UNIVERSITY OF NORTH CAROLINA CHARLOTTE | BELK COLLEGE OF BUSINESS

Overview of Open Science

George Banks

Chair, Board of Directors

CENTER FOR OPEN SCIENCE
SCIENCE WORKS BEST IN THE OPEN

What is open science?

Select your values

Table 1 Core values of science

Value	Definition
Objectivity	Impartiality with regard to how researchers should approach work
Honesty	Reporting our findings and how we arrived at our conclusions truthfully
Openness	Transparently presenting all information relevant to any decision or conclusion that is being drawn from a set of observations, thereby helping readers understand why a decision was made
Accountability	An expressed commitment or obligation to explain and/or justify one's behavior
Fairness	Making professional judgments based on appropriate criteria, including explaining the processes used to determine outcomes
Stewardship	Being aware of and attentive to the dynamics of the relationships between various actors within our enterprise (e.g., colleagues, institutions, universities, organizations)

Core values identified by the National Academies of Science, Engineering, and Medicine (2017)

Castille et al. (2022)

Castille et al. (2022)

Motivation for open science:
#1: Questionable research practices (QRPs)

We conducted a systematic review in the social sciences.

Used a triangulation approach

We sought to identify the good, the bad, and the ugly regarding evidence on QRPs.

(Banks et al. 2016a)

Summary of the QRP Research

- Most common QRPs include HARKing and selectively reporting results
- Editors and reviewers may play a role in the prevalence of QRPs
- Engagement in QRPs has not been shown to vary by academic rank
- The *vast majority* of QRP research has focused primarily on practices that affect *p*-values
- Statistical cutoffs can be problematic

