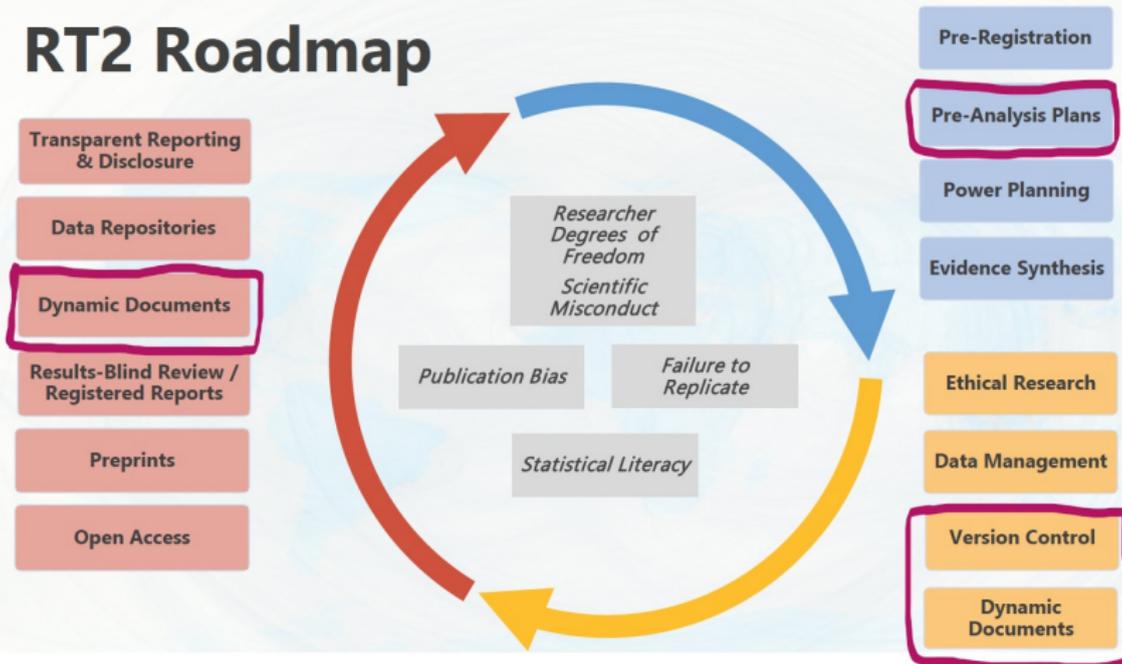# Registration & Pre-Analysis Plans

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Filling in the gaps. An online workshop to promote, improve and implement tools for transparency and reproducibility in health economics research

23 September, 2021

Outline

- Publication bias is a problem
- Registration can help with publication bias
- Pre-analysis plans
- What should we include in our PAP, and where should we post it?

Publication bias is a problem

Three reasons behind:

1. P-hacking
2. The difficulty of publishing statistically insignificant results
3. The "File Drawer Problem"

1) p-hacking

- P-hacking (fishing, researcher degrees of freedom, data mining, data massaging, data dredging, or specification searching) occurs **when researchers**, intentionally or not, **select** a subset of the possible analyses in a study **based on** whether those analyses generate **statistically significant results**

- *If we only write up/publish significant results, and we have no record of all the insignificant results, we have no way to tell if our 'significant' results are real, or if they are the 5% we should expect due to noise*(Garret, 2017)

Sociology journals
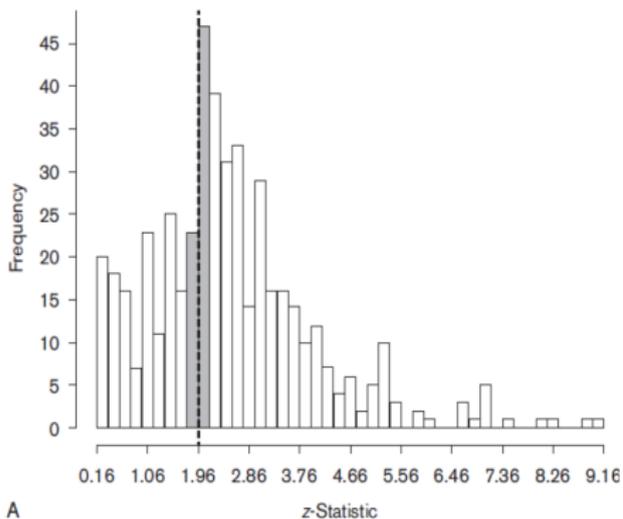
Political Science journals
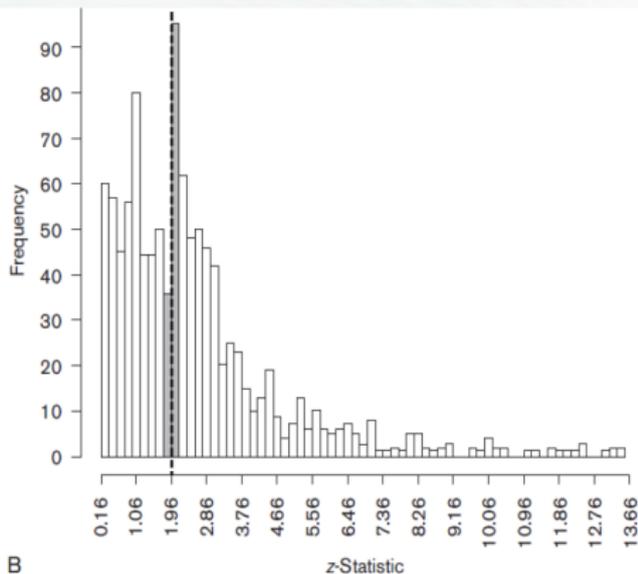
Gerber and Malhotra (2008)

