

Open Science: pros, cons and community

Richèl ‘Rea-shell’ Bilderbeek

1 This presentation

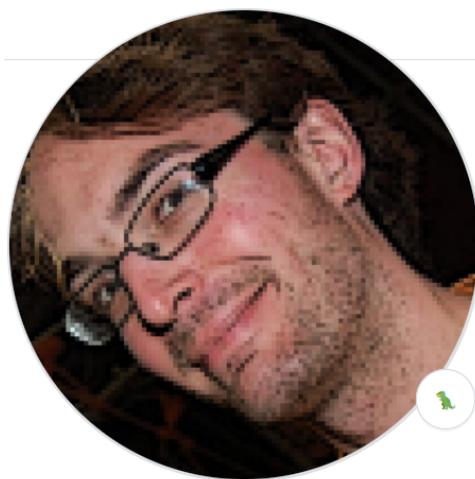
https://github.com/richelbilderbeek/open_science_presentation_enlight_arlus_20240228



2 Goals

- To discuss Open Science
- To share the usefulness of a community

2.1 What I do



Richel Bilderbeek

richelbilderbeek

Follow

Thinks Open Science is a pleonasm. For fun, I teach programming and lead programming teams, both for/with kids and adults.

- 1.75 postdocs
- support at Uppsala University
- founder of Open Science Uppsala
- <https://github.com/richelbilderbeek>

Overview Repositories 1.4k Projects

Pinned

[uppsala-makerspace/loerdagskurser](#) Public

Lördagkurser på Uppsala Makerspace

Processing ⭐ 1 ⚡ 1

[boost_graph_cookbook_1](#) Public

Boost.Graph Cookbook 1: Basics

C++ ⭐ 183 ⚡ 29

[ropensci/babette](#) Public

babette is an R package to work with BEAST2

R ⭐ 41 ⚡ 6

4,205 contributions in the last year

3 This talk

- Experiment 1: Cons: `more_literature`
- Experiment 2: Pros: `literature`
- Experiment 3: Community: `community`

4 Experiment 1: more_literature

- Research question: what are the biggest drawbacks of Open Science for a researcher today?
- Methods: search 5 hours, collect all results, rank these

4.1 Results: least relevant

Feature:

- Open Methods describe ‘how to do research’, not ‘what to research’ (1)

Dispelling myths:

- Open Science does not improve statistical power (1)
- Open Infrastructure costs money too (2)

No idea what to think of this:

- Open Science *may* be neoliberal (3)

4.2 Results: maybe relevant

- Open Access *may be* less inclusive for the poor (4) (5)
- There *may be* impactful cultural and institutional constraints on all facets of Open Science (2)
- Training to do proper Open Data *may be* unaffordable for the poor (6) (5)
- Open Methods *may* diminish qualitative methodologies for the sake of reproducibility (5)
- Open Software *may be* hindered by reluctance to share code (2)
- Open Peer Review *may give* bias and exclusion (5)
- Open Evaluation *may lead to* perverse incentives (1)
- Competition between scientists *may discourage* openness (2), researcher *may be put in* a social dilemma: (2)
- Open Evaluation does not encourage to publish negative results (2)