Some QRP studies not focused on *p*-values

Williams et al. (2020) on fit indices

Gotz et al. (2021) on confidence intervals

Aguinis and Solarino (2019) on qualitative research

Heggestad et al. (2019) on undisclosed scale adaptations

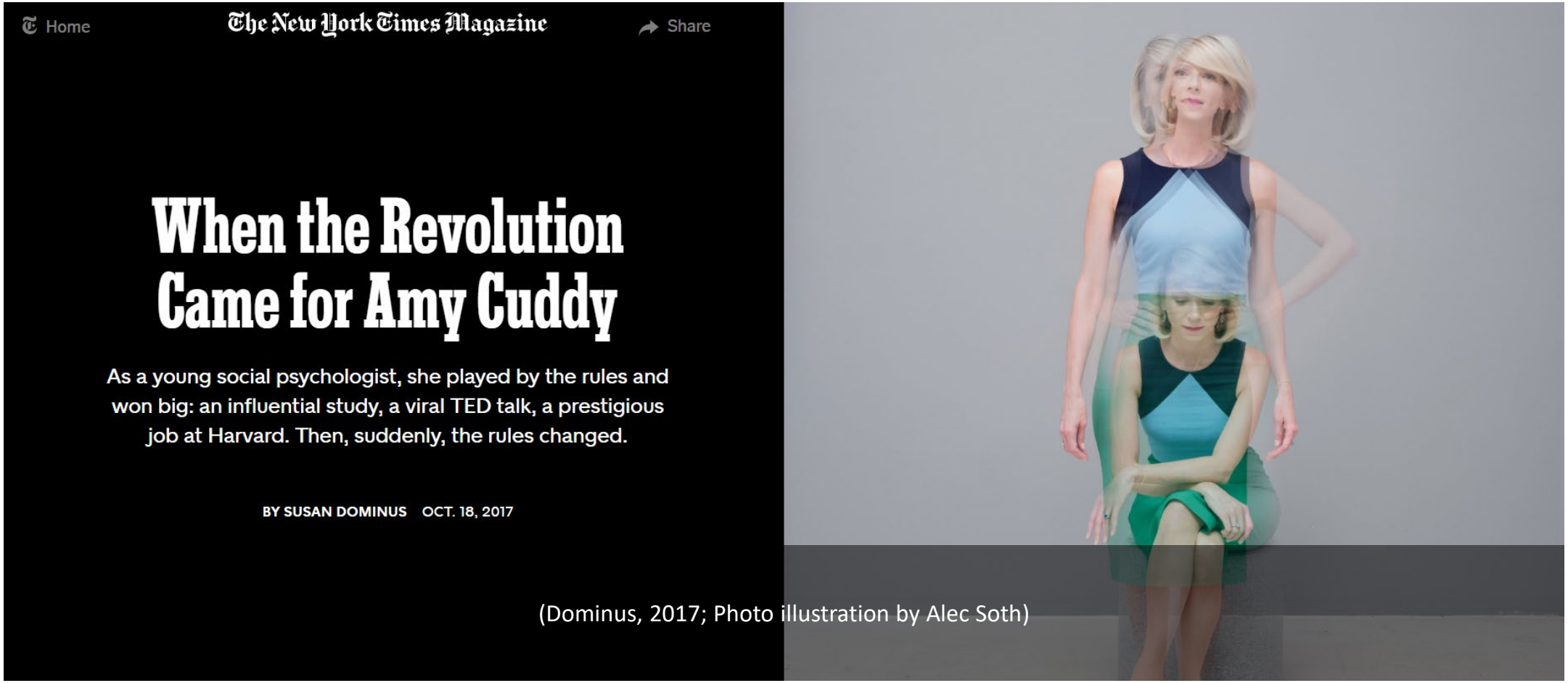
Popular Media Attention

(Oliver et al., 2016)

Popular Media Attention

- https://www.youtube.com/watch?v=Phxht9U2yZk
- https://www.youtube.com/watch?v=sZfOSCoNszE

Popular Media Attention



(Dominus, 2017; Photo illustration by Alec Soth)

Motivation for open science: #2: Need to accelerate science

Banks et al. (2021)

Updated meta-analytic evidence can take decades to emerge

Addressing the Covid-19 pandemic

Motivation for open science: #3: Grand challenges

Disease

Socio-economic mobility

Artificial intelligence

22 grand challenges were identified in management by both academics and practitioners (Banks et al., 2016b)

Open Science Challenges

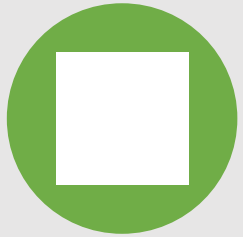
(Aguinis et al. 2020; Banks et al., 2018a)