p-hacking in economics?

Methods Matter: p-Hacking and Publication Bias in Causal Analysis in Economics

Abel Brodeur

Nikolai Cook

Anthony Heyes

Brodeur et al. (2020) analysed 21,000 hypothesis tests from RCT, DID, IV and RDD research designs, published in 25 leading economic journals, and found that p-hacking is particularly concerning in IV studies

#1) *The garden of forking paths*

The garden of forking paths: Why multiple comparisons can be a problem, even when there is no "fishing expedition" or "p-hacking" and the research hypothesis was posited ahead of time[*]

Andrew Gelman[†] and Eric Loken[‡]
14 Nov 2013

"I thought of a labyrinth of labyrinths, of one sinuous spreading labyrinth that would encompass the past and the future ... I felt myself to be, for an unknown period of time, an abstract perceiver of the world." — Borges (1941)

-Researchers will p-hack, intentionally or not, by choosing specifications, datasets, hypotheses, and others modelling decisions(Gelman and Loken, 2013)
-P-hacking is not addressed by adding robustness checks

#1) A graphical view of it...
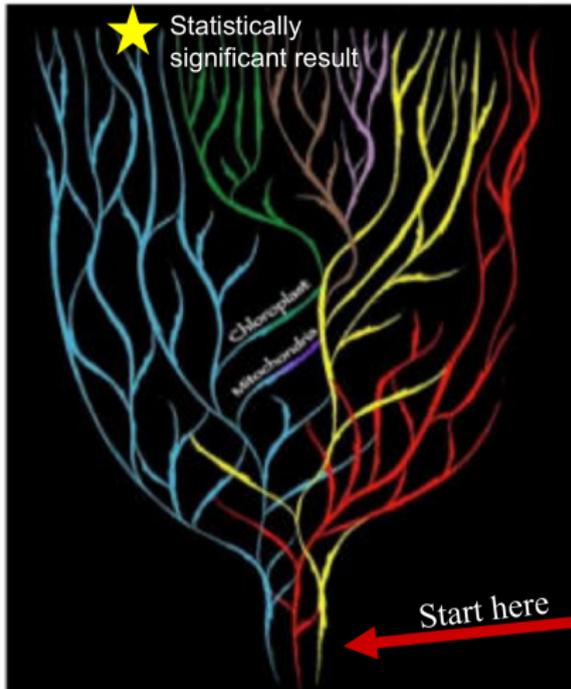
The Garden of Forking Paths

Control for time?

Exclude outliers?

Median or mean?

Hypothesis: "Does X affect Y?"

#2 Do reviewers of HE papers favour positive results?

PUBLICATION BIAS AND EDITORIAL STATEMENT ON NEGATIVE FINDINGS*

Cristina Blanco-Perez and Abel Brodeur

- In February 2015, the editors of eight health economics journals sent out an editorial statement aimed to reduce the extent of *specification searching*
  - Authors: submit papers with negative results as well
  - Referees: not to be biased against studies that do not reject null hypotheses
- Blanco-Perez and Brodeur (2020) tested whether the editorial statement decreased the extent of publication bias
- This analysis found that the publication biased was reduced by 18 points

#3) File drawer problem

According to Rosenthal (1979)

- *Journals are filled with the 5% of the studies that show Type I errors,* while the file drawers *are filled with the 95% of the studies that show non significant results*

