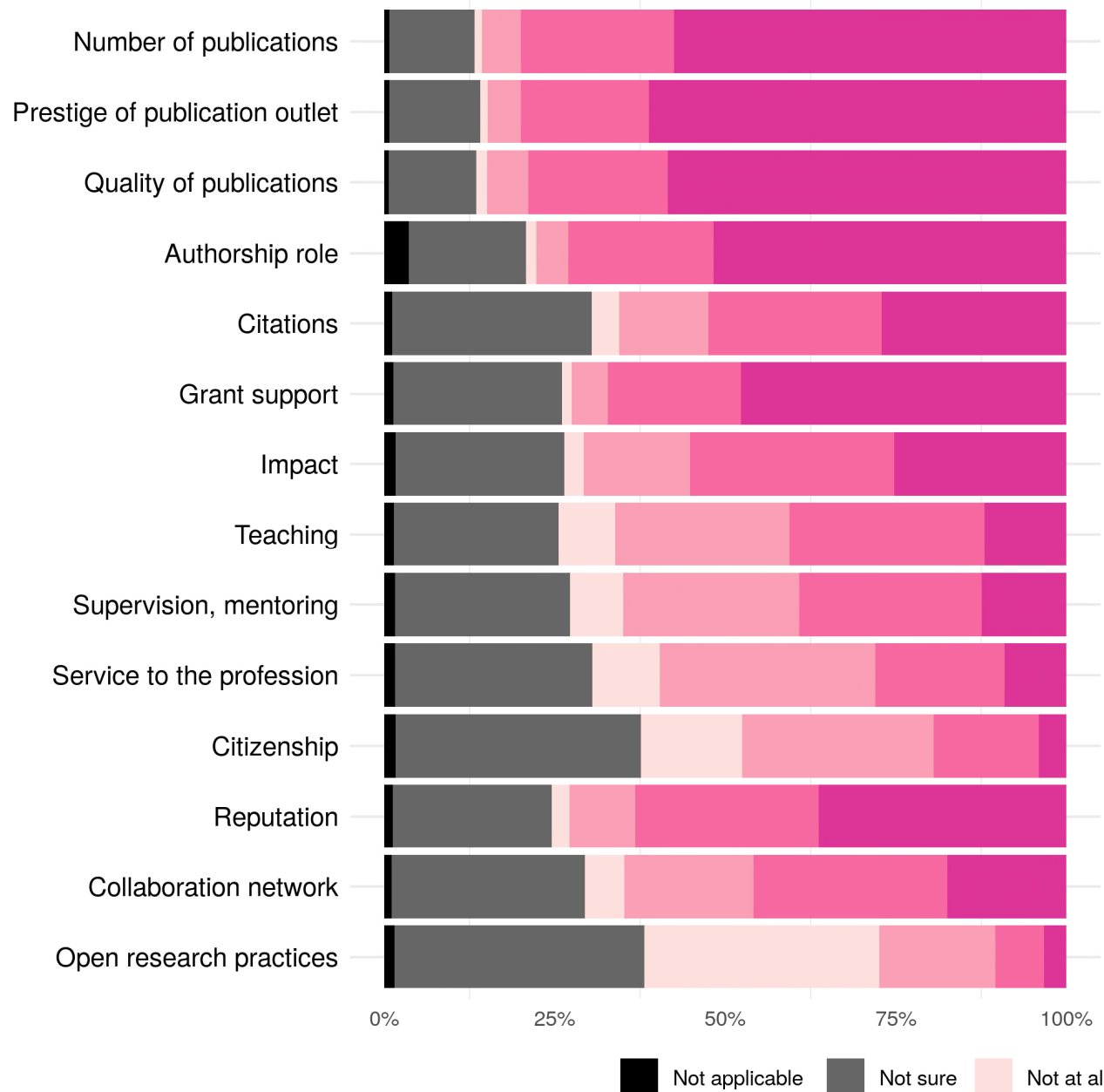
In your opinion, to what extent **should** the following criteria be used for recruitment in your field of research at Oxford?

General agreement on the direction of change between currently used vs desirable recruitment criteria; variation in importance of specific criteria between Divisions.

