OSF Workshop Project:

https://osf.io/pcft5/
Engaging Credibility Issues in the Social Sciences

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Central theme #1: We have a problem. We can solve it.

Things you need to do to advance your career

Things you need to do to advance science

Source: @robinnkok 27 January 2019
Central theme #2: How large is the problem?
Central theme #3: What can we do?
When can we trust research findings?

Criteria of scientific credibility
Trustworthy research findings are those which have survived risky attempts at proving them wrong.
Criteria of Scientific Credibility

- Replicability
- Analytical Robustness
- Analytical Reproducibility
- Method and Data Transparency

A Unified Framework to Quantify the Credibility of Scientific Findings, LeBel et al. 2018
Method and Data Transparency

- A lot of work
- Mistakes become public
- Competitive disadvantage

- Falsifiability
- Find errors and improve
- Cumulative Science
Method and Data Transparency

- Majority of political science studies provide no data / syntax (in journals without data policy)
- 3 out of 10 hyperlinks to data are dead
- „Upon Request“: 50% of authors share reproduction materials

💡 Turning tide: Mandatory data and method transparency slowly becoming standard practice

Key (2016)
Gertler/Bullock (2017)
Stockemer et al. (2018)
Analytical Reproducibility

- Again: A lot of work
- Low risk of being caught

Findings follow from the data
Analytical Reproducibility

Journal with dedicated reproducibility procedure:
Not a single study was reproducible
Janz (2015)

1 out 3 studies: Main finding not reproducible
Stockemer et al. (2018)

Invest in dedicated reproducibility procedures?

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Analytical Robustness & Replicability

- Academic currency: publication
- Not everyone’s equal before the editorial board
- Researcher degrees of freedom

- Robust
- Insensitive to minute analytical decisions
- Replicable
- Predictive power
Publication Bias... is prevalent

Most null results are never written up

The fate of 221 social science experiments

Strong results (42% of total)
Mixed results (36% of total)
Null results (22% of total)

Unwritten Unpublished but written Paper in non-top journal Paper in top journal

Source: A. Franco et al., Science (28 August)

Source: Mother Jones
Publication Bias... is problematic
Generate and specify hypotheses

Collect data

Design study

Interpret data

Publish or conduct next experiment

Source: Chambers 2018
p-hacking

p-hack your way to glory!

https://projects.fivethirtyeight.com/p-hacking/
HARKing, $p$-Hacking and Hypothesis-Testing Research
Low credibility of research

Studies: Representative for entire evidence base of published and unpublished studies?

Findings within Studies: Representative for entire evidence base generated by this study?

Publication bias

Finding

QRPs
Figure 2: P-Value Changes in Observational Studies. Arrows for each study show the total p-value changes from the bivariate to the full specification. The solid part of the arrows shows the p-value changes from only coefficient estimate changes, while the dotted part shows the remaining p-value changes from standard error changes. The figure shows that, when articles failed to present a bivariate specification, they often achieve statistical significance by including covariates. In about half of cases the bivariate includes covariates necessary for sensible estimates. The four up and down arrows reflect cases where the estimate changed sign from the bivariate to the full specification. The figure shows that p-value decreases are largely from coefficient changes. Figures S1-S3 in the supporting information present robustness checks.
Fig. 2 | Results of SCA for MTF. Specification curve analysis showing the range of possible results for a simple cross-sectional regression of digital technology use on adolescent well-being. Each point on the x-axis represents a different combination of analytical decisions, which are displayed in the ‘dashboard’ at the bottom of the graph. The resulting standardized regression coefficient is shown at the top of the graph; the error bars visualize the standard error. Red represents non-significant outcomes while black represents significant outcomes. To ease interpretation, the dotted line indicates the median standardized regression coefficient found in the SCA: $\beta = -0.005$ (partial $\eta^2 < 0.001$, median $n = 78,267$, median standard error = 0.003).
Publication Bias and Selective Reporting

Vries et al. (in Press)
Replicability of Experimental Studies

SOCIAL SCIENCE

ECONOMICS

PSYCHOLOGY

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Solution?
Pre-registration + Results-blind Peer Review
Registered Reports

Journals offering Registered Reports

Source: Hardwicke / Ioannidis (2018)
“And now for something different…”

BIG approaches to increasing the transparency of social research:
  - Prereg
  - Workflows
  - Dyndocs
  - …

But what about minor ways of engaging research transparency and credibility issues?

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Small Things Can Have a Big Impact…

Peer review: increase transparency by using leverage as reviewer in pre-publication peer review

➢ Join the PRO!
Small Things Can Have a Big Impact…

Peer review: increase transparency by practicing open peer review as author and reviewer

- Use hypothes.is on SocArXiv

- Use RESEARCHERS.ONE
Small Things Can Have a Big Impact…

Open data policies: increase your transparency!

