Achieving Open Science

Brian Nosek
University of Virginia -- Center for Open Science

Changing scientific culture is a coordination problem
Technology to *enable* open

Training to *enact* open

Incentives to *embrace* open
Munafo et al., 2017, Nature Human Behavior
Training

Example: Preregistration Challenge

http://cos.io/prereg

Scholarly Paper
https://osf.io/2dxu5

Guided Workflow
http://osf.io/prereg

Available Support
Help guides, consulting
Incentives
Incentives for individual success are focused on getting it published, not getting it right.
## Norms

<table>
<thead>
<tr>
<th>Norm</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communality</td>
<td>Open sharing</td>
</tr>
<tr>
<td>Universalism</td>
<td>Evaluate research on own merit</td>
</tr>
<tr>
<td>Disinterestedness</td>
<td>Motivated by knowledge and discovery</td>
</tr>
<tr>
<td>Organized skepticism</td>
<td>Consider all new evidence, even against one’s prior work</td>
</tr>
<tr>
<td>Quality</td>
<td></td>
</tr>
</tbody>
</table>

## Counternorms

<table>
<thead>
<tr>
<th>Counternorm</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secrecy</td>
<td>Closed</td>
</tr>
<tr>
<td>Particularism</td>
<td>Evaluate research by reputation</td>
</tr>
<tr>
<td>Self-interestedness</td>
<td>Treat science as a competition</td>
</tr>
<tr>
<td>Organized dogmatism</td>
<td>Invest career promoting one’s own theories, findings</td>
</tr>
<tr>
<td>Quantity</td>
<td></td>
</tr>
</tbody>
</table>
University Incentives
Hiring, promotion, tenure
Journals and Funders Incentives

Badges
Standards
Innovation in Publishing
Signals: Making Behaviors Visible Promotes Adoption

https://cos.io/our-services/open-science-badges/; 18 adopting journals

Kidwell et al., 2016
Promoting an open research culture

Author guidelines for journals could help to promote transparency, openness, and reproducibility


Transparency, openness, and reproducibility are readily recognized as
TOP Guidelines

1. Data citation
2. Design transparency
3. Research materials transparency
4. Data transparency
5. Analytic methods (code) transparency
6. Preregistration of studies
7. Preregistration of analysis plans
8. Replication
Some TOP Signatory Organizations

- AAAS/Science
- American Academy of Neurology
- American Geophysical Union
- American Heart Association
- American Meteorological Society
- American Society for Cell Biology
- Association for Psychological Science
- Association for Research in Personality
- Association of Research Libraries
- Behavioral Science and Policy Association
- BioMed Central
- Committee on Publication Ethics
- Electrochemical Society
- Frontiers
- MDPI
- PeerJ
- Pensoft Publishers
- Public Library of Science
- The Royal Society
- Springer Nature
- Society for Personality and Social Psychology
- Society for a Science of Clinical Psychology
- Ubiquity Press
- Wiley
Registered Reports

https://cos.io/rr/

Committee Chair: Chris Chambers; 49 adopting journals as of Feb 2017
Society Incentives

Norms

Communality
Open sharing

Universalism
Evaluate research on own merit

Disinterestedness
Motivated by knowledge and discovery

Organized skepticism
Consider all new evidence, even against one’s prior work

Quality

Counternorms

Secrecy
Closed

Particularism
Evaluate research by reputation

Self-interestedness
Treat science as a competition

Organized dogmatism
Invest career promoting one’s own theories, findings

Quantity
FIG. 3. Norm versus Counternorm Scores: Percent with Norm > Counternorm (dotted), Norm = Counternorm (striped), Norm < Counternorm (solid).
The Kindergartener's Guide to Improving Research
1. Show your work
2. Share
Technology to *enable* open

Training to *enact* open

Incentives to *embrace* open
COS Strategic Plan

https://osf.io/x2w9h

These slides

https://osf.io/yjpv2/

Take a picture
Barriers to Individual Change

1. Perceived norms (Anderson, Martinson, & DeVries, 2007)

2. Construal level (Lieberman & Trope, 1999)

3. Motivated reasoning (Kunda, 1990)

4. Minimal accountability (Lerner & Tetlock, 1999)

5. I am busy (Me & You, 2017)
Presenting exploratory as confirmatory increases *publishability* at the cost of *credibility*.
Preregistration Challenge
http://cos.io/prereg
OSF = Free, open scholarly commons; https://github.com/CenterForOpenScience
http://osf.io