Increasing Openness and Transparency in Academic Research

John Lurquin
CU Boulder
Open Access Week
“Open in Action”
Oct 24-30, 2016

Sponsored by the University Libraries and the Open Science Interest Group

Monday 10/24:
Increasing Openness and Transparency in Academic Research
3:00-4:00PM, UMC 247
Presenter: John Lurquin

Wednesday 10/26:
Open the World of Data with Web APIs
12:00-1:00PM, Norlin Library E113
Presenters: Phil White and Andrew Johnson

Thursday 10/27:
Implementing Open Research Practices with the Open Science Framework
9:30-10:30AM, UMC 247
Presenters: Andrew Johnson and Laura Michaelson
Overview for today

• Open access
  • Macro level
• OA at the micro level
  • Individual research
  • Transparency
• Open data
Open Access at CU

- Institutional repository (CU Scholar)
- Open Access Policy
Open Access

• Open, unrestricted access

Research output
- journal articles
- book chapters
- conference papers
- theses

General public
Students
Other researchers
Open Access

- Open and unrestricted access

  Details of scientific research

- Increase transparency
- Increase confidence in reported research findings
Replication

• Another research team conducts the same study

• Do they produce the same results?
The ‘replication crisis’ across science

Researchers are finding they are unable to reproduce studies long taken for granted in their disciplines.
Replication crisis

Cancer Research Is Broken

There's a replication crisis in biomedicine—and no one even knows how deep it runs.

By Daniel Engber

Study claims $28 billion a year spent on irreproducible biomedical research
What’s going on?

A. Publication bias
B. Pressure to publish
C. Flexibility in research
A. Publication bias

• Reluctance to publish null findings.

• Preference for flashy findings.
B. Pressure to publish

- Hiring and promotion
- Funding
- More PhDs awarded now than ever
C. Flexibility in research

- Consult literature
- Develop hypotheses
- Start data collection
- Process the data
- Outliers?
- Reject $H_0$?
- Determine analysis plan
- Select journal
- Revise
- Resubmit
- Reviewers’ comments
C. Flexibility in research
C. Flexibility in research
C. Flexibility in research
Replication crisis

Publication bias + Pressure to publish → Selective reporting
Replication crisis

- Publication bias
- Pressure to publish
- Selective reporting

False positives
Openness and transparency

• Pre-registration
• Open materials
• Open data

• Overall benefits
  • Documenting research workflow
  • Encouraging attention to details when planning
  • More details when reporting
  • Good for replication
  • Good for meta-analyses
Openness and transparency
Openness and transparency

- Organizations are endorsing
Openness and transparency

• Journals are endorsing

• 3% shared data before

• 25% shared data after
Openness and transparency

Journals are mandating

- PLoS open data policy
- Cortex: Registered Reports
Openness and transparency

- Researchers are publicly committing
Biden threatens to defund universities that don’t publish cancer trial results

Researchers who fail to report clinical trial results will risk losing funding

By Andrew Liptak · @AndrewLiptak · Jun 29, 2016, 4:13p
Openness and transparency

The $1,000,000 Preregistration Challenge

Preregistration increases the credibility of hypothesis testing by confirming in advance what will be analyzed and reported.

For the Preregistration Challenge, one thousand researchers will win $1,000 each for publishing results of preregistered research. All it takes is a single experiment and its analysis to be eligible.

Share this handout for a brief overview and links to more information, and begin your preregistration today!
TOP Guidelines

The Transparency and Openness Promotion Guidelines

Published in Science in 2015, TOP includes eight modular standards, each with three levels of increasing stringency. Signatories, which of the eight transparency standards they wish to adopt for their journal, and select a level of implementation. These features provide flexibility for adoption depending on disciplinary variation, but simultaneously establish consistent.

• Signatories
  • 756 journals
  • 63 organizations
TOP at the university

- Nature surveyed 1,576 researchers (2016)

*Is there a replication crisis?*

YES: 90%
TOP at the university

WHAT FACTORS CONTRIBUTE TO IRREPRODUCIBLE RESEARCH?

Many top-rated factors relate to intense competition and time pressure.

- Always/often contribute
- Sometimes contribute

- Selective reporting
- Pressure to publish
- Low statistical power or poor analysis
- Not replicated enough in original lab
- Insufficient oversight/mentoring
- Methods, code unavailable
- Poor experimental design
- Raw data not available from original lab
- Fraud
- Insufficient peer review
- Problems with reproduction efforts
- Technical expertise required for reproduction
- Variability of standard reagents
- Bad luck

93.5%
TOP at the university

• Measures of research quality

1. Amount of research
2. Citations
3. Openness and transparency
TOP at CU

• CU Libraries
TOP at CU

- CU students
- Publishing datasets in publicly-available repositories
TOP at CU

• Trust

Even in 2015, the public doesn’t trust scientists
Open data at CU

• Get out ahead of changing standards
• Increase confidence in our research
• Increase public trust
• Good for science!
Open data at CU

• Push-back

• “I’m not finished with the data.”
Open data at CU

• Push-back

• “My data is sensitive.”
Open data at CU

• Discipline-specific needs?
• Barriers?
• Incentives?
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