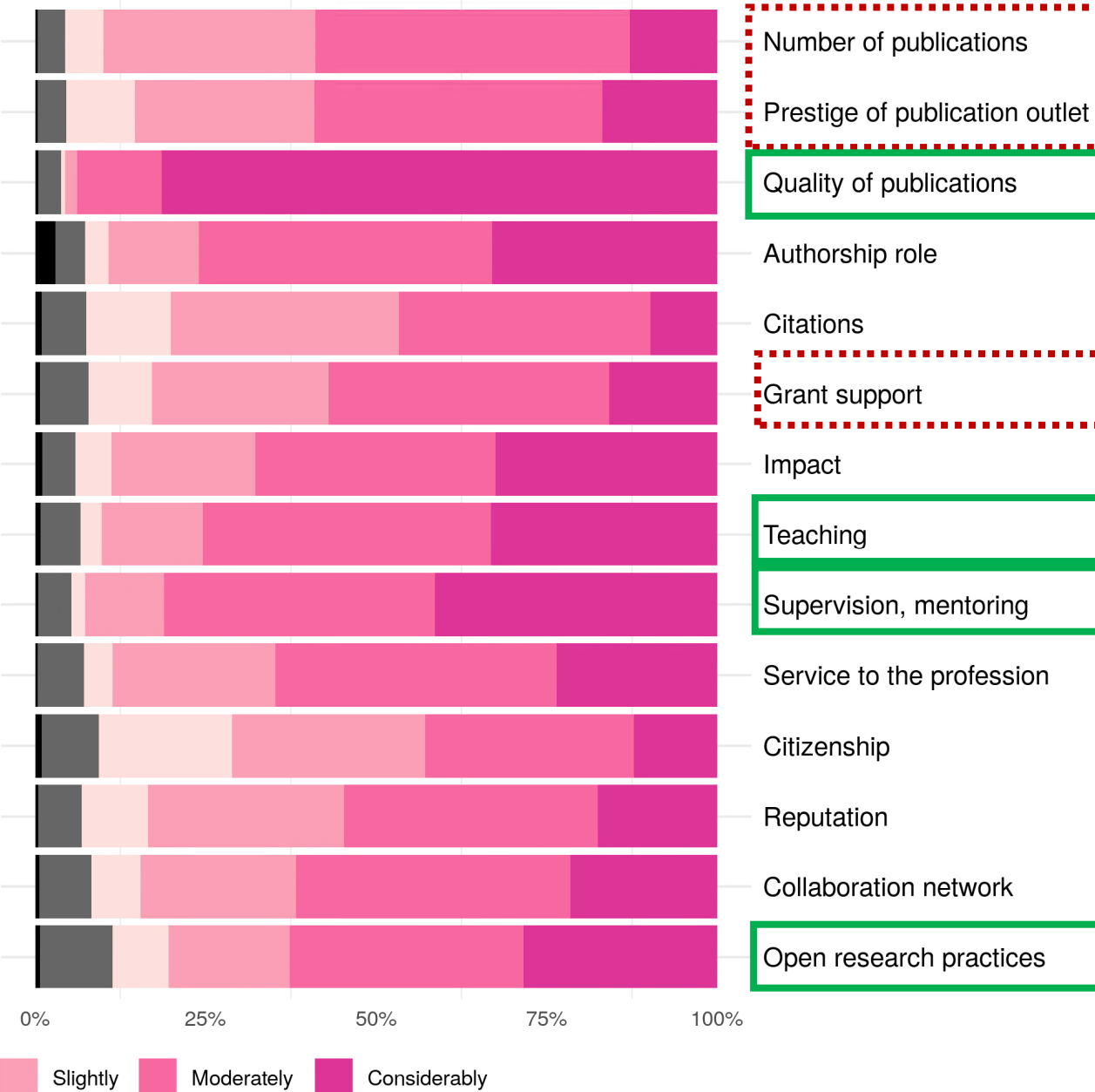
The criteria to score were:

- **Number of publications**
- **Prestige of publication outlet**
- **Quality of publications**
- **Authorship role** (e.g. lead or senior author vs. contributing author)
- **Citations** (e.g. total number, h-index)
- **Grant support** (e.g. total amount, source)
- **Impact** (e.g. policy, medical applications, patents, media coverage)
- **Teaching** (e.g. amount, quality, creation of materials)
- **Supervision, mentoring** (e.g. amount, quality)
- **Service to the profession** (e.g. editorial work, contributions to the work of professional bodies or learned societies)
- **Citizenship** (e.g. involvement in departmental or University committees)
- **National and/or international reputation** (e.g. recognition, awards)
- **Collaboration network** (e.g. size, strength)
- **Open research practices**

