Open Science and Preregistration

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LINGUIST 245
May 3, 2018

Sketchy things you can do to get a significant p-val

1. Number of subjects per condition

    a. Run 10 subjects per condition

    b. Perform a t-test

    c. If $p < .05$: Publish paper!

    Otherwise: Go to step a.

Simmons et al. (2011)

Sketchy things you can do to get a significant p-val

2. Have multiple dependent variables

    a. Run tests to predict each of the variables

    b. Pick the dependent variable that gives you a significant p-value

Simmons et al. (2011)

Sketchy things you can do to get a significant p-val

3. Run models with many different independent variables

    a. Have a set of many independent variables

    b. Run models with various combinations and interactions until your manipulation is significant

Simmons et al. (2011)

Sketchy things you can do to get a significant p-val

4. Have conditions that you don't report on
    a. Run n > 2 conditions
    b. Pick 2 conditions which differ significantly and don't tell anybody about the other conditions

DON'T DO ANY OF THESE THINGS!!!

Simmons et al. (2011)

Simulated false-positive rates

	Significance level		
Researcher degrees of freedom	$p < .1$	$p < .05$	$p < .01$
Situation A: two dependent variables ($r = .50$)	17.8%	9.5%	2.2%

Simmons et al. (2011)

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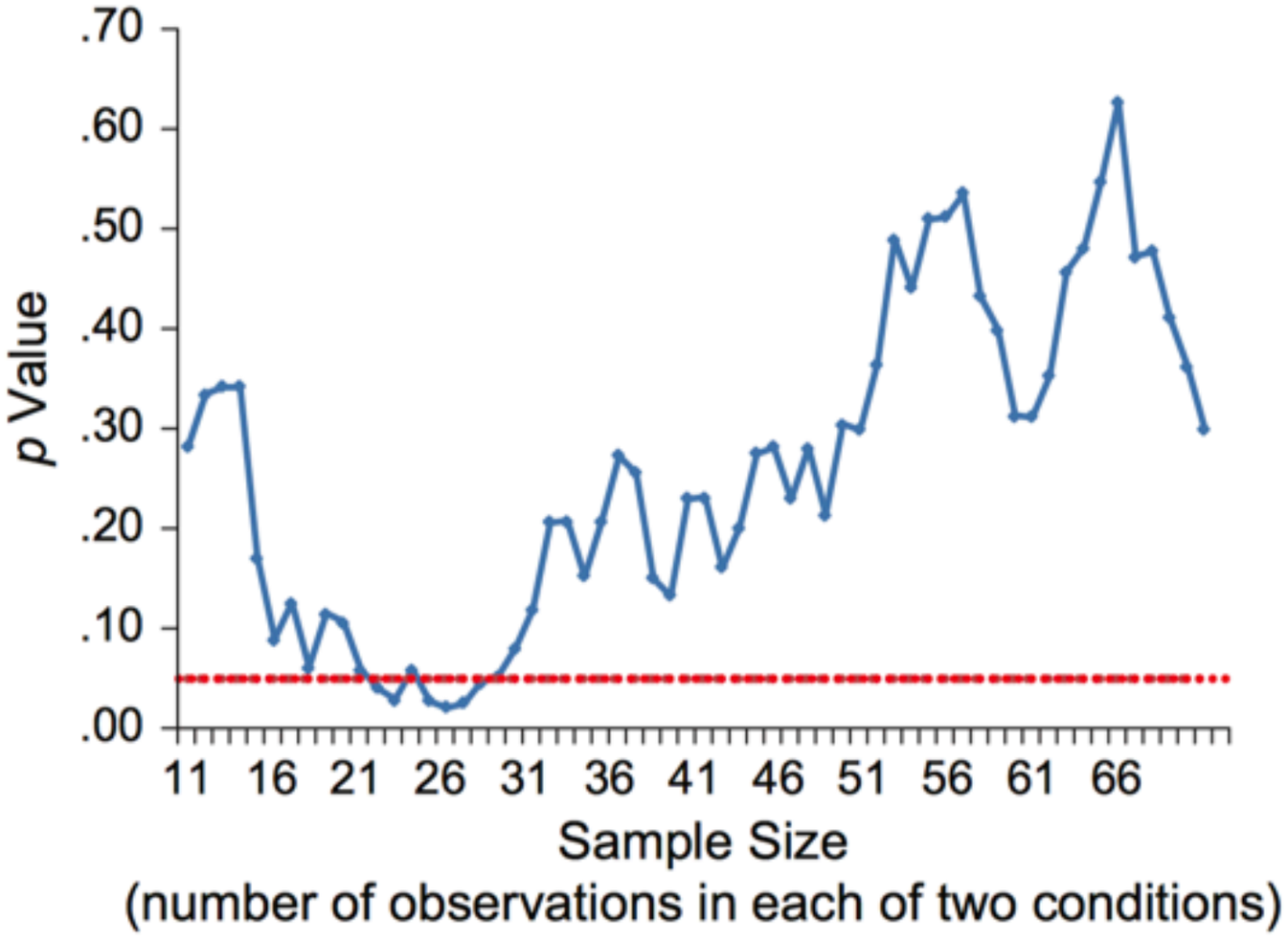
Situation D: dropping (or not dropping) one of three conditions	23.2%	12.6%	2.8%
Combine Situations A and B	26.0%	14.4%	3.3%
Combine Situations A, B, and C	50.9%	30.9%	8.4%
Combine Situations A, B, C, and D	81.5%	60.7%	21.5%

Simmons et al. (2011)

Simulated false-positive rates



Simmons et al. (2011)

Pre-registration

- To keep p-value meaningful, fix the following things **before collecting data**
  1. number of subjects you'll run
  2. exclusion criteria:
     Which data points are you going to exclude from your analysis
  3. dependent variable
  4. independent variables
  5. experimental conditions

Preregistration

- Preregistering provides you (and reviewers and readers of your paper) with proof that you actually fixed all these things

- Just requires filling out a short questionnaire which is permanently stored on a pre-registration platform

My current workflow

1. Come up with and implement experiment
2. Run pilot study with 2-4 subjects
3. Write analysis scripts and test them with pilot data
4. Preregister study and upload analysis scripts to OSF
5. Run actual study
6. Analyze data with pre-registered analysis script
7. (optional) Do **exploratory** post-hoc analyses

What you'll do today

1. Come up with and implement experiment
2. Run pilot study with 2-4 subjects
3. Write analysis scripts and test them with pilot data
4. **Preregister study** and upload analysis scripts to OSF
5. Run actual study
6. Analyze data with pre-registered analysis script
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Tutorial

www.osf.io