LACK OF INCENTIVES

LEARNING CURVE

INABILITY TO SHARE DATA

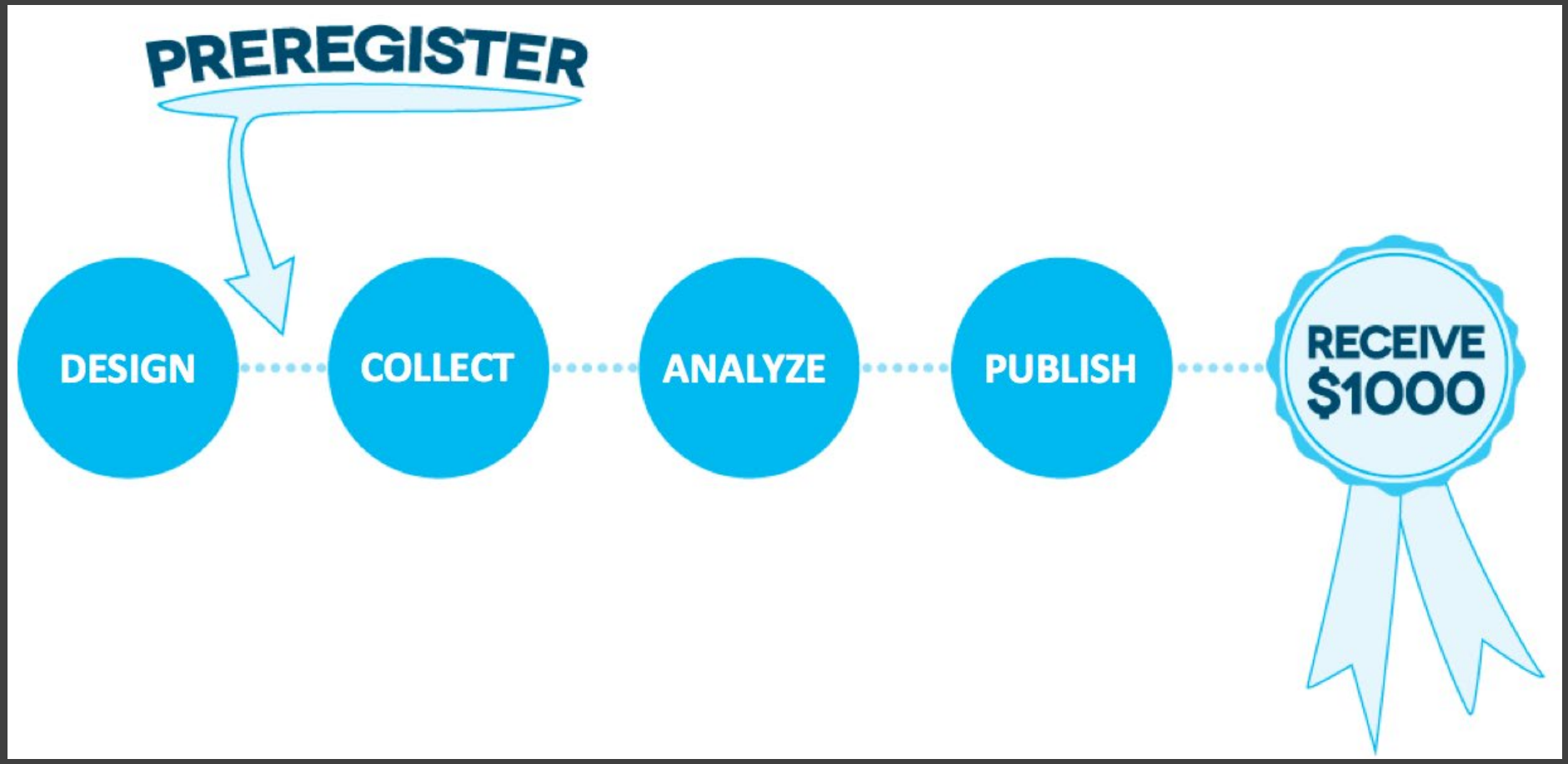
NEED FOR RESEARCHER AND REVIEWER TRAINING



SCALE

Registered Reports

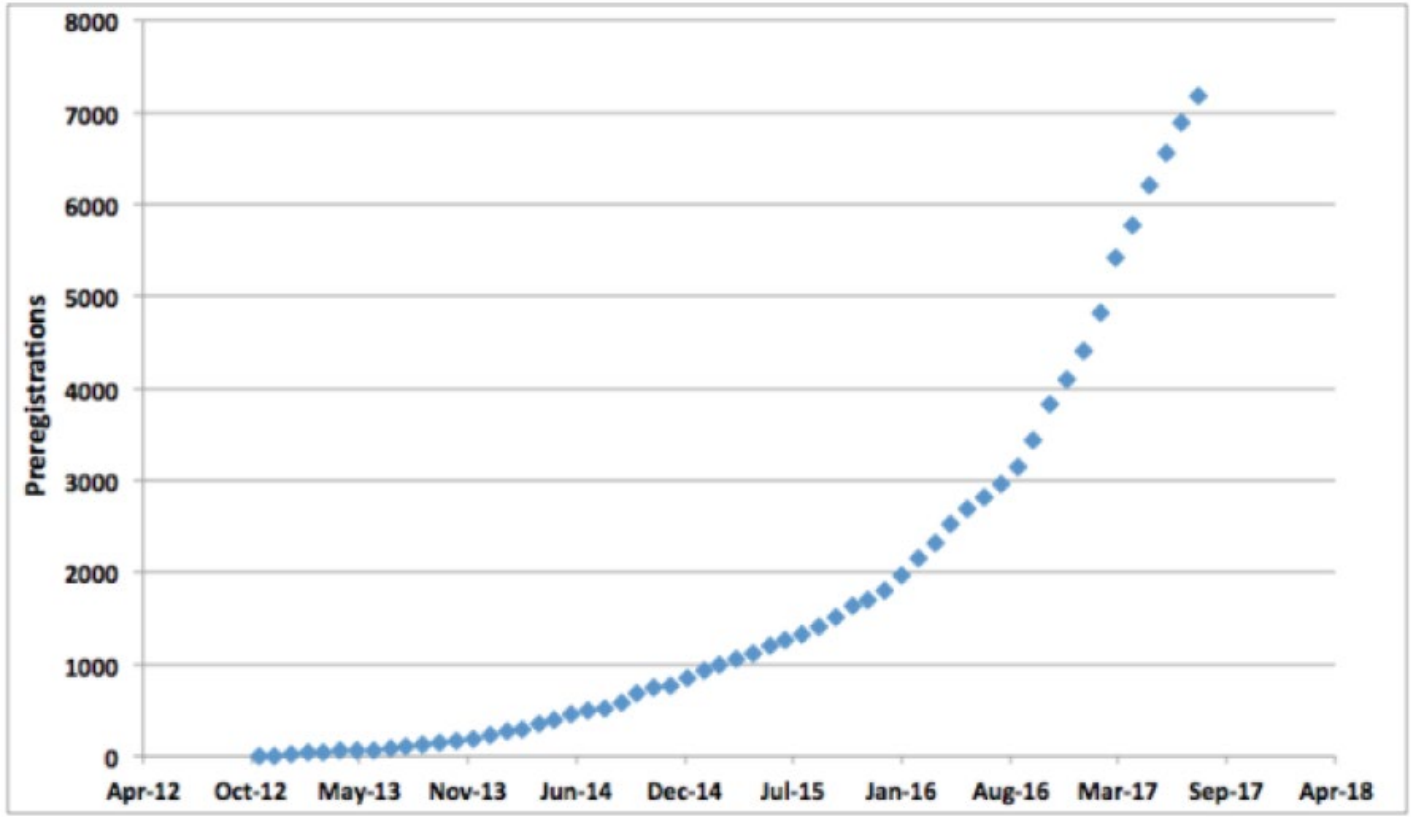
Chambers et al. (2014); Soderberg et al. (2020); Guidelines here: https://www.sciencedirect.com/journal/the-leadership-quarterly/publish/guide-for-authors



