

R: A Hitchhikers Guide to Reproducible Research

– **Wise up**

Brendan Palmer,
Clinical Research Facility - Cork &
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 **@B_A_Palmer**

Don't do what Donny Dont does!



"In short, peer review misses all the hard stuff, and a worrying amount of the easy stuff"

James Heathers,
Northwestern University

#datathugs



Brian Wansink: The grad student who never said no

"Every day we would scratch our heads, ask "Why," and come up with another way to reanalyze the data with yet another set of plausible hypotheses. Eventually we started discovering solutions"

p-values should not define a study

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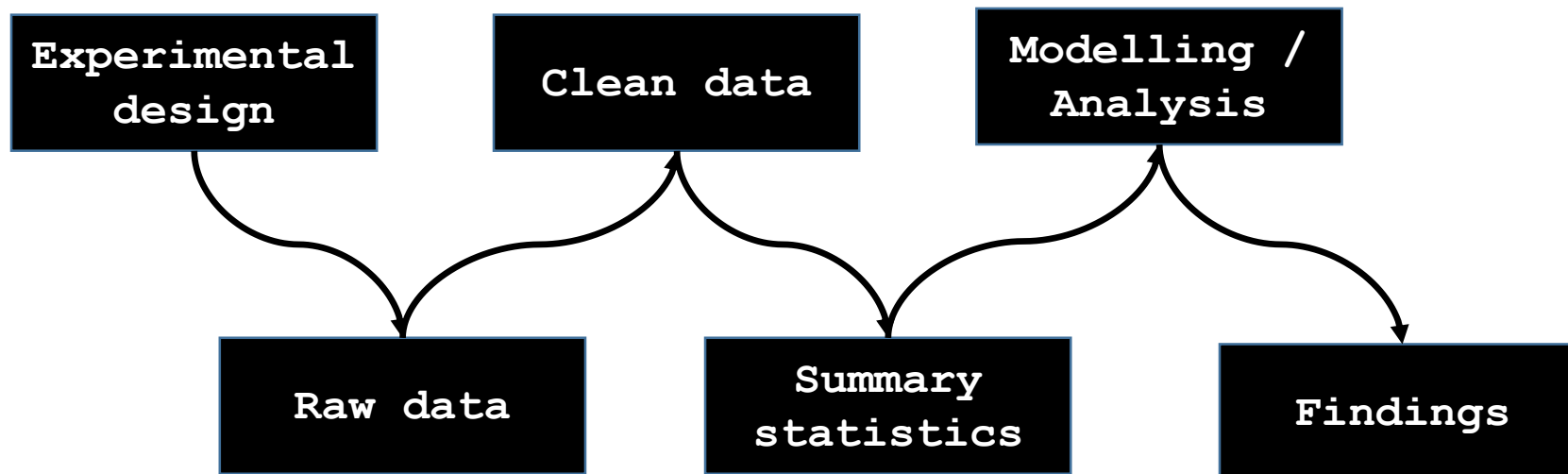
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Statistics: P values are just the tip of the iceberg

Jeffrey T. Leek & Roger D. Peng

28 April 2015



Extreme
scrutiny

A spotlight beam originates from the text 'Extreme scrutiny' at the top right and shines down onto the text 'p-value' at the bottom right. The beam is represented by a white cone that widens as it descends, illuminating the area around the 'p-value' text.

p-value

Required reading



The American Statistician

ISSN: 0003-1305 (Print) 1537-2731 (Online) Journal homepage: <http://amstat.tandfonline.com/loi/utas20>



Eur J Epidemiol (2016) 31:337–350
DOI 10.1007/s10654-016-0149-3



ESSAY

Statistical tests, P values, confidence intervals, and power: a guide to misinterpretations

Sander Greenland¹ · Stephen J. Senn² · Kenneth J. Rothman³ · John B. Carlin⁴ · Charles Poole⁵ · Steven N. Goodman⁶ · Douglas G. Altman⁷

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Abstract Misinterpretation and abuse of statistical tests, confidence intervals, and statistical power have been decried for decades, yet remain rampant. A key problem is that there are no interpretations of these concepts that are at once simple, intuitive, correct, and foolproof. Instead, correct use and interpretation of these statistics requires an attention to detail which seems to tax the patience of working scientists. This high cognitive demand has led to an epidemic of shortcut definitions and interpretations that are simply wrong, sometimes disastrously so—and yet these misinterpretations dominate much of the scientific

literature. In light of this problem, we provide definitions and a discussion of basic statistics that are more general and critical than typically found in traditional introductory expositions. Our goal is to provide a resource for instructors, researchers, and consumers of statistics whose knowledge of statistical theory and technique may be limited but who wish to avoid and spot misinterpretations. We emphasize how violation of often unstated analysis protocols (such as selecting analyses for presentation based on the P values they produce) can lead to small P values even if the declared test hypothesis is correct, and can lead to large P values even if that hypothesis is incorrect. We then provide an explanatory list of 25 misinterpretations of P values, confidence intervals, and power. We conclude with guidelines for improving statistical interpretation and reporting.

