Open Science Community Groningen

Preregistration

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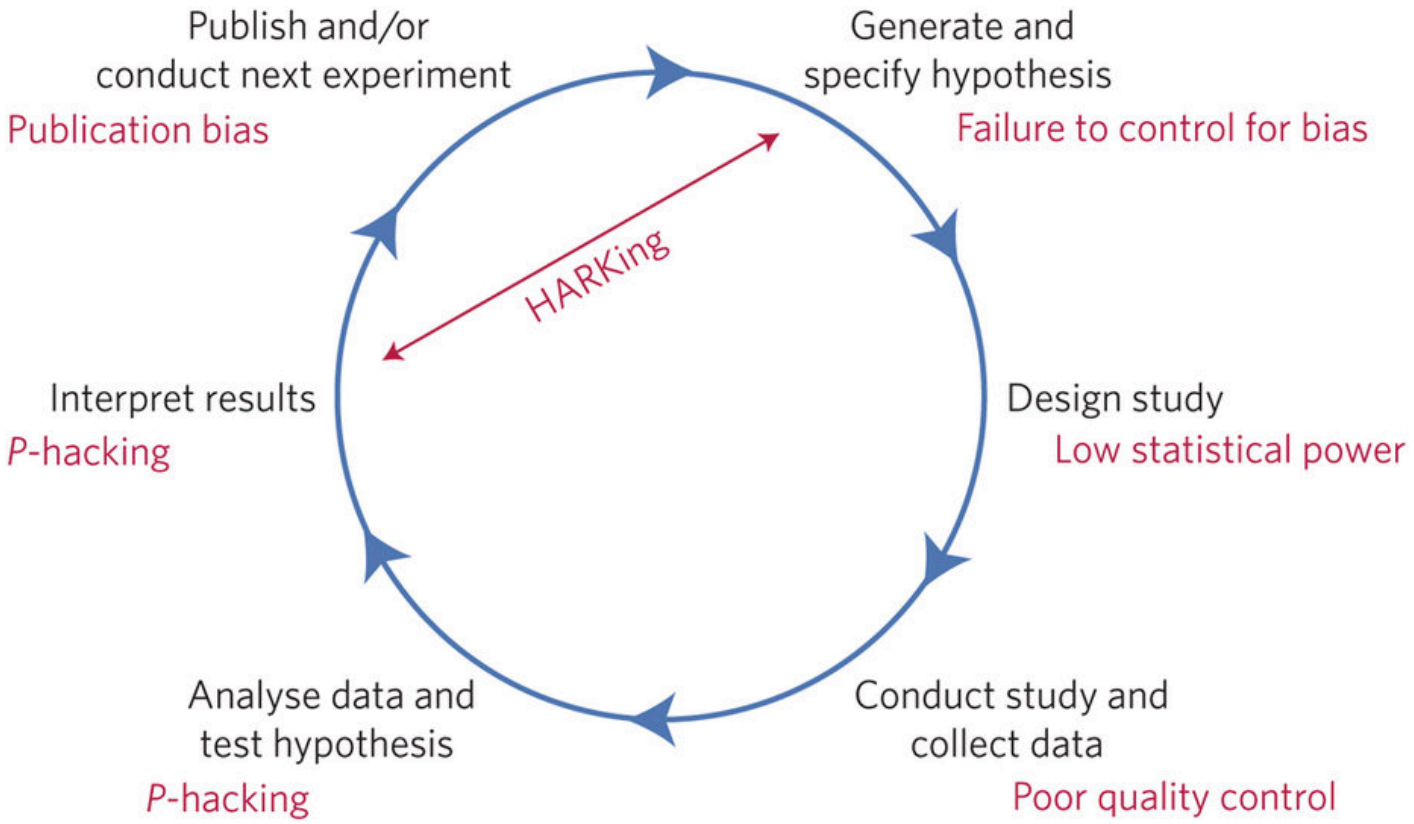
PREREGISTERED

Presentation from the Open Science Center: cos.io/prereg

Hypo-Deductive Model of the Scientific Method



Reference: http://www.nature.com/articles/s41562-016-0021#f1

The Problem

The combination of a strong bias toward statistically significant findings and flexibility in data analysis results can lead to irreproducible research