**Perceived current recruitment criteria
(N=1028)**

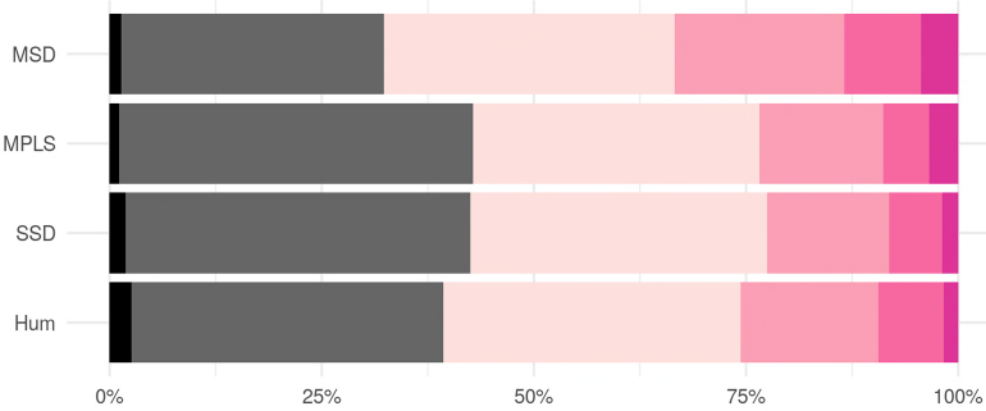


**Desired future recruitment criteria
(N=1024)**

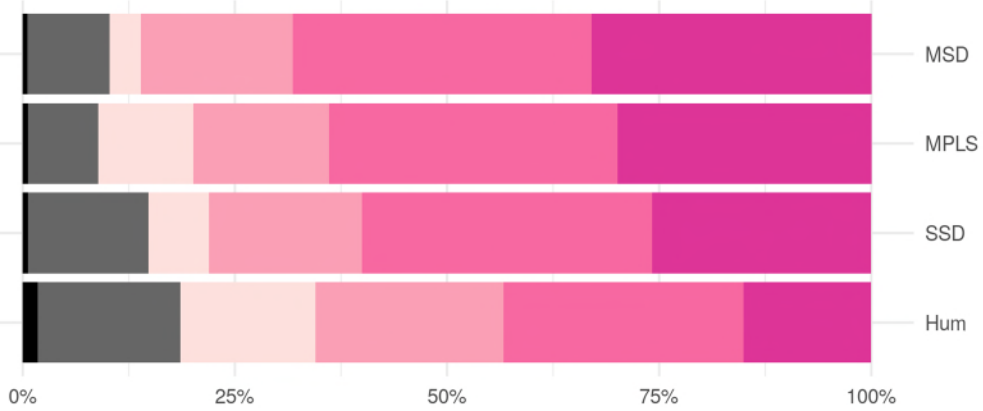


Open research practices

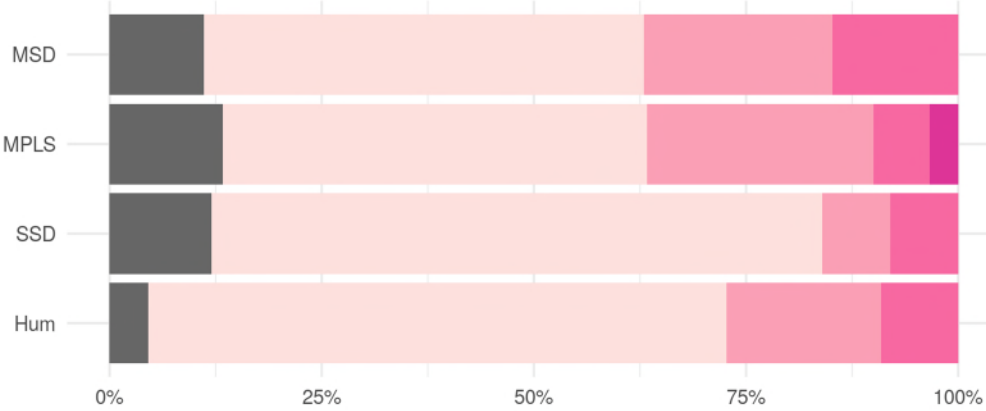
Perceived current recruitment
Non-Academics (N=992)



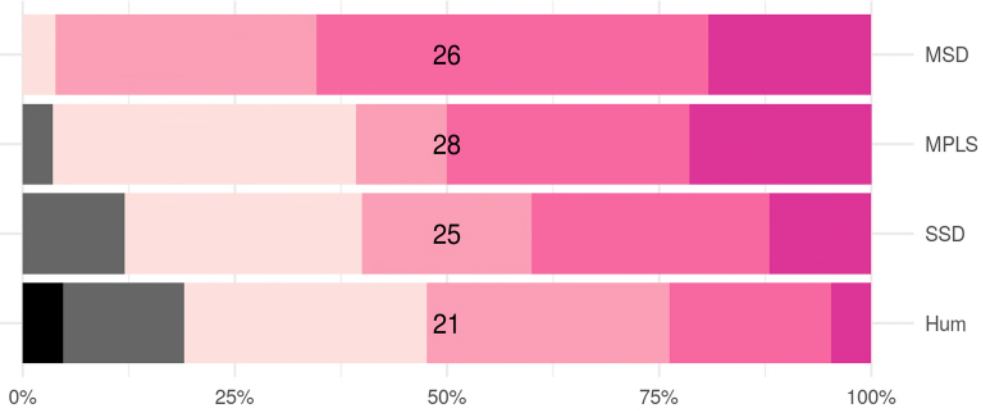
Desired future recruitment
Non-Academics (N=958)



Academics (N=104)



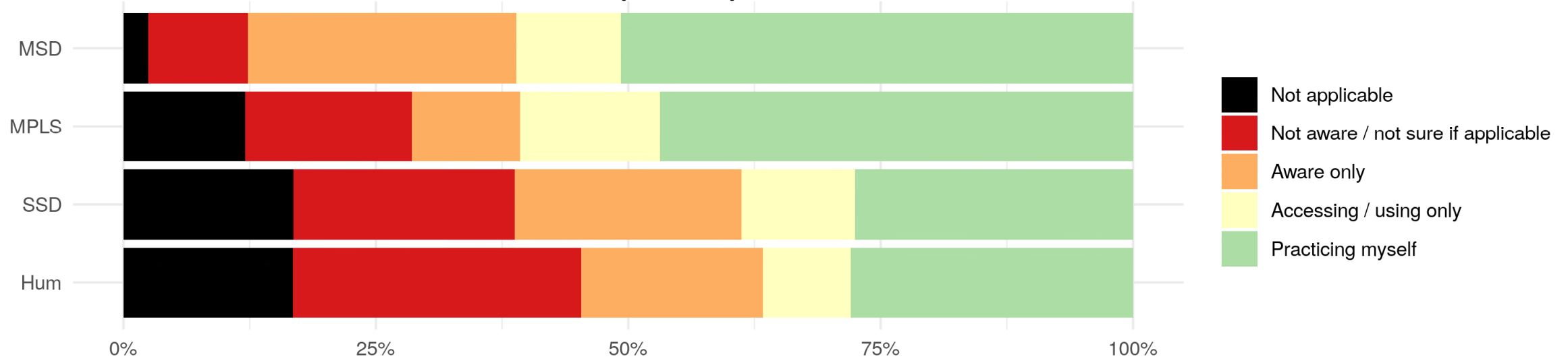
Academics (N=100)



