Science Editor Symposium: Reproducibility & Reporting Guidelines (4.3)

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American Journal of Political Science

Jan E. Leighley, Editor
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Associate Editors

Midwest Political Science Association
Journal Impact

The American Journal of Political Science is known for:

- Outstanding contributions to scholarly knowledge about notable theoretical concerns, empirical issues, or methodological strategies in any subfield of political science

- A reputation for publishing cutting-edge methodological approaches, and especially quantitative analyses
Replication and Verification in Political Science

1995: Gary King’s “Replication, Replication”
The same year: AJPS editors, et al., ask authors to make data available

2012: AJPS Editor requires data sets to be uploaded to AJPS Dataverse

2016: Editor establishes guidelines for replication files, and requires external verification as a condition of publication

The “Replication” Process

1. Authors are given conditional acceptance, and are required to upload replication files to Dataverse.

2. For quantitative analyses, the verification process is carried out by the Archive Staff at the Odum Institute for Research in Social Science, at the University of North Carolina, Chapel Hill.

3. For qualitative analyses, the verification process is undertaken by the Qualitative Data Repository (QDR), at Syracuse University.

4. If code provided by author does not replicate analytical results, then Odum/QDR provides report to journal office, which communicates issues to authors.

5. After Odum/QDR confirms that all analytical results are verified, replication data set is awarded open science badges for “open materials” and/or “open data” and accepted paper is sent to publisher.

6. Exemptions are allowed for restricted access data and human subjects protection; if data are not made publicly available, code and other documentation are still available.
Quantitative Open Data, Open Materials Verification:
The data and materials required to verify the computational reproducibility of the results, procedures and analyses in this article are available on the American Journal of Political Science Dataverse within the Harvard Dataverse Network, at:

Qualitative Open Data, Open Materials Verification:
The data and materials required to verify the results, procedures and analyses in this article are available on the American Journal of Political Science Dataverse within the Harvard Dataverse Network, at:

Quantitative Open Data PA/PR, Open Materials PM:
The materials required to verify the computational reproducibility of the procedures and analyses in this article are available on the American Journal of Political Science Dataverse within the Harvard Dataverse Network. The data required to verify the computational reproducibility of the results are available from [Repository Name], under protected access, as described on the American Journal of Political Science Dataverse, at:

Costs & Benefits of our Replication Process

- Demands a high level of documentation on the part of authors; most code does not run on first try; multiple re-submissions are usually required
- External verification adds 50-60 days to publication; some of this is due to author response time.
- Increases demands on editorial office (manuscript flow, author communications)
- Establishes a high bar for analytical rigor
- Provides data sets for replication, as well as teaching purposes
Challenges

- Limitations of computational reproducibility
- Terminological confusion
- Qualitative verification (n=1)
  - "Distracts" from other serious issues?

Transparent reporting at Nature journals

Sowmya Swaminathan, Head of Editorial Policy,
Nature Research
Council of Science Editors, May 2019
How can journals support reproducible research?

• Set editorial policies (methodology including reporting standards, data, code, materials, protocols)

• Facilitate compliance (implementation/infrastructure/service solutions)

• Provide innovative publication venues (data journals, registered reports)

• Align on and adopt community standards (e.g., reporting standards, data policies)

2013: Nature journal reporting checklist for life science articles

• Covers poorly reported experimental design and analytical details

• Requires reporting of blinding, randomisation, sample size estimation, & in-lab replication

• Sets standards on reporting of statistics

• Sets standards on reporting of reagents esp. antibodies, cell lines

• Consolidates policies on data and code

• Mandatory on papers undergoing review

• Reviewer access to checklist

• Monitor compliance with required items

2017:
• Publishing checklist with paper
Understanding impact: transparency of reporting in Nature journal papers

1. Did a change in Nature journals’ editorial policy for life sciences research improve reporting? The NPQIP Collaborative Group (Malcolm Macleod & colleagues, University of Edinburgh, BMJ Open Science 2019;3:e000035)

   “we saw improvements in the transparency of reporting, the observed improvements in experimental design were much more modest.”

   *Randomisation, Blinding, Sample size calculation*  
   *Reporting Statistics*

   Significant improvement in statistics reporting for in vivo & in vitro
   • exact sample size,
   • definition of t-test,
   • whether assumptions of test were checked,
   • whether technical or biological replicates


   “Specifically, improvement in reporting of the three methodological information was at least three times greater when a mandatory checklist was implemented than when it was not.”

Perceptions of improvements in published papers due to checklist

“83% of surveyed Nature authors felt that the checklist had significantly improved reporting of statistics within papers published in Nature journals”

78% of surveyed Nature journal authors continue to use the checklist at least to a small extent with their continued work.

Roughly a quarter are using it to a large extent.