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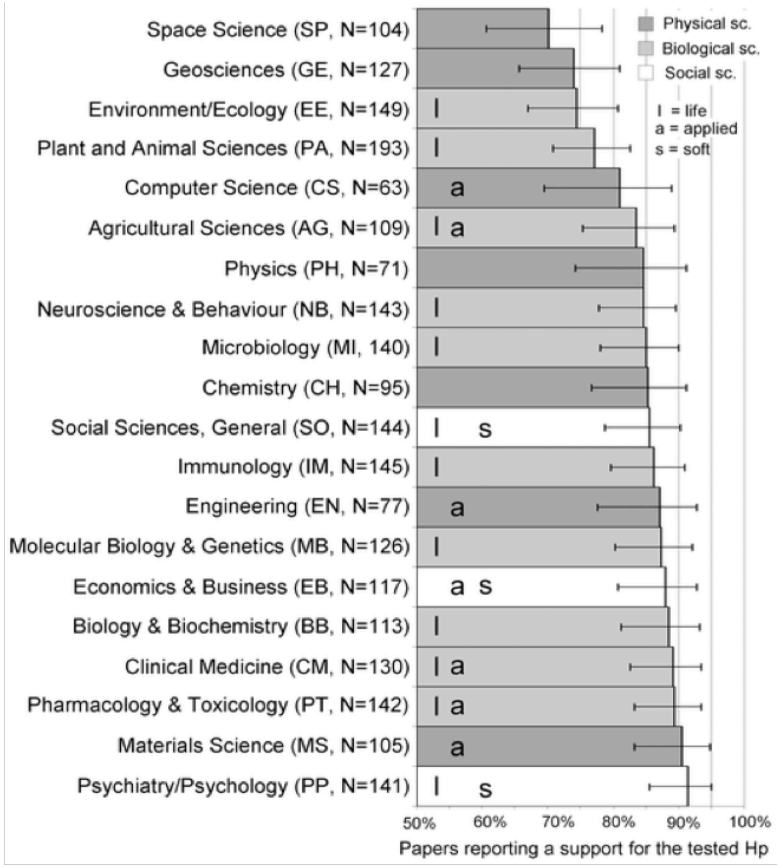

Fanelli D (2010) "Positive" Results Increase Down the Hierarchy of the Sciences. PLoS ONE 5(4): e10068. doi:10.1371/journal.pone.0010068
http://127.0.0.1:8081/plosone/article?id=info:doi/10.1371/journal.pone.0010068

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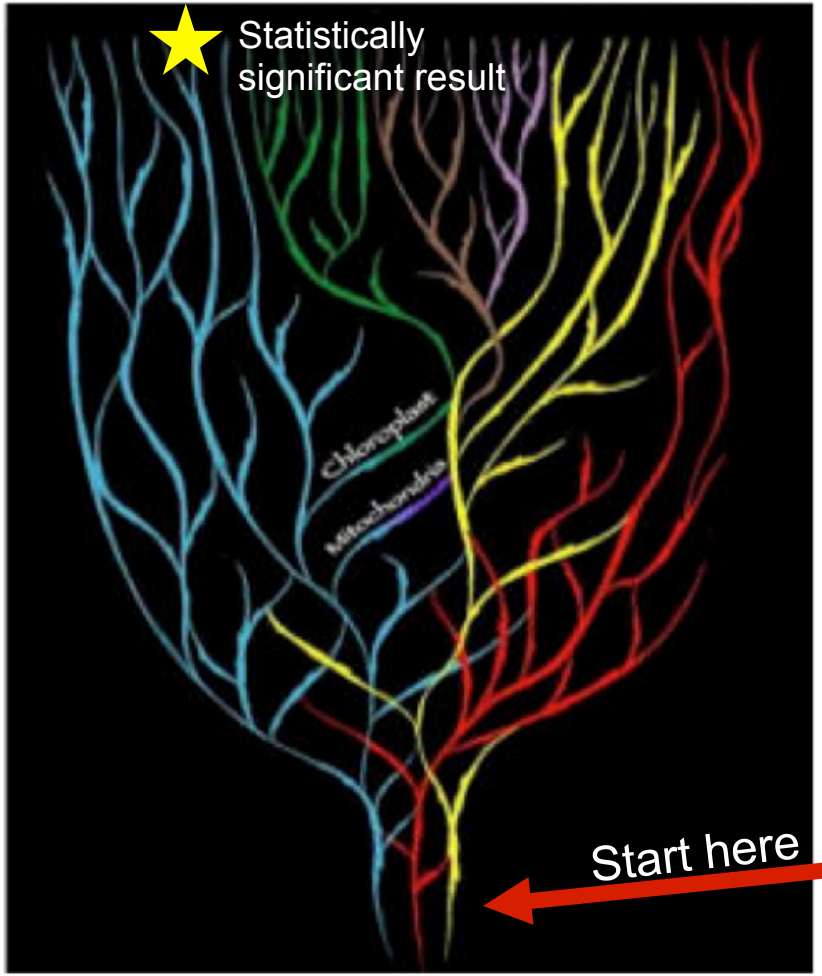

The Garden of Forking Paths

Control for time?