Not applicable Not sure Not at all Slightly Moderately Considerably

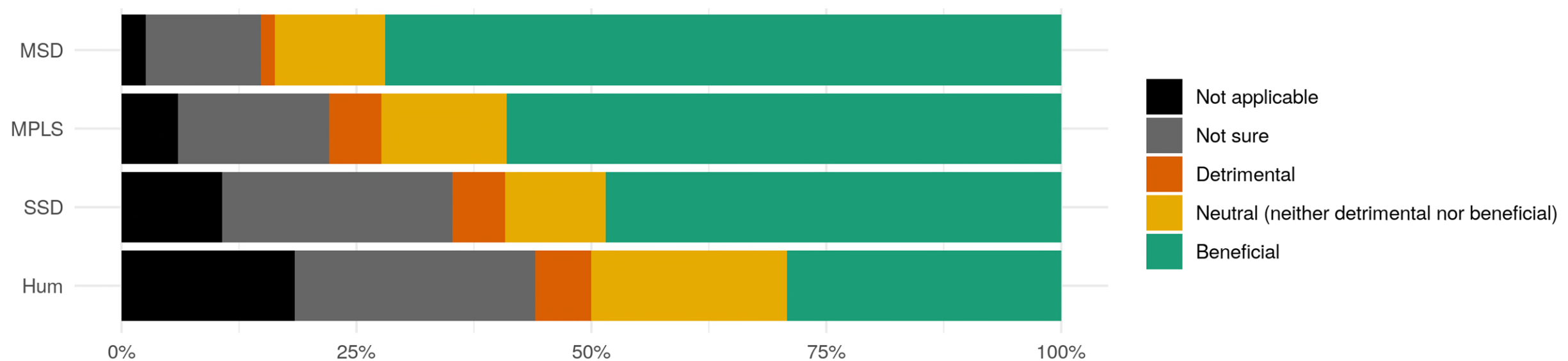
Average awareness across all ORPs

Academics (N = 112)



Effect of widespread adoption averaged across all ORPs

Academics (N = 111)



Training

For which of the following topics do you think more guidance is necessary?

The topics listed were:

- How to publish open access articles, theses, or monographs [**Open Access**]

- How to prepare data management plans [**Data Management Plan**]

- How to prepare data and metadata for archiving, and possibly for sharing in a public repository in line with community standards [**FAIR data**]

- How to prepare ethics applications that allow archiving of anonymised data in a public repository [**Ethics**]

- How to write good quality code (including unit testing, version control, reproducible documentation) and share it publicly (e.g. selection of a repository that assigns a DOI) [**Open Code**]

- How to prepare materials for sharing (e.g. in a digital repository that assigns a DOI, or in a physical repository) [**Open materials**]

- How to choose and apply licences for sharing resources (e.g. data, materials, and/or code) and navigate relevant legislation (including copyright law, privacy and GDPR law, commercial law, and institutional regulations) [**Licences**]

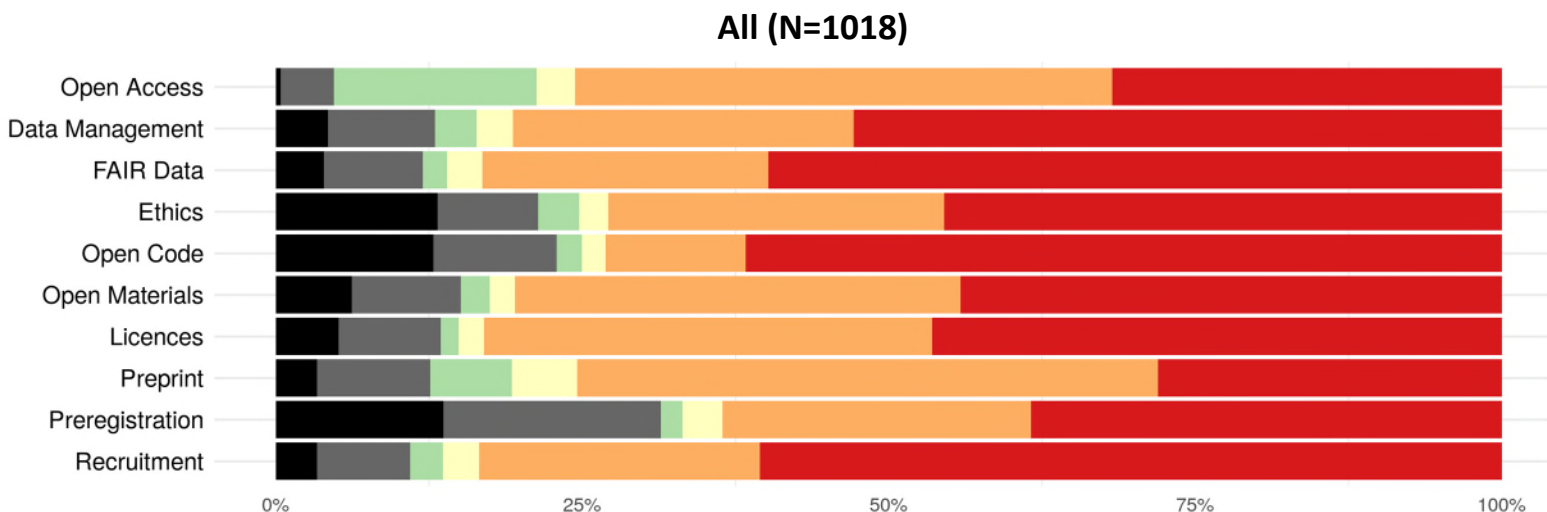
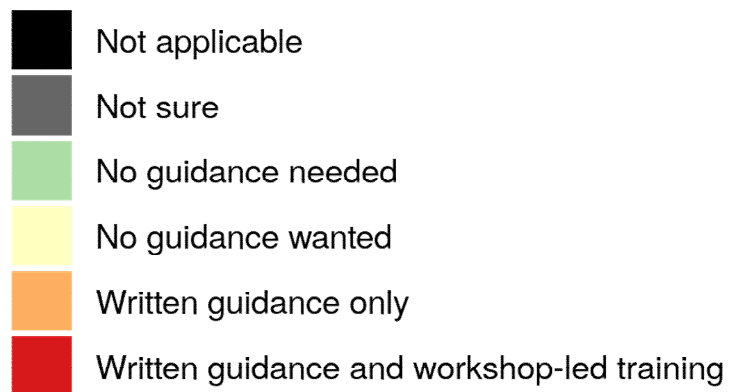
- How to prepare preregistrations and/or registered reports (including experimental design, statistics, data simulation) [**Preregistration**]

