Open Science for ECR

NEURD April 6, 2020

What is Open Science?
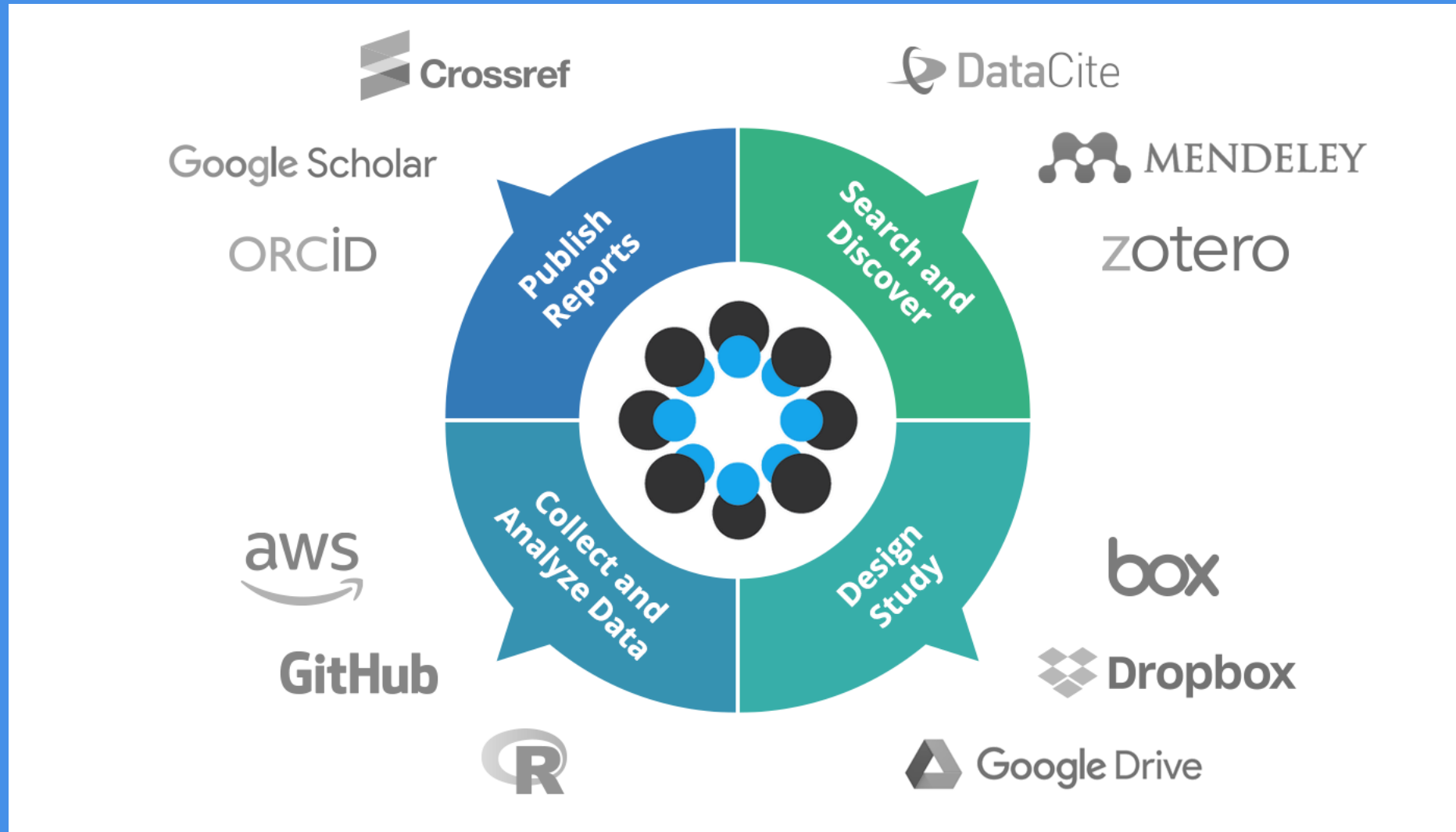
Organisation for Economic Cooperation and Development (OECD):