Incentives to Preregister

- The opportunity was given to receive $1,000 for preregistering your research study. Visit **cos.io/prereg** for more info.

Pre-registration on Open Science Framework



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Preregistration evaluation found:

1. Preregistration is associated with better planning

2. Registration is associated with fewer opportunistic researcher degrees of freedom

Toth et al. (2021)

Table 1. *Frequency of Authorship Policy by University*

Authorship Policy	Carnegie Classification		Medical School Status	
	R1	*R2*	*Medical School*	*No Medical School*
	n = 131	*n* = 135	*n* = 114	*n* = 152
Has a policy	51 (38.90%)	13 (9.60%)	53 (46.50%)	11 (7.20%)
No policy	80 (61.10%)	122 (90.40%)	61 (53.50%)	141 (92.80%)

Note: *n* = 266 total Universities

Rasmussen et al. (2020)

Authorship Prospective Meta-Analysis

- We examined gender differences in authorship experiences
- n= 3,565 university researchers
- k = 46 independent organizations across 12 countries
- We present seven actionable and clear guidelines to prevent and resolve authorship disputes
- Open and transparent authorship practices serve to benefit all stakeholders and can promote a broader research ethics culture.
- For open-access authorship training based on funding by the National Science Foundation see: https://www.authorshipproject.org/

Authorship Agreement

Authorship on a paper, presentation, or other scholarly work indicates a substantial contribution to a project and accountability for the results. Authorship decisions often affect reputations and careers, and they can be a source of tension, even within healthy collaborations. This tool may help to facilitate open, transparent communication about authorship decisions among collaborators.

Authorship is often best discussed as early as possible in a project. Research projects can be long and involved, and parts of a project may be disseminated at different times. As a result, authorship on each part or product may vary; for example, if a project has two main parts, a different person may lead each section and become first author on a publication.

Even if roles have not yet become clear, early conversations about authorship help to set expectations and to clarify the importance of open and honest discussion throughout the process. This agreement is meant to be a "living document"—one that can be revisited and changed as circumstances evolve over the course of a project.

Instructions.

The prompts and questions provided are designed to foster transparent conversations among collaborators in order to reach a shared set of expectations. All fields are required; however, acceptable answers include "not applicable" and "undetermined" if those responses best reflect the circumstances of your collaboration. A copy of this form should be distributed to all collaborators and/or stored in a shared location. If you plan multiple outputs (e.g., multiple publications; conference proceedings and articles, etc.) from one project, use a different form for each intended output. Please refer to University Policy #318: Authorship Policy and Resolution Procedures for additional information and resources.

Section 2.

Project background & publication goals

Working project title and description.