- Guidance on sharing preprints (e.g. selection of appropriate repository, consideration of publisher's rights, ethical considerations) [**Preprint**]

- How to assess job applications responsibly, fairly, and transparently [**Recruitment**]

Training

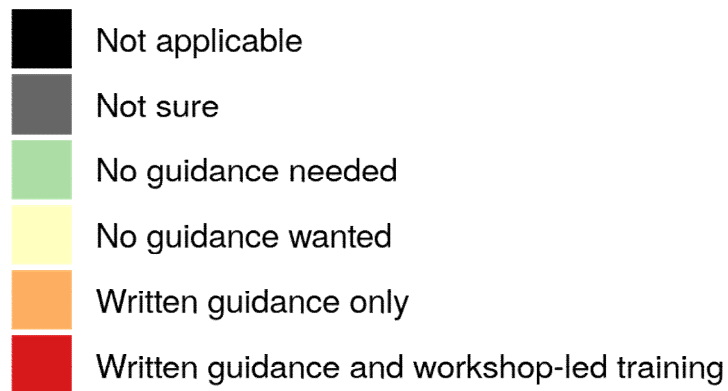
For which of the following topics do you think more guidance is necessary?



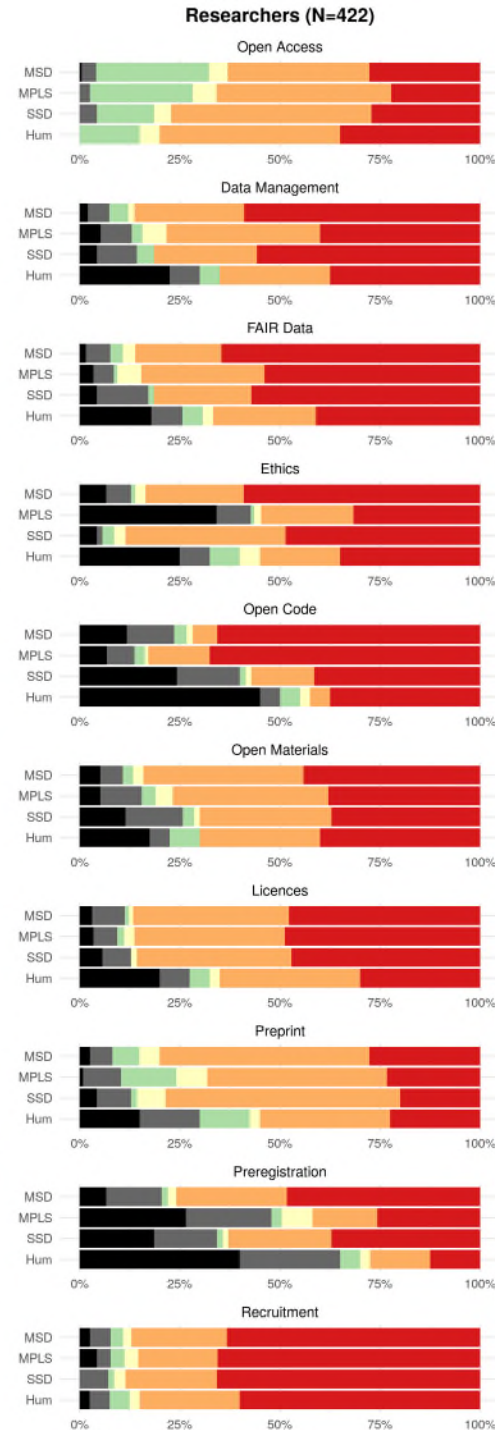
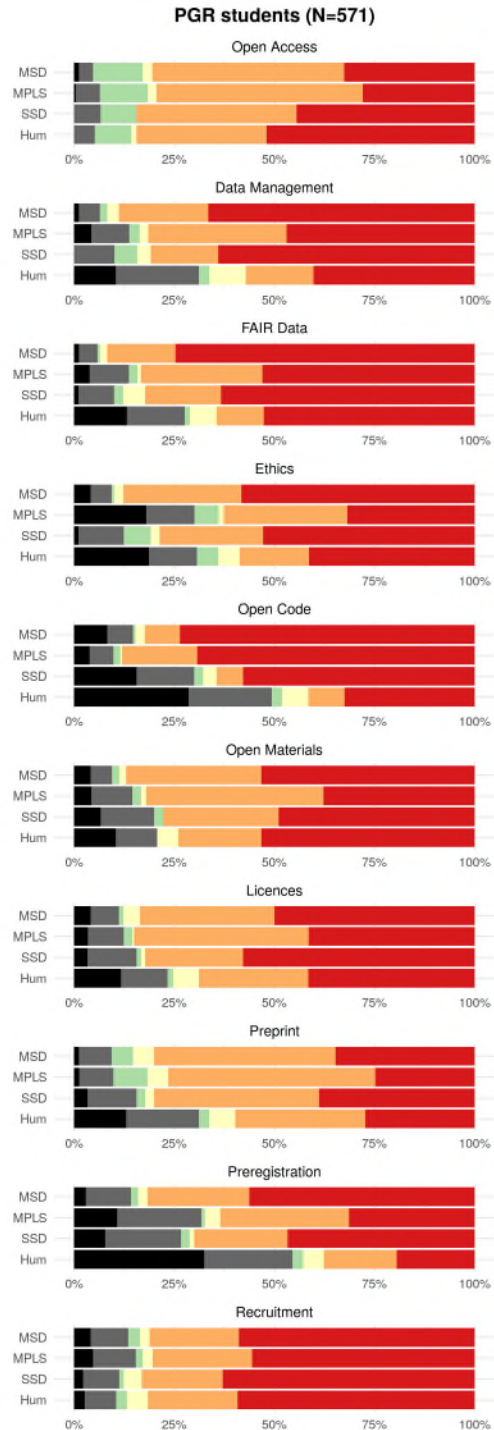
Strong demand for training. Some variation between Divisions if practice not applicable to all fields