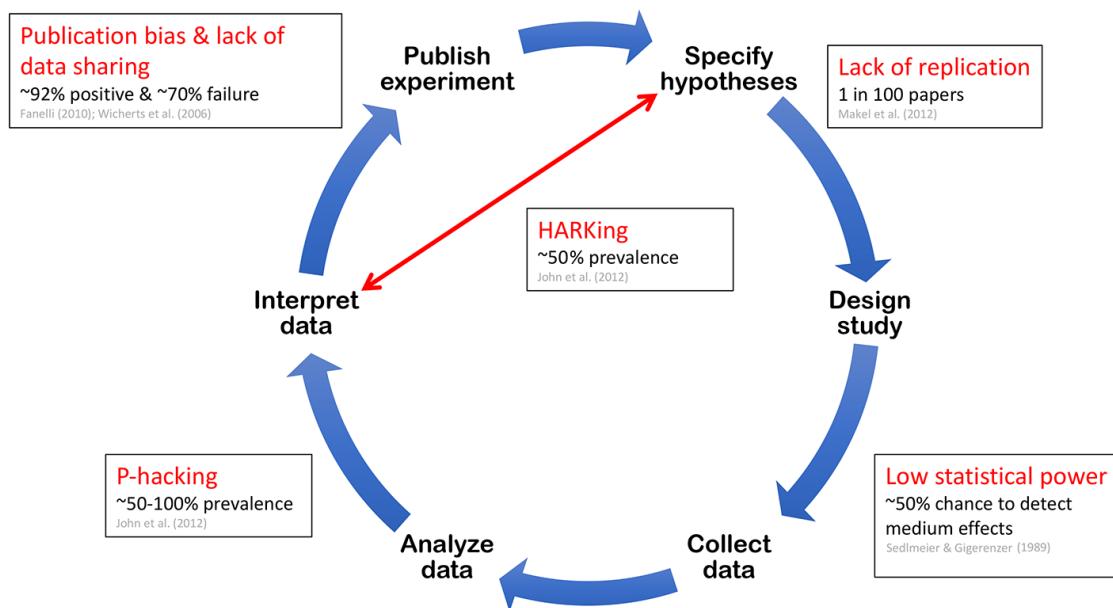
4.3 Results: most relevant

- Open Data excludes/inconveniences the industry (5)
- Lack of standards for sharing research materials (2)
- Open Infrastructure is not in place yet (1) (2)
- Open Data (a.o. FAIRification) takes more time (7) (2)
- ... especially sharing sensitive data is more complex (2)
- Open Methods takes more time (7) (2)
- Open Data has no clear legal guidelines, nor sanctions (2)

5 Experiment 2: literature

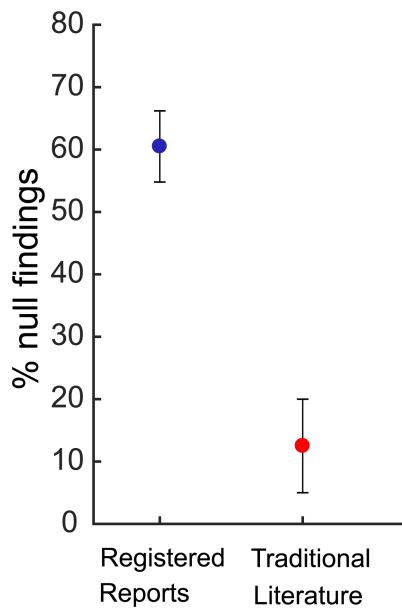
- Research question: what are my favorite papers on Open Science that I know?
- Methods: copy-paste these from earlier presentations with literature searches

5.1 Result: regular science is a problem (8)



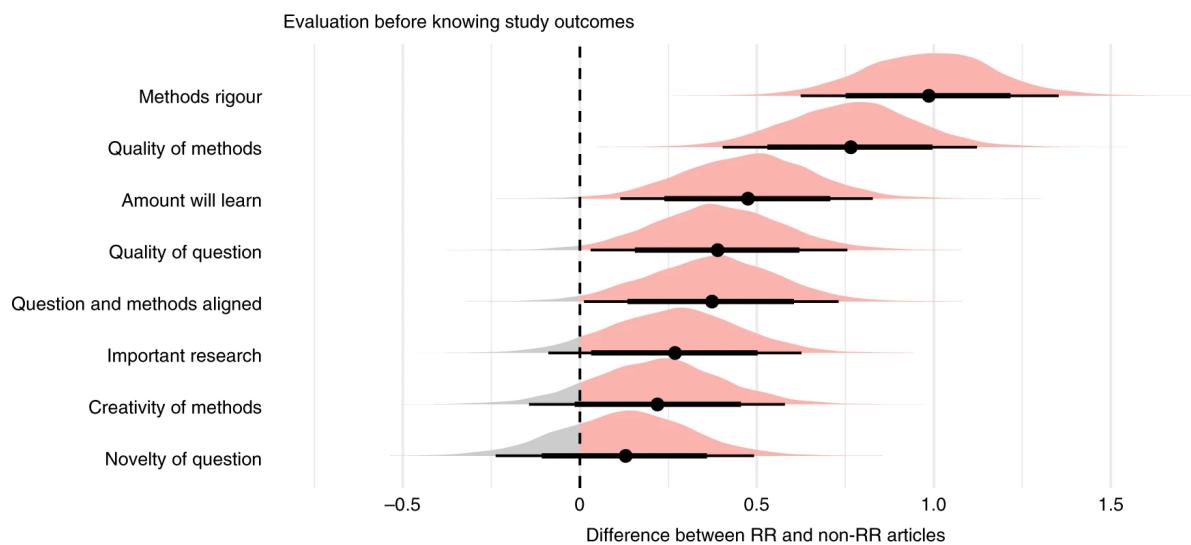
there exists a version with incorrect/inflated numbers!