OS is "[...]to make the primary outputs of publicly funded research results – publications and the research data – publicly accessible in digital format with no or minimal restriction"
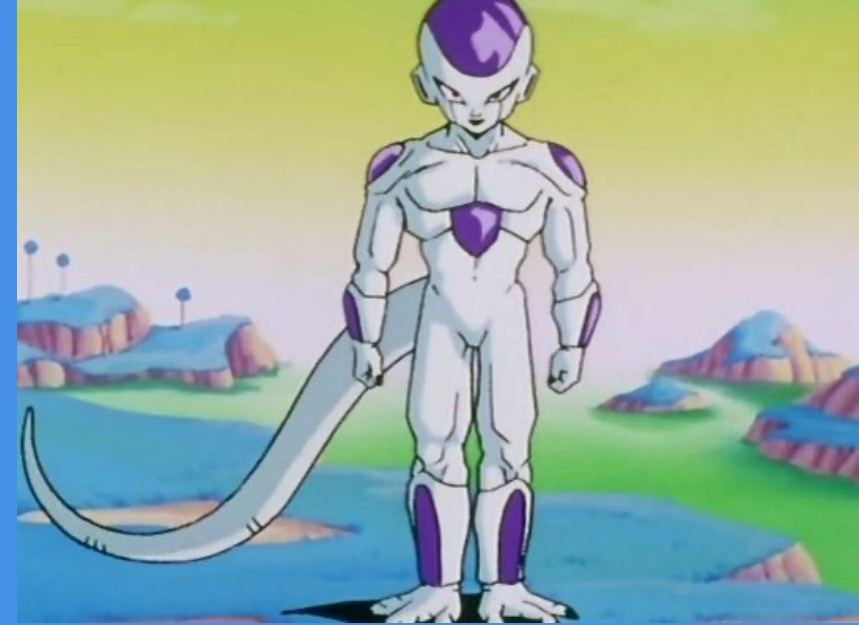
= Open Access

Open Science goes further!

Source: Center for Open Science

Final Form:
Registered Reports

DEVELOP IDEA → DESIGN STUDY → COLLECT & ANALYZE DATA → WRITE REPORT → PUBLISH REPORT

Stage 1 Peer Review

Stage 2 Peer Review

Source: Center for Open Science

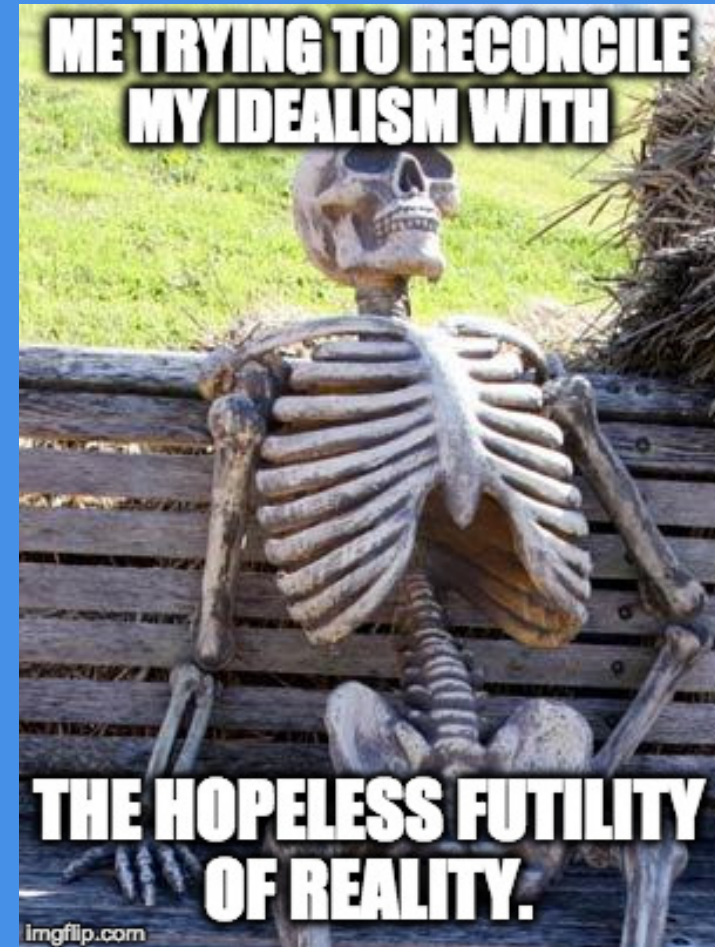# Currently, 242 Journals that adopted Registered Reports at least partially

Journals that have adopted Registered Reports   **Special Issues**   **Some Features**