Training

For which of the following topics do you think more guidance is necessary?



Strong demand for training. Some variation between Divisions if practice not applicable to all fields



Support

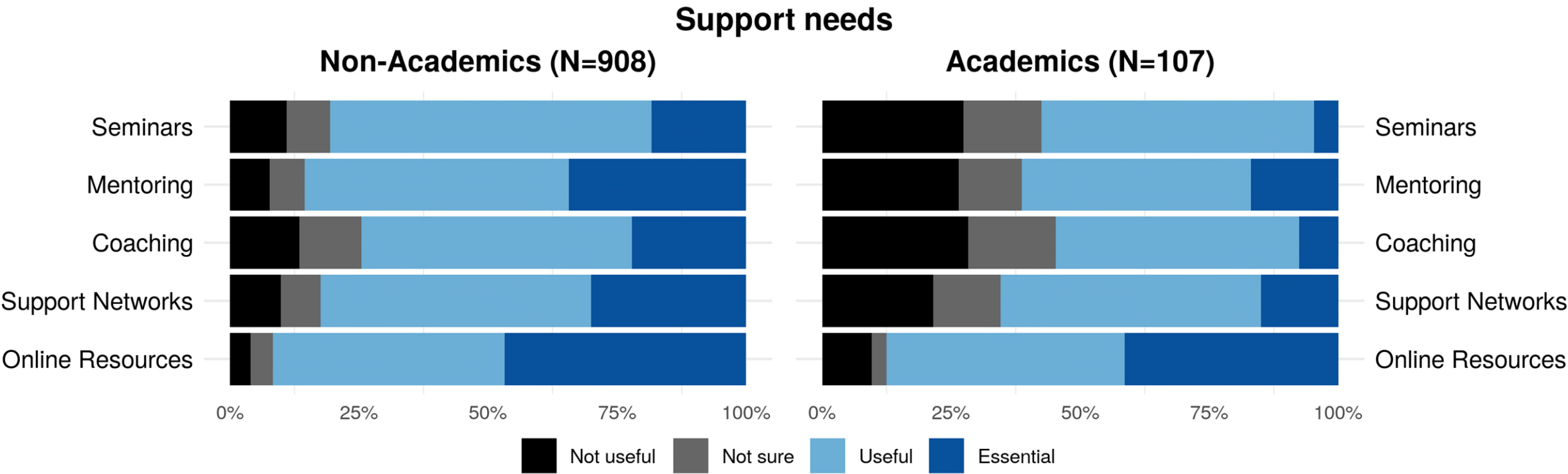
What additional support would you find useful to implement open research practices?

The list of support suggested was:

- **Seminars** introducing relevant topics
- **Online resources** collating case studies and tips.
- **Support networks** open to researchers from all career stages, with a focus on sharing experience and good practice
- **Mentoring** from an expert in your field who has experienced similar challenges and can provide specialist advice as needed
- **Coaching** support from a trained coach who can help you explore options and identify what may work best for you to tackle either focused problems or strategic longer-term issues

Support

What additional support would you find useful to implement open research practices?



Agreement that online resources are largely useful or even essential. Mentoring and support networks also considered important forms of support for non-academics, followed by coaching and seminars

**+ Funding
Univ. endorsement
Advocacy**

Summary

- **Awareness** varied between practices (~25% unaware on average, range: 3%-55%), with a large proportion of respondents **aware of open research practices but not practicing them** (45%).
→ *downsides or barriers?*
- Widespread adoption of ORPs largely presumed to be **beneficial**, and majority of respondents (~65%) thought there was **no downside** associated with each ORP (with notable exceptions, e.g. concerns over costs & inequities, ethics, giving away resources that a researcher's career depends on...).
- Around 40% of respondents thought there were **barriers** to adoptions of ORPs, especially a lack of **training, norms** and **incentives**, followed by a lack of **infrastructure**, and **policy**. (40%: not sure or not applicable; 20%: no barriers).
- Strong demand for **training** (i.e. online guidance and/or workshops, ~80% of respondents), and large demand for community **support** (e.g. mentorship, support networks, ~80% of respondents).
- General agreement on the direction of **change** between **currently used vs desirable recruitment criteria** that aligns with the DORA principles (i.e. no JIF-based assessment); but the importance of specific criteria varies between Divisions (e.g. academics in MSD thought ORPs were a very desirable criterion).