5.2 Result: Open Science helps honest reporting (7)

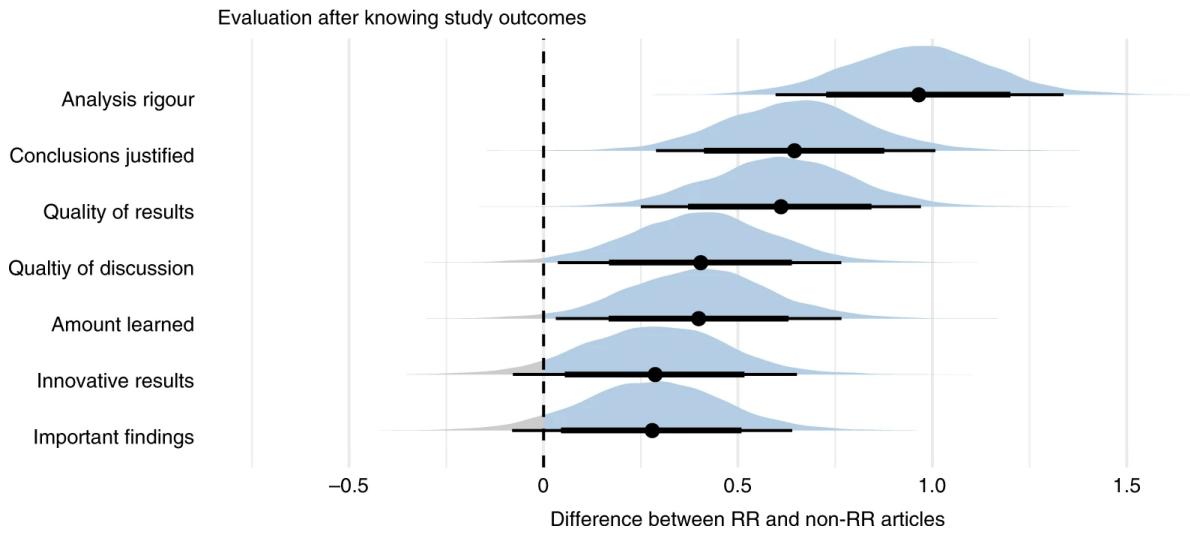


- the file drawer problem
- ‘being held hostage by your data’

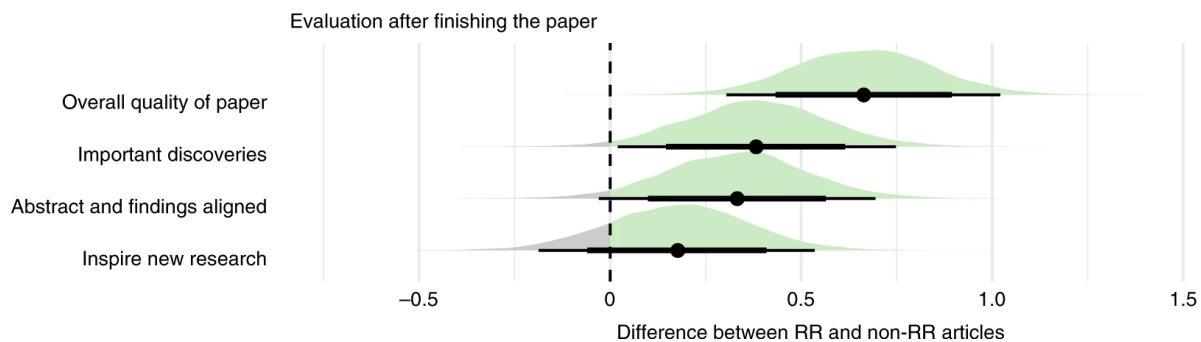
5.3 Result: Open Science results in better papers 1/3 (9)