Understanding impact: Author perceptions

- “I loved the checklist so much, that I forwarded it everyone in the lab to adhere to it for all manuscripts and keep an account.”
- “We found the exercise very useful and we certainly acknowledge the value of this initiative from NCB (it should be extended to every journal).”
Lessons learnt, challenges & opportunities

Checklists can work to influence research practise & reporting standards

- Make it a requirement
- Monitor compliance

BUT...

- Monitoring compliance is resource-intensive
- Journal-driven approaches must be complemented by training and mentoring
- Align on reporting standards across publishers, funders and institutions

Toward minimum reporting standards for life scientists

**WHO:** Group of journal editors and experts in reproducibility and transparent reporting

Nature Research (Springer Nature), PLOS, Science (AAAS), Cell Press (Elsevier), eLIFE, Wiley, Malcolm MacLeod (Univ of Edinburgh); David Mellor (Centre for Open Science)

https://osf.io/preprints/metaarxiv/9sm4x/

**AIM:** Improve reproducibility!

- A "minimum standards" framework: a framework setting out minimum expectations for reporting across four core areas: Materials (including data and code), Design, Analysis and Reporting (MDAR)
- A "minimum standards" checklist: tool to help journals and researchers in adoption of the framework
- An "elaboration document" or user guide: provides context for the “minimal standards” framework and checklist

**NEXT STEPS:**

- Pilot checklist with small group of journals
- Refine with feedback from wider group of stakeholders including researchers, reproducibility experts, funders and others
Thank you!

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The story behind the image
Dorothy Hodgkin (1910–1994)
Dorothy Hodgkin pioneered the application of x-ray crystallography techniques to determine the three-dimensional structure of biomolecules, helping to unravel how their atomic arrangements influence how they work in the body. She remains the only British woman scientist to have been awarded the Nobel Prize for Chemistry.
Multi-pronged approach to promoting reproducibility and reporting

Counter publication bias
- Registered reports
- Scooping policy

Open research practices
- Policies: sharing materials, data, code
- Enabling: sharing protocols, reagents

Open publication process
- Preprint deposition upon submission
- Published peer review

Counter publication bias
- "The importance of being second"
- Will consider manuscripts that confirm or extend a study published within last 6 months
- Value for reproducibility - "organic" replication via a complementary ('scooping') study is even better than a post-hoc replication study.

"There is a self-evident benefit to publishing complementary research, and at PLOS Biology, we consider that two papers from two groups independently identifying the same phenomenon in parallel increase the confidence in the results of the work." (PLOS Biology Editorial)
• Registered reports

- Launching on PLOS Biology, in collaboration with CHDI (a not-for-profit Huntington’s Disease research org.)

- Study proposals are assessed for: experimental design, ethical approval plan, data sharing plan etc.

  → commitment to publish, regardless of study outcome, if Registered Report passes peer review

- **Aim:**
  - Increase rigor and robustness of experimental design
  - Well-designed and well-conducted studies are published regardless of eventual results and study outcome

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• Policies: sharing materials, data, code
• Enabling: sharing protocols, reagents

- **Data Policy** – authors required to make all data underlying their findings fully available without restriction at the time of publication (checked and enforced on PLOS Biology)

- **Materials sharing** - strongly encourage deposition of materials in repositories (e.g. Addgene)

- **RRIDs** - Research Resource Identifiers (RRIDs) for citing and **uniquely identifying** research resources.

- **Protocol deposition** - directly partnering with protocols.io to enable authors to share protocols & methodological details
  - Authors obtain a unique DOI for their protocols and link directly to these from the Methods section in their articles
Open publication process

- Preprint deposition upon submission
- Published peer review

- Preprint posting:
  - PLOS partnership with bioRxiv to enable automatic preprint posting of submitted research articles
  - Authors given choice to opt in
  - Empowers authors to share their work on a trusted platform during peer review

- Published Peer Review (coming soon):
  - Authors choose (at acceptance) whether to make the peer review history public
  - Reviewers choose whether to reveal their identities
  - If author opts in – decision letters, reviews and author responses to reviewers are published along with the article

Reporting checks

- No formal checklist adapted yet but editors manually check certain reporting items on accepted papers.

- PLOS Biology will be one of the journals testing the MDAR checklist over the next few months (Materials, Design, Analysis & Reporting checklist)
>112,000 articles published with Data Availability Statements

- 25% with data in public repositories
- Supplementary information in figshare

488 protocols related to 263 PLOS articles in protocols.io

2 trials Registered Reports

Grants

>112,000 articles published with Data Availability Statements

2,400 preprints posted on behalf of authors since May 2018

Questions & Discussion

We’re always interested in your feedback, suggestions, or submissions.

Contact us at scienceeditor@councilscienceeditors.org

CSEScienceEditor.org