Recommendations

- Provide comprehensive and systematic **training** to all staff and students, with modular structure to account for different needs by discipline
- Create central **online guidance** 'Choose your own path through the research cycle'.
- Propagate **norms**, through community building, **mentorship** programme, support **network**.
- To develop **incentives**, run follow-up focus groups with academics regarding **recruitment criteria**.
- To mitigate further **barriers** (infrastructure, norms, incentives, policies, funding), need to liaise and coordinate actions with **stakeholders**.
- No blanket **policy**: run community discussions / consultations in the humanities / SSD to adapt approach to what is beneficial to these fields.
- **Equitability** (of access to resources, infrastructure, and support) should be built in all programmes.

Why bother?

priorities for advancing Research & Innovation culture

Supporting the implementation of
locally-relevant projects that map to a
small number of **interconnected** university priorities

Research practice

Enabling researchers
to do reliable,
reproducible, and
transparent research



Valuing contributions

Recognising a
diversity of talents,
skills, & outputs, and
evaluating them fairly



Careers

Supporting
researcher careers
by focusing on
career destinations



Aligned policies, support, incentives

research practice: support, reward, and celebrate what we value

Define

- Research integrity & ethics
- Open research
- Research data management
- Reproducible and transparent research
- Responsible research & innovation
- Research impact

Simplify

- Research fundamentals **training**
- **Online guidance** 'Choose your own path through the research cycle'.

Support

- Appropriate policies, guidance, tools, training in research practice
- Delivery via super-team with collective institutional responsibility (e.g. IT, HR, Bodleian, Divisions)
- Embed enablers in our systems

Reward

- Review recruitment, promotion, retention to reward what we value

Institutional leadership

- Academic Lead for Research Practice
- Institutional Lead for UK Reproducibility Network (UKRN)

Sector connectivity

- Institutional membership of UKRN
- National and international groups to:
 - Reform academic assessment
 - Track open research practices
 - Implement the narrative CV
 - Develop common standards of practice

UK Reproducibility Network (UKRN)

61 local networks

researchers (many early-career)
coordinating **grassroots initiatives**

www.ukrn.org/local-network-leads/

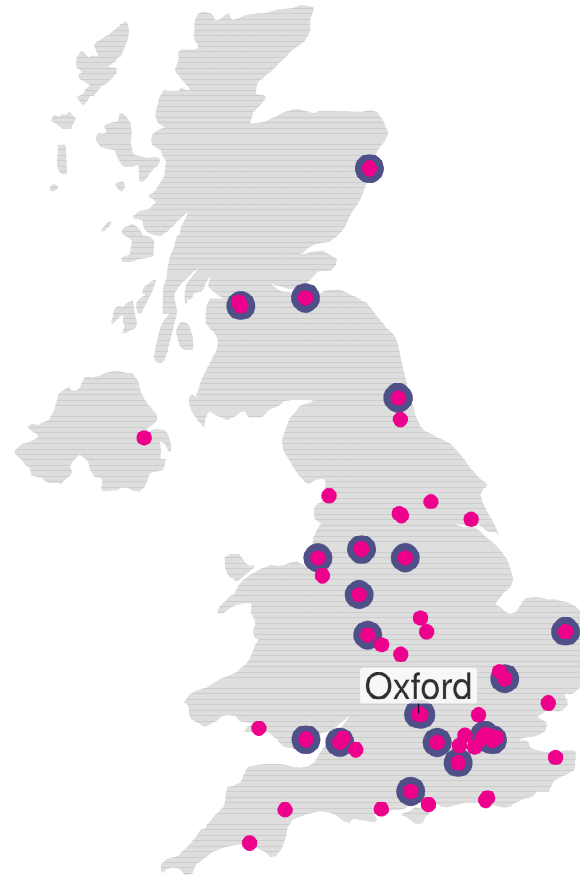
since 2019: **Malika Ihle**

23 institutional members

an **academic** appointed as
UKRN Institutional Lead

www.ukrn.org/institutional-leads/

since 2022: **Laura Fortunato**



44 external stakeholders

e.g. funders, publishers, learned societies

<https://www.ukrn.org/stakeholders/>



Map by Adam Kenny

3-year plan for institutional membership of UKRN (2022-2025)

“Growing and embedding open research in institutional practice and culture”, supported by the Research England development Fund (2021-2026)

1. Curation of existing training resources on open research and reproducibility
 - develop curated list that maps onto UK national strategic priorities
 - categorise training resources by stage in the "research journey"
2. Survey to identify training gaps across the UK
 - design informed by experience with SSI, UKRN, Surrey, RROx survey
3. Sharing effective practice across partner institutions and the wider sector, to align incentives nationally and, where possible, beyond the UK
 - online platform to search by practice, training, institution