5.4 Result: Open Science results in better papers 2/3 (9)



5.5 Result: Open Science results in better papers 3/3 (9)



6 Experiment 3: community

- Research question: what are the pros and cons of Open Science for a researcher today?
- Methods: visit meetings, select favorites

6.1 The Open Science Uppsala community

- Who lives in a town with a local community?
- Who has visited that local community at least once?

6.2 Open Science Uppsala goals



- teach
- **discuss**
- English
- regularly
- everyone
- Uppsala
- free
- publicly
- scholarly

6.3 My statement

literature + community

>

literature + more_literature

6.4 It takes time to setup an infrastructure

The illustration features a woman with long brown hair and glasses, looking thoughtfully at a presentation slide. The slide has a light blue background and contains the following text:

Open Science Uppsala

- Presentation by Barbro Bornsäter:
- FAIR data for Heritage Science: Developing
a guide to good practice for open science
within the heritage sciences

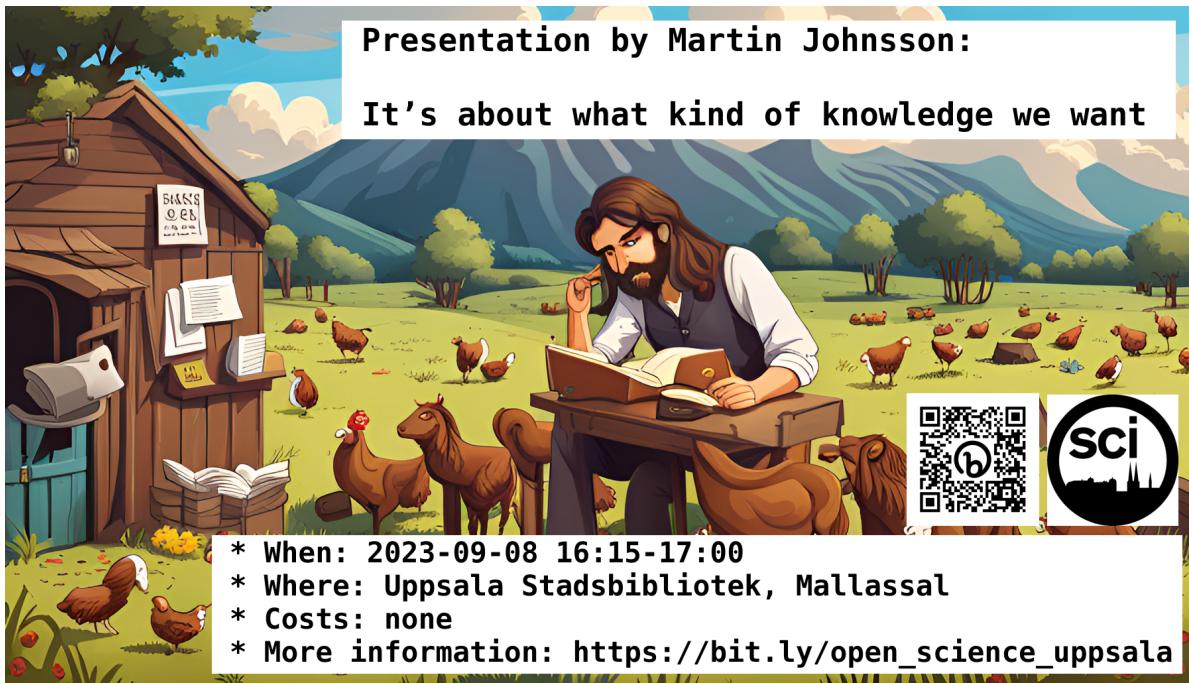
- * When: 2023-06-09 16:15-17:00
- * Where: Uppsala Stadsbibliotek, Mallassal
- * Costs: none
- * More information:
https://bit.ly/open_science_uppsala

On the right side of the slide, there is a circular logo with the letters "sci" and a QR code.

