Open Science [Psychology]

17 October 2017

Agenda

1 Updates
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   - meeting with School Research subcommittee
   - next meeting of our group: Wednesday, 15 November, 4:00-5:15 pm.

2 Replicability vs. Reproducibility (Abbey Nydam)

2 Workshop on p-curve analysis (Faye Nitschke)

3 Discussion about sample sizes and effect sizes (Eric Vanman)

4 Next Steps
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     - R Markdown, R, or Jamovi
     - PsyArXiv
     - Other?
   - Bridging to other Schools and the University (maybe via ESS and Research Ethics)
   - Expanding our impact (outreach to UQ, Brisbane, and beyond); recruit new members
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Reproducible is the bare minimum of science, and we don't even do this…

		Data: **Same**	Data: **Different**
Code/ Method	**Same**	Reproducible	Replicable
	Different	Robust	Generalisable

Effect Sizes, Sample Size, and Power

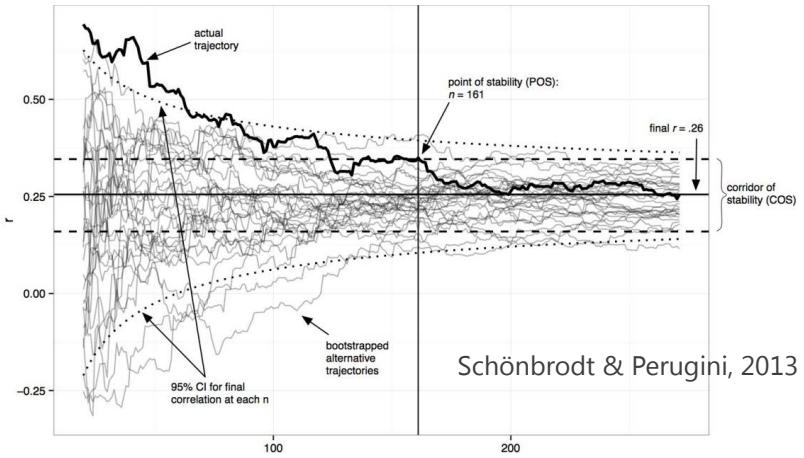
Power analysis and effect size

Daniel Lakens
Eindhoven University of Technology

Jeremy Biesanz
University of British Columbia

How do you determine the sample size for a new study?

Small samples have large variation, more Type 2 errors, and inaccurate estimates

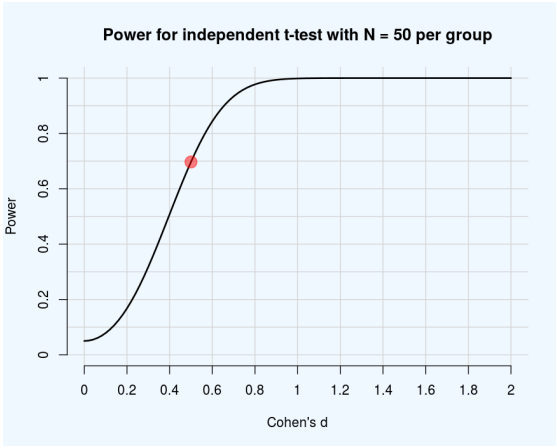


Schönbrodt & Perugini, 2013

Studies in psychology often have low power. Estimates average around 50%
(Cohen, 1962; Fraley & Vazire, 2014)

Statistical power is the long-run probability of observing $p < \alpha$ with N participants, assuming a specific effect size.

Since you never know the true ES, better thought of as a curve…



But…

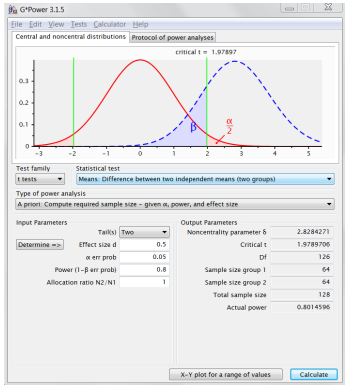
You never know the true effect size, and the the literature is biased

If you expect a true effect of 0, power is 0

From Läkens:

My department requires sample size justification before funding a study. One justification the IRB accepts is 90% power.

That often means people take an effect size from a pilot study or the literature, and do the 'sample-size samba' in G*Power



What we have been doing wrong: Using previous studies as an effect size estimate

A pilot study does not provide a meaningful effect size estimate for planning subsequent studies.