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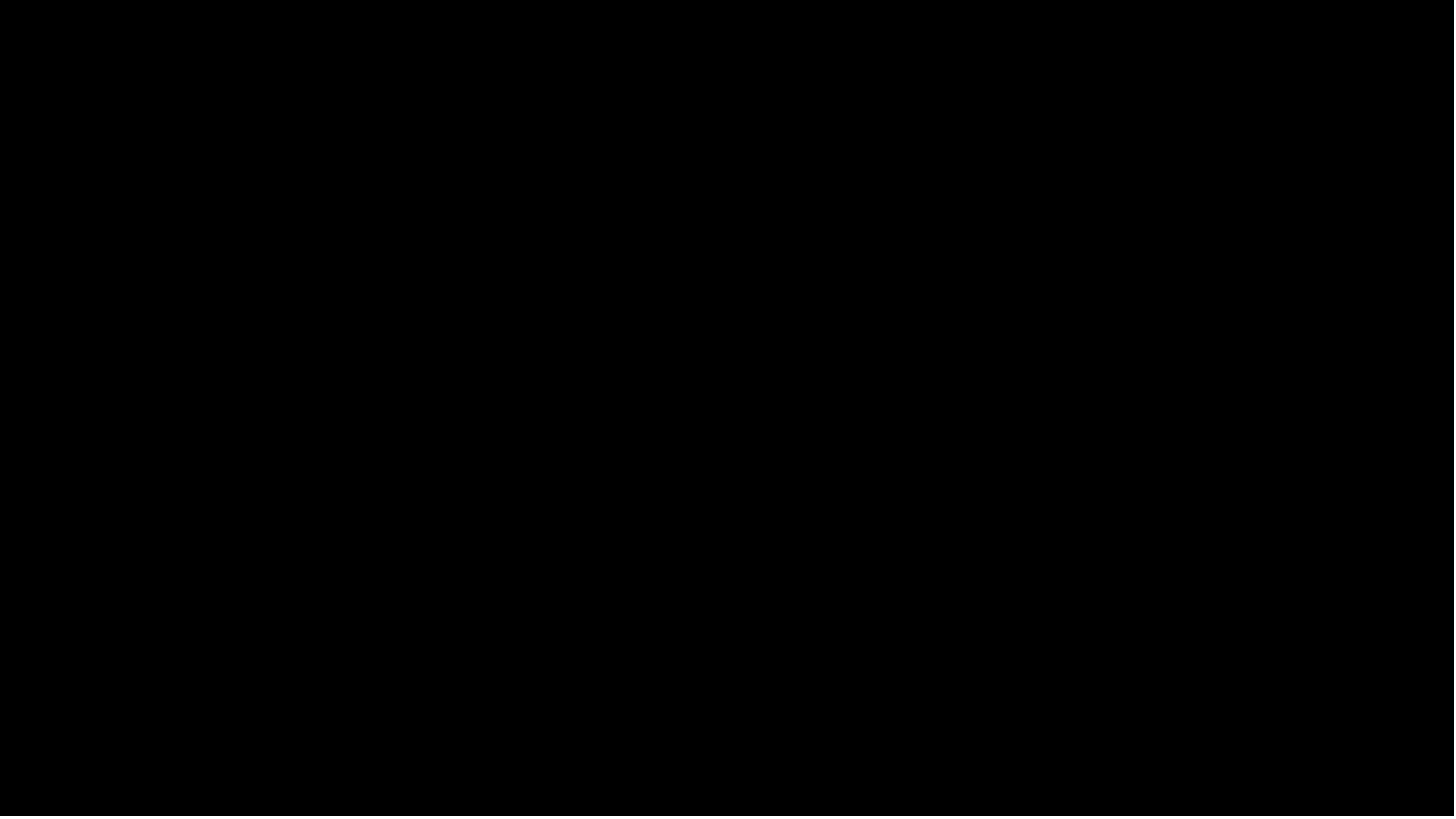


Laura Fortunato

Reproducible Research Oxford Lead

UK Reproducibility Network Institutional Lead

Email: laura.fortunato@anthro.ox.ac.uk



Recommendations

Provide comprehensive and systematic **training** to all staff and students, with modular structure to account for different needs per disciplines → Research Culture programme - Research Practice (Bodleian Libraries; IT services; Research Services; Researcher representatives including Academic Lead)

Create central **online guidance** 'Choose your own path through the research cycle'.

→ Research Runway platform?

Propagate **norms**, through community building, **mentorship** programme, support **network**.

→ Reproducible Research Oxford, as local node of the UK Reproducibility Network?

To develop **incentives**, run follow-up focus groups with academics regarding **recruitment criteria**.

→ DORA implementation team?

To mitigate further **barriers** (infrastructure, norms, incentives, policies, funding), need to liaise and coordinate actions with **stakeholders**. → UKRN Institutional Lead?

No blanket **policy**: run community discussions / consultations in the humanities / SSD to adapt approach to what is beneficial to these fields. → RROx, Research strategy and Policy unit?

Equitability (of access to resources, infrastructure, and support) should be built in all programmes.

→ Research Culture programme?

Sample size

Role	Round 1	Round 2	min N	max N	Target	% max N
PGR Student	499	262	237	761	7,012	10.9
Research Staff	20	331	311	351	4,897	7.2
Research Support Staff	7	62	55	69	960	7.2
Academic	13	113	100	126	1,911	6.6
Total	539	768	703	1,307	14,780	8.8

	Div	Both rounds	Target	% N
Medical Sciences Division	MSD	458	5456	8.4
Mathematical, Physical, and Life Sciences	MPLS	451	4481	10.1
Social Sciences Division	SSD	210	2726	7.7
Humanities	Hum	157	1903	8.3
Gardens, Libraries and Museum	GLAM	21	56	37.5
Department for Continuing Education	ContEd	8	158	5.1
	College	2		
	Total	1307	14780	8.8

Question	MSD	MPLS	SSD	Hum	Total
1. Affiliation & Role	458	451	210	157	1307
2. Awareness	420	399	181	135	1163
3. Effect	419	399	181	135	1162
4. Barriers	378	367	167	122	1061
5. Downsides	377	369	168	122	1063
6. Current recruitment	368	353	163	119	1028
7. Future recruitment	370	352	161	116	1024
8. Training	365	351	160	117	1018
9. Support	364	352	159	116	1015
Total drop-outs	94	100	51	41	292
Attrition rate	20.5	22.2	24.3	26.1	22.3