Developing how to make data FAIR. Sometimes, the machines come to the researchers, but sometimes the researchers need to visit the facility.

Resulted in (10). See also (1) (2).

6.5 Open may be unfair to companies



A company can be built around a non-sharable resource. It would be unfair to share that resource.

See also (5)

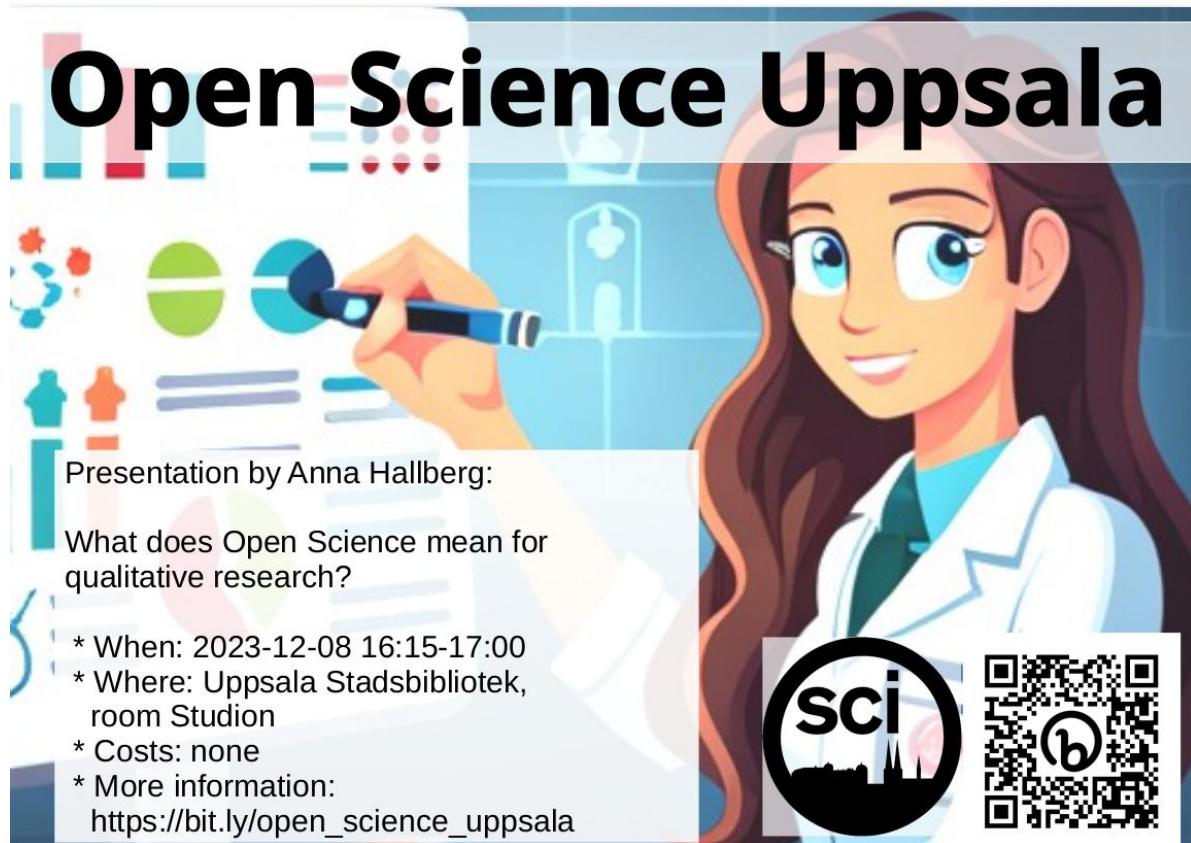
6.6 Open source alleviates constraints



Openly develop useful software and avoiding bureaucracy helps your software getting used.

See also (2) on cultural and institutional constraints.