Leon, Davis, & Kraemer, 2011

Effect sizes from the published literature are always smaller than you expect, even when you take into account that effect sizes from the published literature are always smaller than you expect.

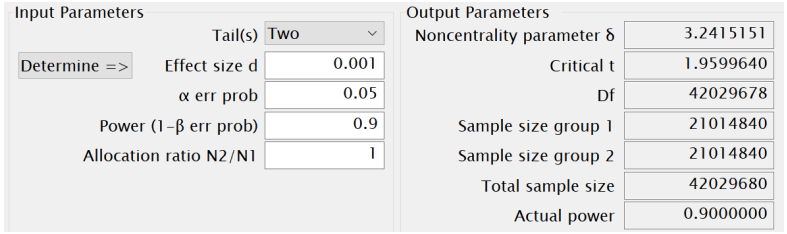
Alternative: Plan for the change you would like to see in the world. As yourself, "What is the smallest effect size of interest?"

Requires you to specify H1! That's a good thing. What does you theory predict, or what do you care about if H0 is false?

If we don't, science becomes **unfalsifiable**. We can never 'accept the null'.

But ‘I’m not interested in the size of the effect – the presence of any effect supports my theory!’ *Really?*

Detecting d = 0.001 requires 42 million people.



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Is an effect size of d = 0.001 support for my theory?

Is an effect size of d = 0.01 support for my theory?

Is an effect size of d = 1 support for my theory?

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University of Technology

HTI

HUMAN-TECHNOLOGY INTERACTION

Code of Scientific Conduct

TU/e expects its academic staff and students* to respect the following five central values of scientific integrity and to conform to the norms and principles that follow from them for their research, design and educational activities:

1. Trustworthiness

Academic staff and students ground their views as academics on scientific evidence. This entails that:

- They do not fabricate, falsify or suppress evidence. The selective omission of research results is reported and justified.
- In presenting results of their activities, they do so with the corresponding uncertainties.
- In scientific communication, they strive for precision and nuance.
- They do not present as established facts speculations, personal opinions and claims that go beyond available evidence.

2. Intellectual honesty

Academic staff and students respect standards of quality in their field and they respect the achievements of others. This entails that:

- They acknowledge and respect intellectual property and authorship. Plagiarism is unacceptable.
- They only claim authorship if they have made a genuine contribution.
- They carry out peer-review tasks seriously and make assessments solely on scientific grounds.
- They only accept tasks for which they have the necessary expertise.
- In educational activities, they accurately present available knowledge in the discipline.

3. Openness

Open and unbiased communication is essential for science and engineering. For academic staff and Students, this entails that:

- They contribute actively to an academic climate in which insights and criticisms are welcome from all, regardless of academic rank and personal characteristics.
- They give room to others to develop or take their own intellectual stance in research, design and education.
- Whenever they publish research results, they present their research such that its results may in principle be replicated.
- They make accessible, after publication, all information needed for intersubjective testing of design results and design processes.
- They make accessible, after publication, research data for re-use by colleagues.

4. Independence

Academic staff and students operate in a context where academic freedom and independence are of great importance. Where needed, they guard this independence against commercial, political and personal interests. This entails that:

- In research, they chose their methods and criteria primarily to realize scientifically valuable goals.
- With external sponsors of scientific research, they arrange that all relevant results of this research may be published within a specified, reasonable amount of time.
- They report interests that may potentially conflict with the independence of research activities.
- They avoid situations in which reasonable doubt concerning the objectivity of their scientific judgement may arise.

5. Societal responsibility

Science and engineering are vital for the health and well-being of people and for a sustainable economy. They may also be the cause of harm and risks. For academic staff and students this entails that:

- They actively seek, within the limits and standards appropriate to their field, to contribute to society through research, design, knowledge dissemination and/or public debate.
- In their research and design, they adhere to the ethical codes for activities in which human subjects and animals are involved.
- They report possible harm and risks of scientific and technological developments to the relevant authorities; in case of doubt, they consult ethical advisory bodies or signal the need for such ethical advice.

Possible cases of violations of this code of conduct should be reported to relevant supervisors or to the confidential officer for scientific integrity at Tu/e. See http://www.tue.nl/en/research/scientific-integrity/.

*This includes guests of TU/e who have access to the university's facilities