Exclude outliers?

Median or mean?

Hypothesis: “Does X affect Y?”

Gelman and Loken, 2013

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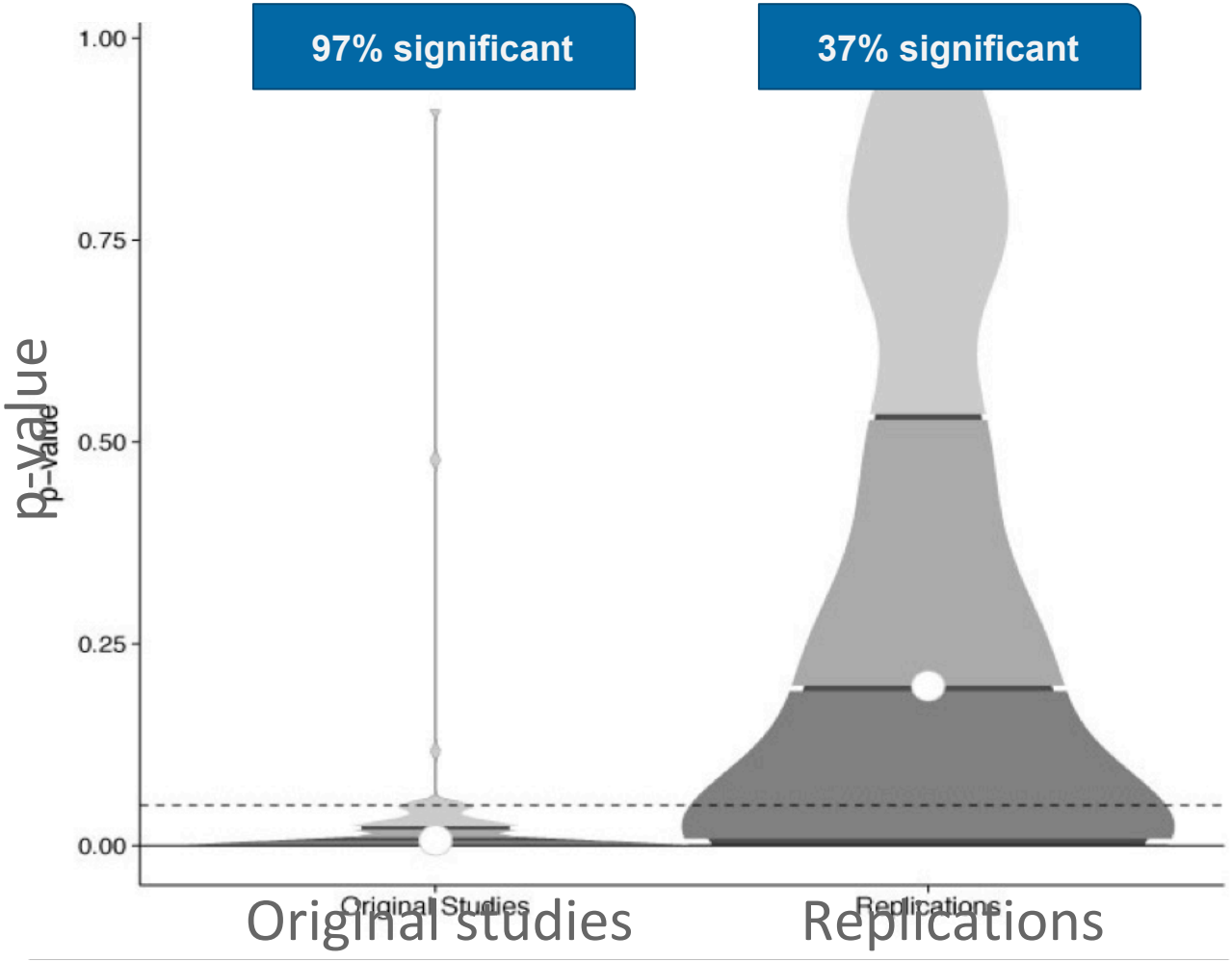
Reproducibility Project: Psychology



What is Preregistration?