6.7 Qualitative research is different



Open Science Uppsala

Presentation by Anna Hallberg:

What does Open Science mean for qualitative research?

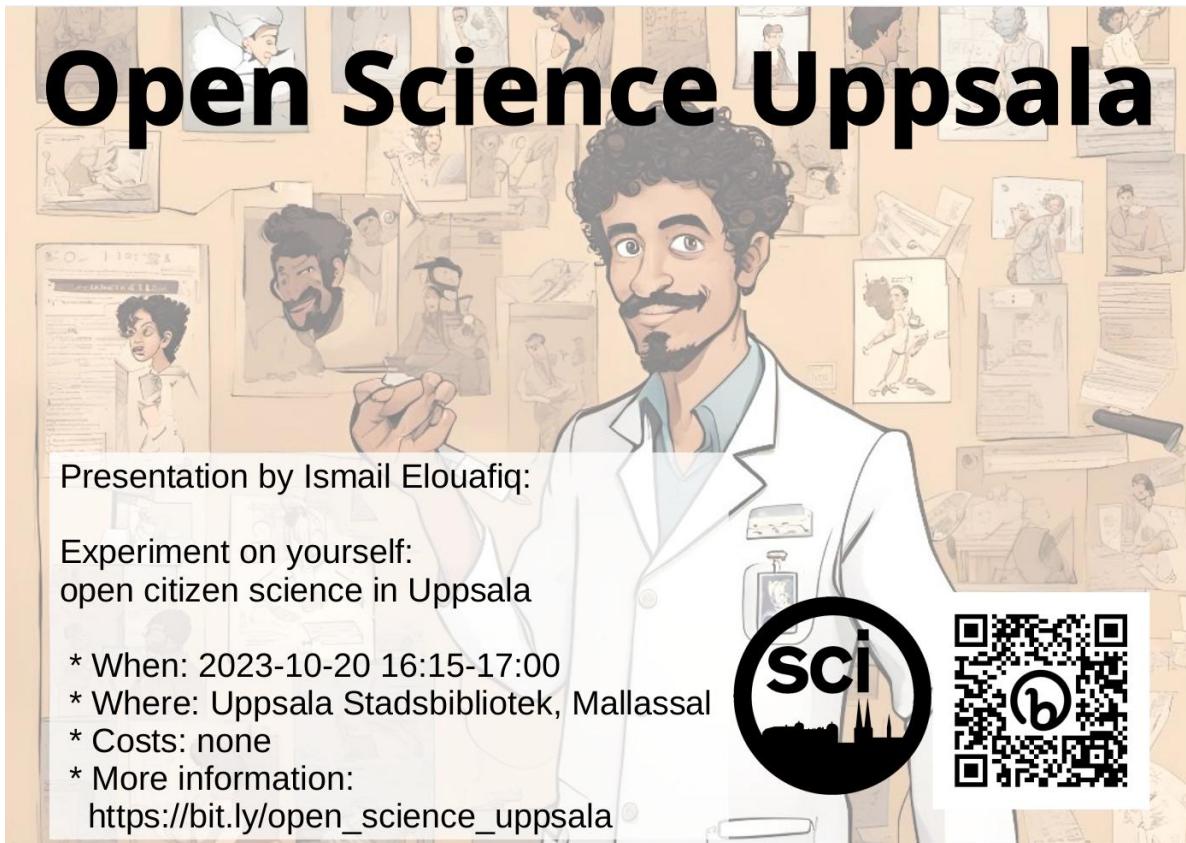
- * When: 2023-12-08 16:15-17:00
- * Where: Uppsala Stadsbibliotek, room Studion
- * Costs: none
- * More information:
https://bit.ly/open_science_uppsala

Replication does not make sense for qualitative papers, (e.g. ‘What is democracy?’), so those fields need to be judged differently.

See also (1).

6.8 Citizen science helps



Achieving statistical power ignores the individual. Citizen science helps find strong effects in few individuals.

6.9 Preregistration with statistical power 1/3



The background of the slide features a stylized illustration of several scientists in white lab coats and glasses, some wearing stethoscopes, looking down at a circular logo.