- Studies tucked away in file drawers, that did not make the magic $<.05$ level

- Consequence: High percentage of false positives. We cannot produce accurate measures of true effects
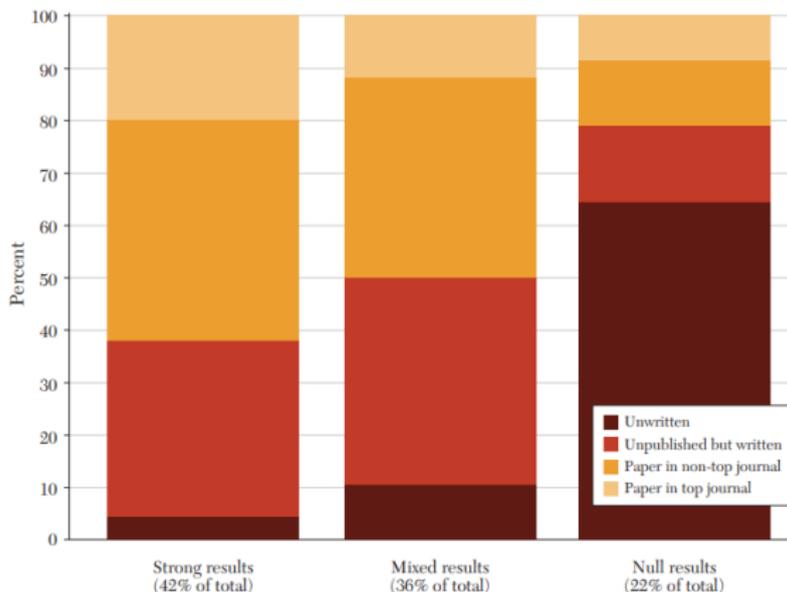
Figure 1. Publication Rates and Rates of Writing Up of Results from Experiments with Strong, Mixed, and Null Results

Christensen and Miguel (2018)

Registration can help with publication bias

- To **track** the complete body of knowledge in a topic of research, regardless of the direction and magnitude of the results
- The **use of registries** to catalogue all research conducted on a given topic
- Registration before the analysis. Sources of information that serve as a **permanent and public record** of all the research done in a specific field, independent of the final results

What is a PAP?

- "A document wherein a researcher outlines her planned empirical analysis **before** having an opportunity to access the data" Burlig (2018)

- "For the PAP to be credible, this **should be submitted** to a (public) registry, which archives and timestamps the PAP, preventing it from being altered after the researcher gains access to her data" Burlig (2018)

PAPs in observational studies (Burlig, 2018)

The vast majority of papers (in economics) are non-RCTs.

So, *how do observational studies fit into the transparency landscape*?

- Many observational studies use public data and this could hinder pre-registration
- Challenge! **Not everything can be** credibly **pre-registered**

When pre-registration is possible?

Scenarios where pre-registration is possible

- The data are not yet available
- The event to be studied has not yet occurred
- The data are confidential

PAP before data is released

This applies to public, administrative or your own data

- A large number of administrative datasets are announced pre-release
- Better still, there are often multiple waves
- Many events in the world are announced beforehand (i.e elections; policy changes)

PAP using confidential data

- Transparency and replication is hard *with* data . . . now imagine without!
    - The fraction of papers published in AER that requested exemptions to its open data policy rose from 6.5% in 2005 to over 45% by 2016
- Using confidential data opens interesting new opportunities. For example:
    - You can easily argue that you have not seen the data. A data use agreement or transfer record serves as a time stamp
    - You are asked to submit a document detailing what you wish to do with the data in order to gain access ⟵ PAP

PAP in practice

- The PAP checklist by McKenzie (2012)
- PAP for RCTs from Alejandro Ganimian
- PAP for observational studies from Burlig (2018)

FAQ about pre-registration(Science, 2021)

Can someone *scoop* my ideas?

- Date-stamped pre-registration make your claim verifiable
- By the time you have pre-registered, you are ahead of any possible scooper
- Embargo your pre-registration

Where to register?

- The American Economics Association (RCTs only)
- The J-PAL Hypothesis Registry
- EGAP
- 3ie
- The Open Science Framework (OSF)
- Clinicaltrials.gov
- As-predicted

Useful resources

- https://www.cos.io/initiatives/prereg
- https://www.povertyactionlab.org/resource/pre-analysis-plans
- https://dimewiki.worldbank.org/Pre-Analysis_Plan
- https://www.bitss.org/wp-content/uploads/2015/12/KatherineCasey_PAPs.pdf
- https://oconnell.fas.harvard.edu/files/lkatz/files/dbfkos_pap_w26993.pdf

Thanks!

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