Be Transparent

Laura Klinkhamer
lklinkha@exseed.ed.ac.uk

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What?

Optional/desirable:

- Pre-registering your research plans
- Making your work openly accessible (no fees for readers)
- Making your data openly accessible for other researchers

But most importantly:

- *Honestly* record and present your steps and outcomes

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Why?

- So that your research is credible
  (helps with your professional image too!)

- So that the scientific community can learn from and build upon your research
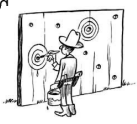
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Why?

Reproducibility/replication crisis:
Lots of results in scientific studies
(particularly in psychology) cannot be replicated

File-drawer problem:
Publishing biased towards significant findings

→ Incentivizes HARKing
Hypothesizing After the Results are Known

i.e. presenting (*post-hoc*) hypotheses you made after seeing the results as if they were your *a priori* hypotheses

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Why?

- This way – is science really helping to get closer to the truth?

- Can we do better?

We Can Do It!

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The "recipe" to reproducible research?

Reproducible Research Checklist

- ❑ What is my *general* research question?
- ❑ What are my *specific, concise and testable* hypotheses?
- ❑ What are my variables of interest and how will they be measured?
- ❑ Do I have covariates? If so, what is my *rationale* for including them?
- ❑ What is my sample size?
- ❑ What statistical tests will I use to test my hypotheses?
- ❑ How will I treat missing or skewed data, outliers?
- ❑ What criteria will I use to make inferences? (e.g., p-values, effect sizes, confidence intervals).

Does my "recipe" have enough information for someone else to "make" the same research study?

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How?

Dos	Don'ts
✓ Use your plan/recipe as your framework/guide	× Keep trying things until you get a significant result
✓ Try to make your changes before the analysis phase	× Wait until the last minute to make changes, potentially after seeing the results
✓ Transparently record all changes in your notebook and report these	× Hide the changes because you are embarrassed about making 'mistakes' at the start
✓ Clearly indicate which of your hypotheses and analyses are **confirmatory** and which are **exploratory**	× Go back to change your original research question and main hypotheses after seeing the results
✓ Apply multiple comparison corrections if applicable	× Ignore the family-wise error rate
✓ Keep it simple	× Overcomplicate your analyses

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Final comments

- Significant results are **NOT** better or more important than non-significant results!

- Remember the Three T's:
  Think before you do, Trace your steps and be Transparent

- Important: trying to make your work more reproducible is not an all-or-none thing and there is no one-size-fits-all solution to it. Every situation differs, and it's about being aware of the principles and trying to apply them to your situation. Every little bit helps ☺

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