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A time-stamped, read-only version of your research plan created ***before*** you begin data collection.

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A time-stamped, read-only version of your research plan created *before* you begin data collection.

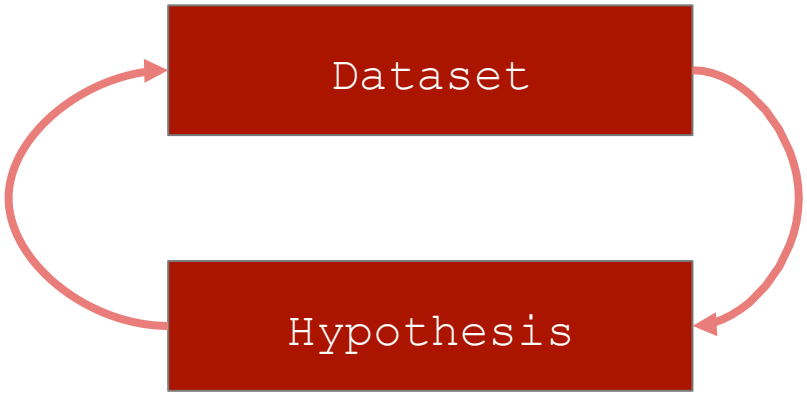
It contains:

- Hypothesis
- Data collection procedures
- Manipulated and measured variables
- Statistical model
- Inference criteria

When the research plan undergoes **peer review before results are known**, the preregistration becomes part of a Registered Report

What problems does preregistration fix?

1. The file drawer effect
2. **P-Hacking**: Unreported flexibility in data analysis
3. **HARK**ing: Hypothesizing After Results are Known



What problems does preregistration fix?

Preregistration makes the distinction between **confirmatory** (hypothesis testing) and **exploratory** (hypothesis generating) research more clear.

Confirmatory vs. Exploratory Analysis

Context of confirmation

- Traditional hypothesis testing
- Results held to the highest standards of rigor
- Goal is to minimize false positives

P-values interpretable

Context of discovery

- Pushes knowledge into new areas/ data-led discovery
- Finds unexpected relationships
- Goal is to minimize false negatives

P-values meaningless

Confirmatory vs. Exploratory Analysis

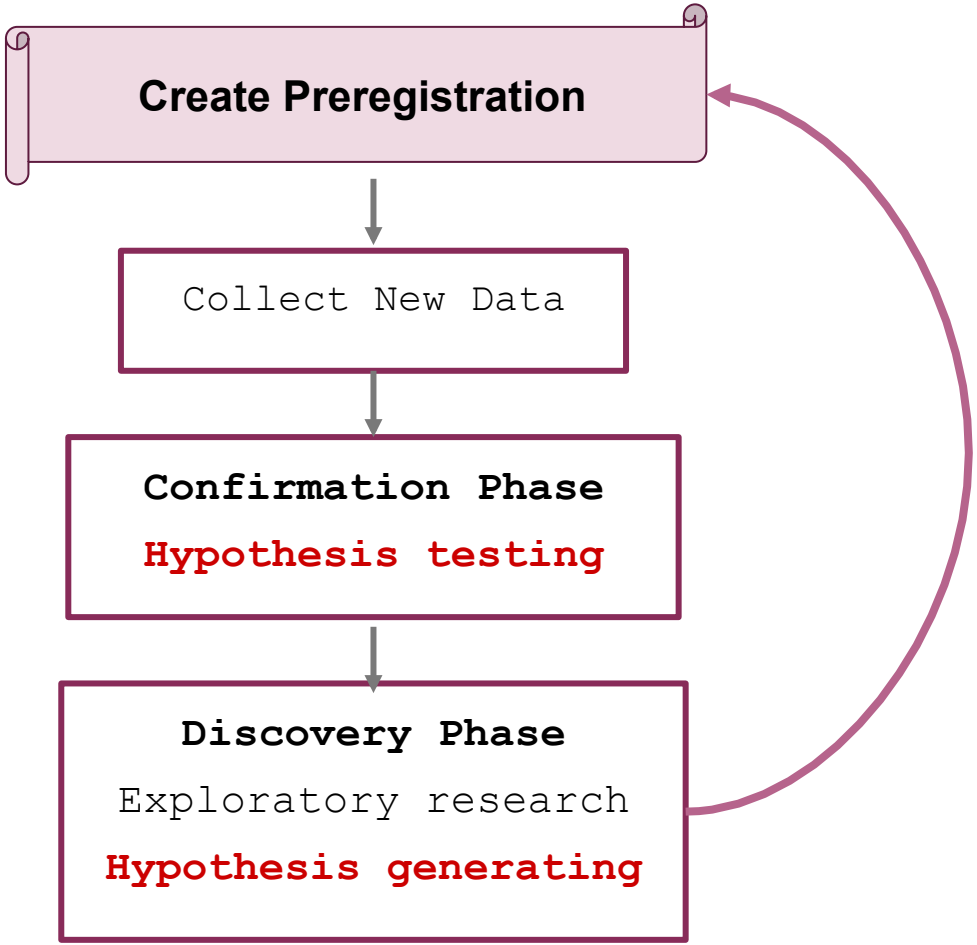
Presenting exploratory results as confirmatory increases the publishability of results **at the expense of credibility of results.**