- Be **FAIR**!

- Use (one of) the many data repos out there!

Open Science Framework

The Dataverse® Project
Small Things Can Have a Big Impact… Some Additional BITSS Catalyst Crowd Wisdom!

- Consider making required research ethics forms for human subjects research publicly available: often require aims & hypotheses = form of pre-registration!

- Start or join a preprint journal club.

- Start or join a reproducibility-themed journal club (e.g., ReproducibiliTea: A Reproducibility-themed Journal Club)

- Use SHERPA/RoMEO to gain awareness of journal policies on preprints and self-archiving (i.e., green OA)

- Distribute locally: "8 Easy Steps to Open Science: An Annotated Reading List" by Sophia Crüwell et al. (2018, PsyArXiv link)

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- Check to see if your preferred data repositories curate your research data. Investigate the value of data curation (e.g., at Digital Curation Centre).

- Consider your reputation and scholarly identity as related to reproducibility.

- Create an ORCID!

- Use citation standards to properly credit data, code, software and other materials (see, e.g., here)

- Explore StudySwap and other platforms that encourage interlab collaboration and replication (see intro paper here)

- Plan to earn Open Science Badges (data, materials, preregistration)

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**Felix Schönbrodts "10 Easy Steps to Increase Your Openness":**

1. Create an account on OSF (http://osf.io/)
2. Upload the material for an existing study (e.g., questionnaires, protocols, maybe reproducible analysis scripts) to an OSF project.
3. Prior to publication, add an open license to all of your figures (so that you can reuse them in later publications, blog posts, or presentations: "Figure available under a CC-BY4.0 license at osf.io/XXXX."
4. For the next project: Change the consent forms in a way that open data would be possible for that project (see here).
5. Sign the PRO initiative and expect openness (or a justification why not) if you review another paper (https://opennessinitiative.org/)
6. For the next data analysis: Practice to create scripts for reproducible data analysis (e.g., SPSS syntax, R scripts). All analytic steps that lead from raw data to the final results should be reproducible.
7. Let a master student preregister his/her thesis. Can be either a "local preregistration", or a proper preregistration at OSF or at https://aspredicted.org/. See this workshop material for how to do a preregistration: https://osf.io/yd487/, https://osf.io/mx7yp/
8. Do your own first preregistration; enter the Prereg challenge and get 1000$: https://cos.io/prereg/
9. Publish your first open data set: Ensure anonymity, provide a codebook. See article here for details (German-language)
10. Team up with colleagues and establish a local open science initiative (e.g., UKRN, NOSI)!

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Small Things Can Have a Big Impact… some additional BITSS Catalyst Crowd Wisdom!

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- Felix Schönbrodt (LMU Munich)

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Thank you
Backup
Social Science Experimental Studies

- Ackerman et al. (2010)
- Aviezer et al. (2012)
- Balafoutas and Sutter (2012)
- Derev et al. (2013)
- Duncan et al. (2012)
- Gervais and Norenzayan (2012)
- Gneezy et al. (2014)
- Hauser et al. (2014)
- Janssen et al. (2010)
- Karpicke and Blunt (2011)
- Kidd and Castano (2013)
- Kovacs et al. (2010)
- Lee and Schwarz (2010)
- Morewedge et al. (2010)
- Nishi et al. (2015)
- Pyc and Rawson (2010)
- Ramirez and Beilock (2011)
- Rand et al. (2012)
- Shah et al. (2012)
- Sparrow et al. (2011)
- Wilson et al. (2014)

Relative standardized effect size

- 95% confidence interval
- Point estimate larger than zero ($P < 0.05$)
- Point estimate not different from zero ($P > 0.05$)

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Which Studies Are Replicable?

- Hauser et al. (2014), Nature
- Gneezy et al. (2014), Science
- Janssen et al. (2010), Science
- Balafoutas and Sutter (2012), Science
- Pyc and Rawson (2010), Science
- Aviezer et al. (2012), Science
- Nishi et al. (2015), Nature
- Duncan et al. (2012), Science
- Karpicke and Blunt (2011), Science
- Derex et al. (2013), Nature
- Kovacs et al. (2010), Science
- Morewedge et al. (2010), Science
- Wilson et al. (2014), Science
- Rand et al. (2012), Nature
- Ramirez and Beilock (2011), Science
- Sparrow et al. (2011), Science
- Shah et al. (2012), Science
- Gervais and Norenzayan (2012), Science
- Kidd and Castano (2013), Science
- Lee and Schwarz (2010), Science
- Ackerman et al. (2010), Science

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*Prediction market and survey beliefs*