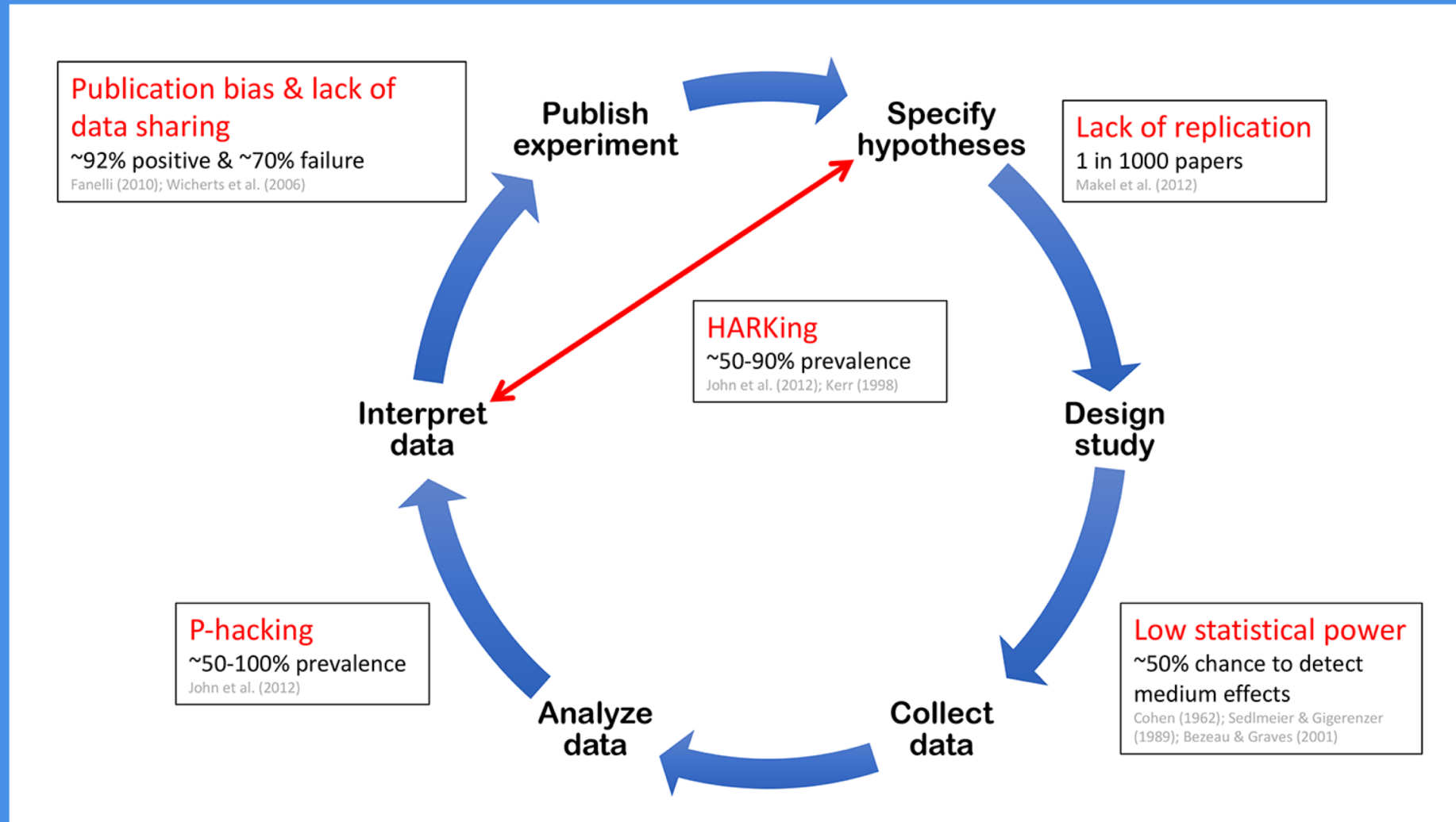| Journal	Notes
AAS Open Research	Author Guidelines
Academia Journal of Stroke	Details to follow
Acta Psychologica	Guidelines
Addiction Research & Theory	Guidelines
Advances in Methods and Practices in Psychological Science	Guidelines for Registered Reports | Guidelines for Registered Replication Reports
Affective Science	Announcement | Details to follow
Alimentary Pharmacology & Therapeutics	Guidelines
AMRC Open Research	Author Guidelines
Animal Behavior and Cognition	Guidelines
Animals	Guidelines

https://cos.io/rr/

Some caveats

- Registered reports do not substitute good theory/experimental design/proper statistics
  - Szollosi, A., Kellen, D., Navarro, D. J., Shiffrin, R., van Rooij, I., Van Zandt, T., & Donkin, C. (2019). Is preregistration worthwhile?. *Trends in Cognitive Sciences*.
- Registered reports do not prevent Reviewer 3
- Many journals are still clumsy with adopting RRs
- Front-End Costs
- „Bro-pen Science"

Why Open Science?