P-values interpretable

P-values meaningless

Example workflow

Theory driven, a-priori expectations



Incentives to Preregister

You can receive a **Preregistered Badge** for preregistering your research *before* you begin your study. Visit cos.io/badges for more information and to see which journals currently issue badges.

Let’s look at OSF form, real-time!

http://osf.io/prereg/

Examples of completed preregistrations:
https://osf.io/e6auq/wiki/Example%20Preregistrations/?view

Different formats for different studies

- **Use of secondary data**: https://osf.io/x4gzt/
- **Qualitative Research**: https://osf.io/dv8km/ or https://osf.io/j7ghv/
- **Experience sampling (ESM) studies**: https://osf.io/2chmu/
- **fMRI studies**: https://osf.io/6juft/
- **Systematic reviews and meta-analyses**: https://osf.io/preprints/metaarxiv/3nbea

Just some examples, there are many more

Want help? OSCG Q&A

Bi-monthly preregistration Q&A in 2021:

January 19, 13:00-14:00

March 1, 13:00-14:00

September 7, 13:00-14:00

November 8, 13:00-14:00

Please send an email to info@openscience-groningen.nl to receive the google meet link

PREREGISTERED

Preregistration video tutorials

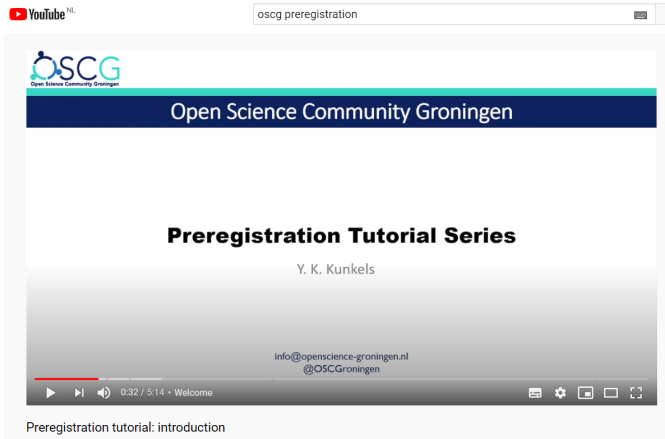
- Goal: offering information and step-by-step guides on pre-registration.

- Format: Short (5 to 10 minutes) video's disseminated online.

Preregistration video tutorials

- Series: Looking at one major topic at a time and breaking it down into small, manageable chunks.
- Interactivity & revelancy: Easily skip to a part or video that is most relevant.
- Example:

https://www.youtube.com/watch?v=O6lL_VcSfE4



Preregistration tutorial: introduction

FAQs

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Can’t someone “scoop” my ideas?

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1. Date-stamped preregistrations make your claim verifiable.
2. By the time you’ve preregistered, you are ahead of any possible scooper.
3. Embargo your preregistration.

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2. Making multiple preregistrations and only citing the one that “worked.”

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While fairly easy to do, this makes fraud **more intentional**.

Preregistration helps keep you honest to **yourself.**

Tips for writing up preregistered work

1. Include a link to your preregistration (e.g. https://osf.io/f45xp)
2. Report the results of **ALL** preregistered analyses
3. **ANY** unregistered analyses must be transparent

Thank you for attending!

1. POLL: Do you think you will attend one of the next Q&A sessions

THANK YOU!

Learn more: cos.io/prereg