Editor's note This article has been published online as supplementary material with an article of Wasserstein RL, Lazar NA. The ASA's statement on p -values: context, process and purpose. The American Statistician 2016.


The ASA's Statement on p -Values: Context, Process, and Purpose

Ronald L. Wasserstein & Nicole A. Lazar

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 View supplementary material 

 Accepted author version posted online: 07 Mar 2016.
Published online: 09 Jun 2016.

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Pre-registration

- Documenting detail of method and analysis plan before analysing (or collecting) data

Why?

- Prevents rushing into data collection
- Better ensures that researchers collecting data understand what they are doing
- Prevents p-hacking

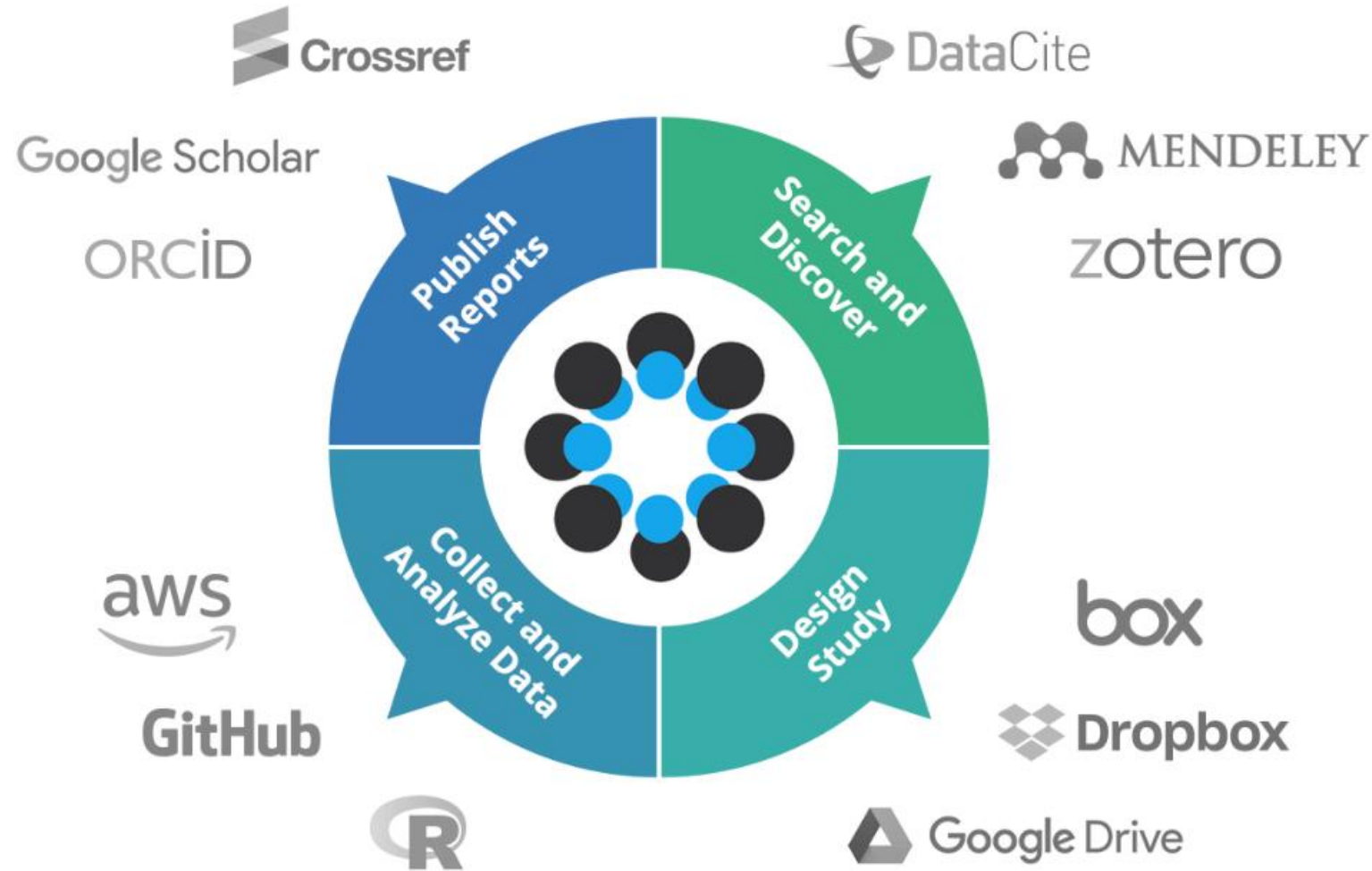
Does pre-registration slow projects down?