Well it's probably better for Science

Publication bias & lack of data sharing
~92% positive & ~70% failure
Fanelli (2010); Wicherts et al. (2006)

Lack of replication
1 in 1000 papers
Makel et al. (2012)

HARKing
~50-90% prevalence
John et al. (2012); Kerr (1998)

Low statistical power
~50% chance to detect medium effects
Cohen (1962); Sedlmeier & Gigerenzer (1989); Bezeau & Graves (2001)

P-hacking
~50-100% prevalence
John et al. (2012)

Publish experiment → Specify hypotheses → Design study → Collect data → Analyze data → Interpret data → Publish experiment
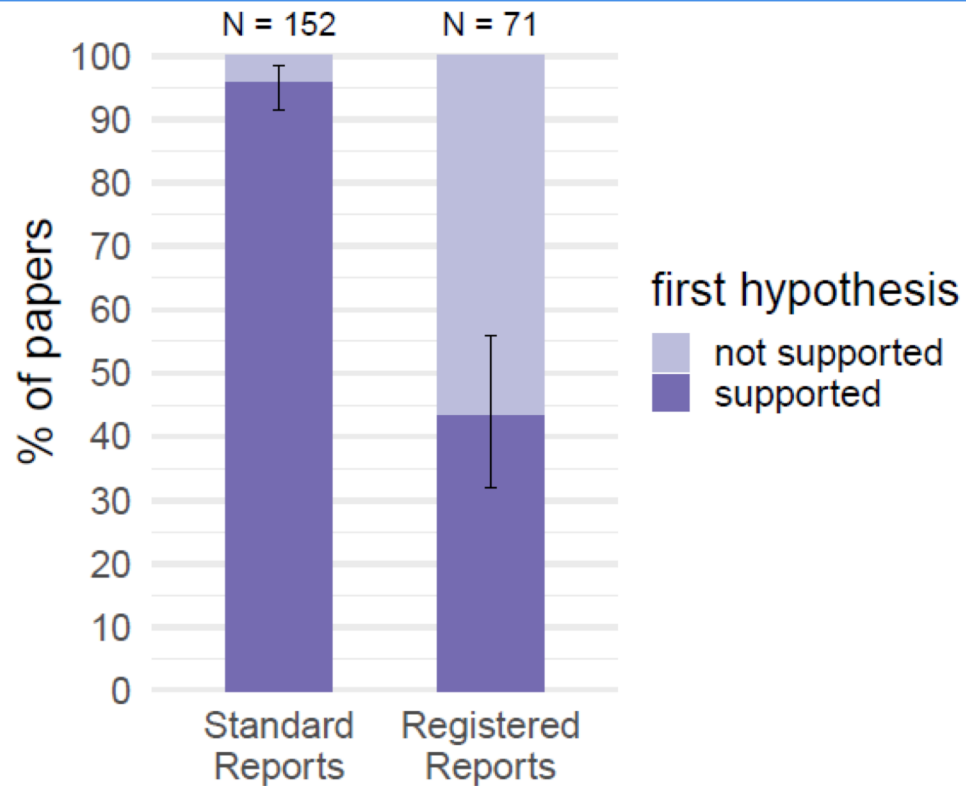
Source: Center for Open Science

Yup…

Figure 2. Positive result rates for standard reports and Registered Reports. Error bars indicate 95% confidence intervals around the observed positive result rate.

Scheel, A. M., Schijen, M., & Lakens, D. (2020, February 5). An excess of positive results: Comparing the standard Psychology literature with Registered Reports. https://doi.org/10.31234/osf.io/p6e9c

But also for you!

Benefits of Open Science for ECR

- The most expensive parts of science is the data collection
  - Take the publication gamble before you invest
- Stage 1 review provides you valuable feedback from experts in the field besides your supervisor/collaborators
  - At a point where it's actually helpful and not hindsight bias/HARKing
- RR let you focus on quality research rather than taking as much shots as possible until you find something significant
- RR protect you from scientific misconduct imposed by superiors (if you actually get to pull it off)
- Open Science is a vibrant community