Possible conferences/publication venues for submission.

Transparency check list

Shortened, 12-item version

- http://www.shinyapps.org/apps/ShortTransparencyChecklist/

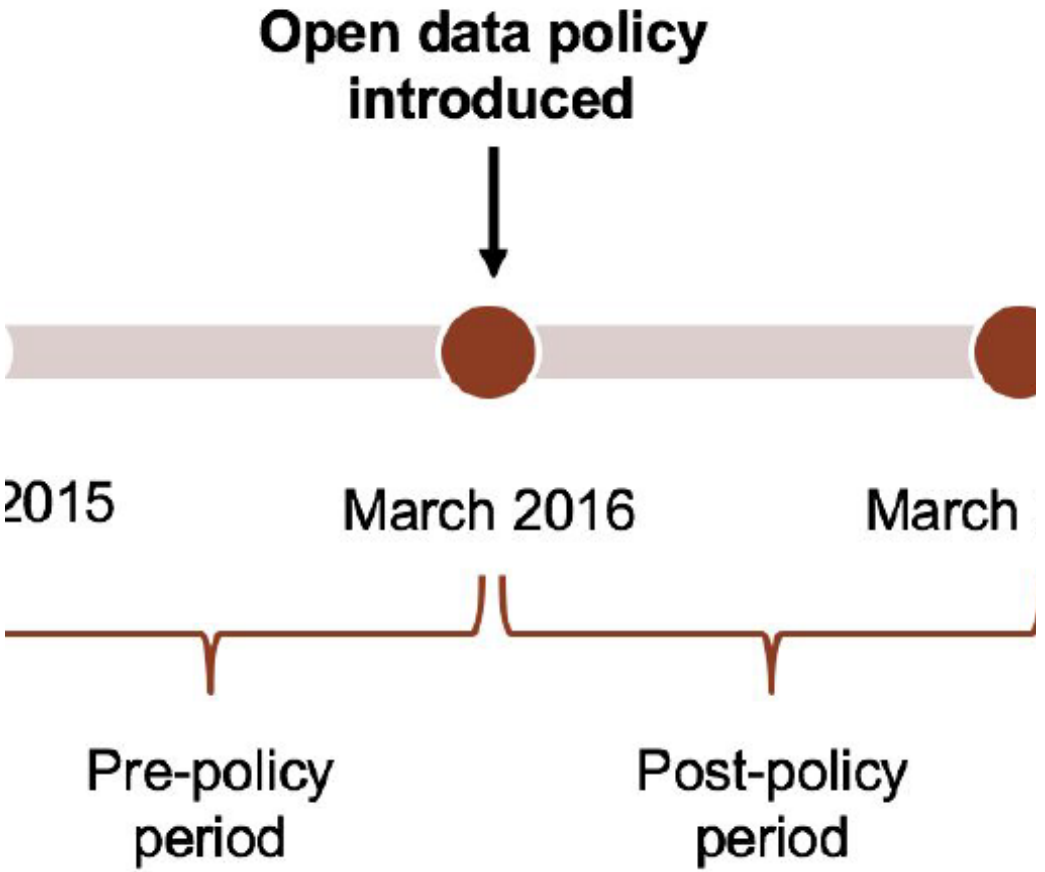
Shortened, 36-item version

- http://www.shinyapps.org/apps/TransparencyChecklist/

Aczel et al. (2019)

Open data

- A mandatory open data policy was introduced at the journal *Cognition* for papers submitted after
- March 1st 2016. In brief, the policy requires that:
  - “All empirical papers must archive their data upon acceptance in order to be published unless the authors provide a compelling reason why they cannot.”



(Hardwicke et al., in 2019)

Open data

Data availability goes up to about 80%;

Computational reproducibility looks reasonably healthy overall

Only about 48% of articles in the post-policy period had understandable data sets

Overall, the policy had a positive impact

Conclusion

- “Management is just starting to become aware of the social psych crisis, and people are largely unaware of the new guidelines and practices (including reviewers and editors). I hope that this changes-but until then “honest” researchers are punished in the review process.”
- “Many of these practices were normatively acceptable-for a long time. The changes in norms are wonderful, but they are quite new .”

Participant quotes from Banks et al. (2016b)

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2023 is the Year of Open Science

Celebrating the Benefits and Successes of Open Science

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