- Probably
- But also
 - prevents wasting time running sub-optimal designs
 - helps catch confounders
 - improves pedagogy

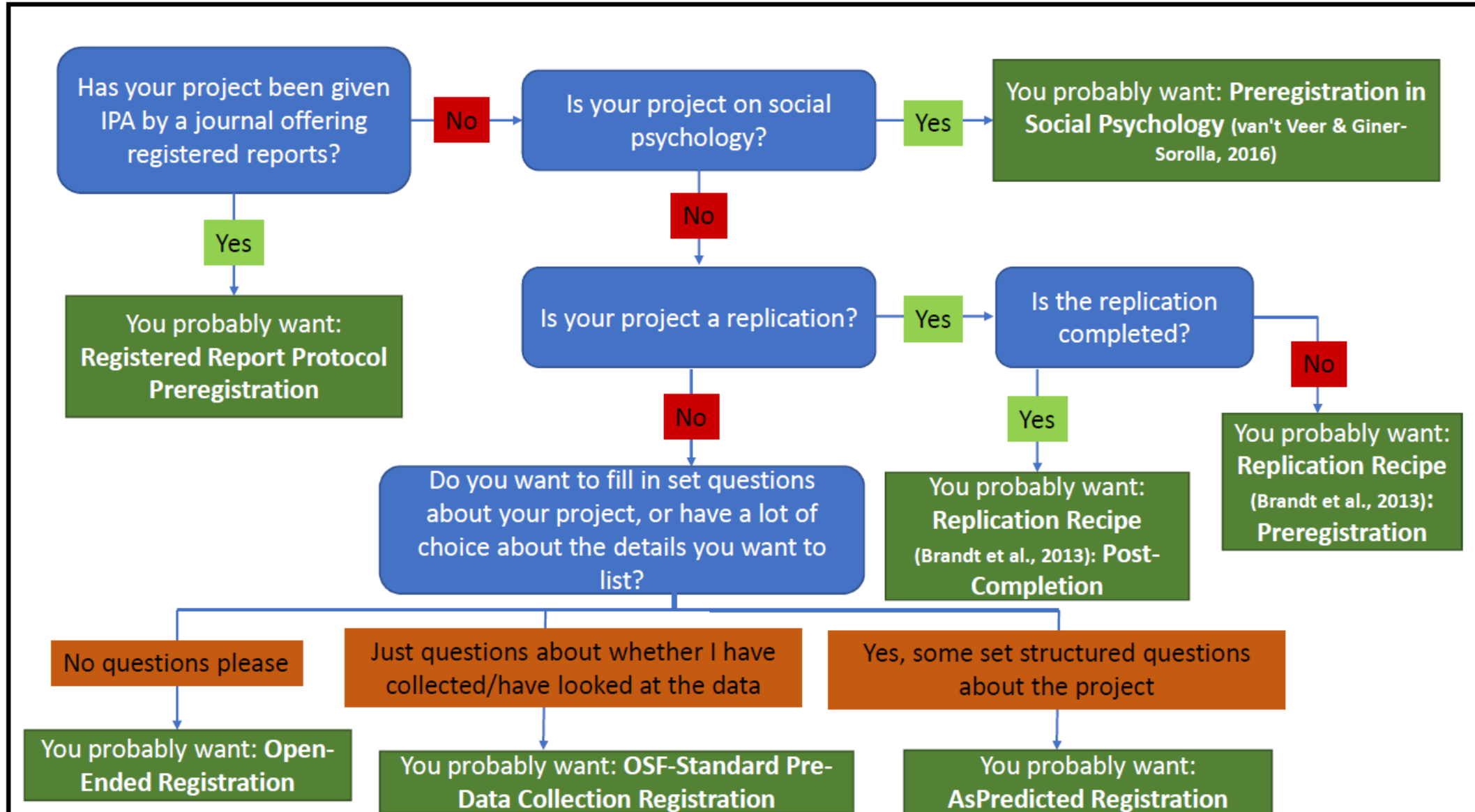
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Recently added

[An examination of the societal and individual effects of early school leaving in the Irish context, focusing on Sundays Well Life Centre as an example of alternative education](#)

Healy, Órlaith (Community-Academic Research Links, University College Cork, 2012-04-18)

This research project examines the societal and individual effects of early school leaving (ESL); looking at the role of alternative education services for young people in Ireland, focusing on the Life Centre (LC) as an ...

And finally

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Teaching the tools to get
computers to do cool science

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Googling for Help

Notes

Check that top Google results haven't change and adjust as needed
Current top 3 hits:

1. <https://blog.exploratory.io/selecting-columns-809bdd1ef615>
2. <https://dplyr.tidyverse.org/reference/select.html>
3. <https://stackoverflow.com/questions/21502465/replacement-for-rename-in-dplyr>

[Link to the data carpentry webpage](#)

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- Responsible Conduct of Research

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- Coming to a School of Applied Psychology near you!!

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Cork (Ireland) R-Users Group

