TROUBLESHOOTING OPEN SCIENCE

Image by Adam Douglas

OPEN SCIENCE STUDENT SUPPORT GROUP

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My Twitter

My OSF Profile

- Post-doc with the Ohlson Research Initiative, Cumming School of Medicine (and the Health & Wellness Lab)
- Background in kinesiology, exercise physiology
- My motivation for talking to you today is that supporting grad students and post-docs is important to me, and open and replicable practices **are the future** for early career researchers
- Involved with the Society for Transparency, Openness and Replication in Kinesiology (STORK) and SportRxiv
- My journey, with some pragmatic tips along the way…

BECOMING AWARE

- **Questionable research practices**: a variety of design, analysis, and reporting practices that may be employed to present biased evidence to support a conclusion [1].

  - Post hoc manipulation of hypotheses after the results are known (**HARKing**);
  - Undisclosed manipulation of analyses to meet the alpha level (usually $p<0.05$; ***p*-hacking**);
  - Non-reporting of null findings '**file drawer problem**' [2].
  - **Publication bias**: selective publication on basis of the direction or strength of the study findings [3]

  - **Survivorship bias:** for example, a professor who assumes that they 'survived' academia because they did things a certain way, so perpetuates a practice because it is believed to be beneficial or even required for early career researchers [4].

BARRIERS FOR ECRs

The incentive structure isn't in place yet [5]

- The incentive structure is changing:
  - Open science practices are becoming an important skills, now included on post-doc and job advertisements;
  - Funders beginning to value open science.

- Other incentives as an ECR [5-7]:
  - Reproducibility builds your credibility;
  - Future you will thank you – save time, avoid disaster.

BARRIERS FOR ECRs

Supervisors, principal investigators or other senior collaborators

- **Best case scenario** = everyone is already supportive, or everyone is easily converted because:
  - Reproducibility is the right thing to do;
  - Transparency is a fundamental part of science;
  - Open science makes the world a better place.

- **Worst case scenario** = doesn't see the point, dismissive or hostile towards increased transparency

- **Typical scenario** = neutral, open to more information, some concerns, wonders if the practice is overly burdensome, unsure of benefit.

DO AND TELL

- It's easier to convince people when there is minimal extra work!

TELL, DON'T ASK

- Simple but **sometimes** effective

EVERY LITTLE HELPS

- Don't be put off by some **all-or-nothing approaches** to open science - there are many barriers for ECRs [8]
- Do your best **given current circumstances** - actively participating in this support group means you have already made a commitment
- **Incremental progress is still progress**

TROUBLESHOOTING PREPRINTS

- The practical: PsyArXiv Frequently Asked Questions
- The pragmatic (approval of all co-authors):
  - Check in advance that your intended journal accepts preprints using Sherpa Romeo;
  - You need this - it's hard to get Tri-Council (CIHR, NSERC, SSHRC) funding without publications (preprints are accepted on applications) and it will make you more competitive in general;
  - Comply with Tri-Agency Open Access Policy on Publications

TROUBLESHOOTING PRE-REGISTRATION AND RRs

Collaborate!

Two examples:

- Journal club → registered report on the positive result rate in kinesiology
- Twitter discussion → analysis of selective reporting bias in exercise oncology

Benefits:

- Shared workload & shared problem solving;
- Work with like-minded people - can be a very rewarding!
- Leadership skills;
- Not time sensitive;
- No ethics submission.

WHERE TO START

- Transparent reporting **within** a manuscript (e.g., supplementary material);
- Distinguishing between confirmatory and exploratory research;
- Conducting analyses in an open-source software (e.g., Jamovi, R)
- Using the Open Science Framework to openly share study materials;
- Providing an open comment/feedback on a preprint (supporting the community);
- Consulting your ethics board about sharing de-identified data for studies that studies that are already in progress.

WHERE TO AIM

- State requirements for transparency upfront when beginning new project;
- Support a meta-research project;
- Use open science as a teaching and mentorship tool.

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RESOURCES/OF INTEREST

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- RIOT Science Club: https://www.youtube.com/playlist?list=UUqAkVUPSOg0bC5dB9tPRAVw including Dr Florian Markowetz on Five selfish reasons to working reproducibly: https://www.youtube.com/watch?v=S8bU1CyEkRM&list=UUqAkVUPSOg0bC5dB9tPRAVw
- SHERPA/JULIET - Summaries of research funder open access policies.
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