Open Science Uppsala

Presentation by Adam Gill:

Resource Allocation, Timing, and Transparency
in Peer Review: A Case Study of Economics
Researchers

- * When: 2023-11-10 16:15-17:00
- * Where: Uppsala Stadsbibliotek, Studion
- * Costs: none
- * More information:
https://bit.ly/open_science_uppsala

sci 

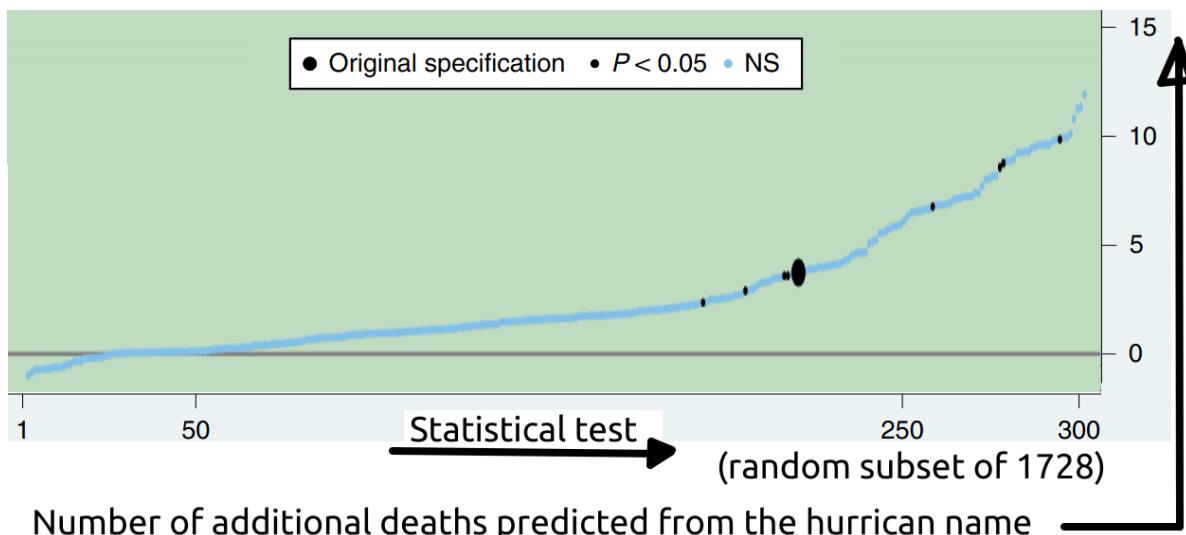
One can do a specification curve analysis in a pre-registered study to keep statistical power

6.10 Preregistration with statistical power 2/3 (11)

Decision	Original specifications	Alternative specifications
(1) Which storms to analyse	Excluded two outliers with the most deaths	Dropping fewer outliers (zero or one); dropping storms with extreme values on a predictor variable (for example, hurricanes causing extreme damages)
(2) Operationalizing hurricane names' femininity	Ratings of femininity by coders (1-11 scale)	Categorizing hurricane names as male or female
(3) Operationalizing hurricane strength	Property damages in dollars; minimum hurricane pressure	Log of dollar damages, hurricane wind speed.

- Data: Hurricane name, amount of deaths, year, wind speed, pressure
- Hypothesis: the name of a hurricane is a predictor of the amount of deaths

6.11 Preregistration with statistical power 3/3 (11)

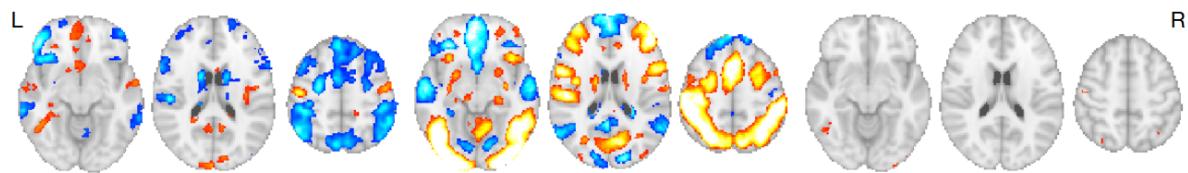


6.12 Science is more complex 1/4



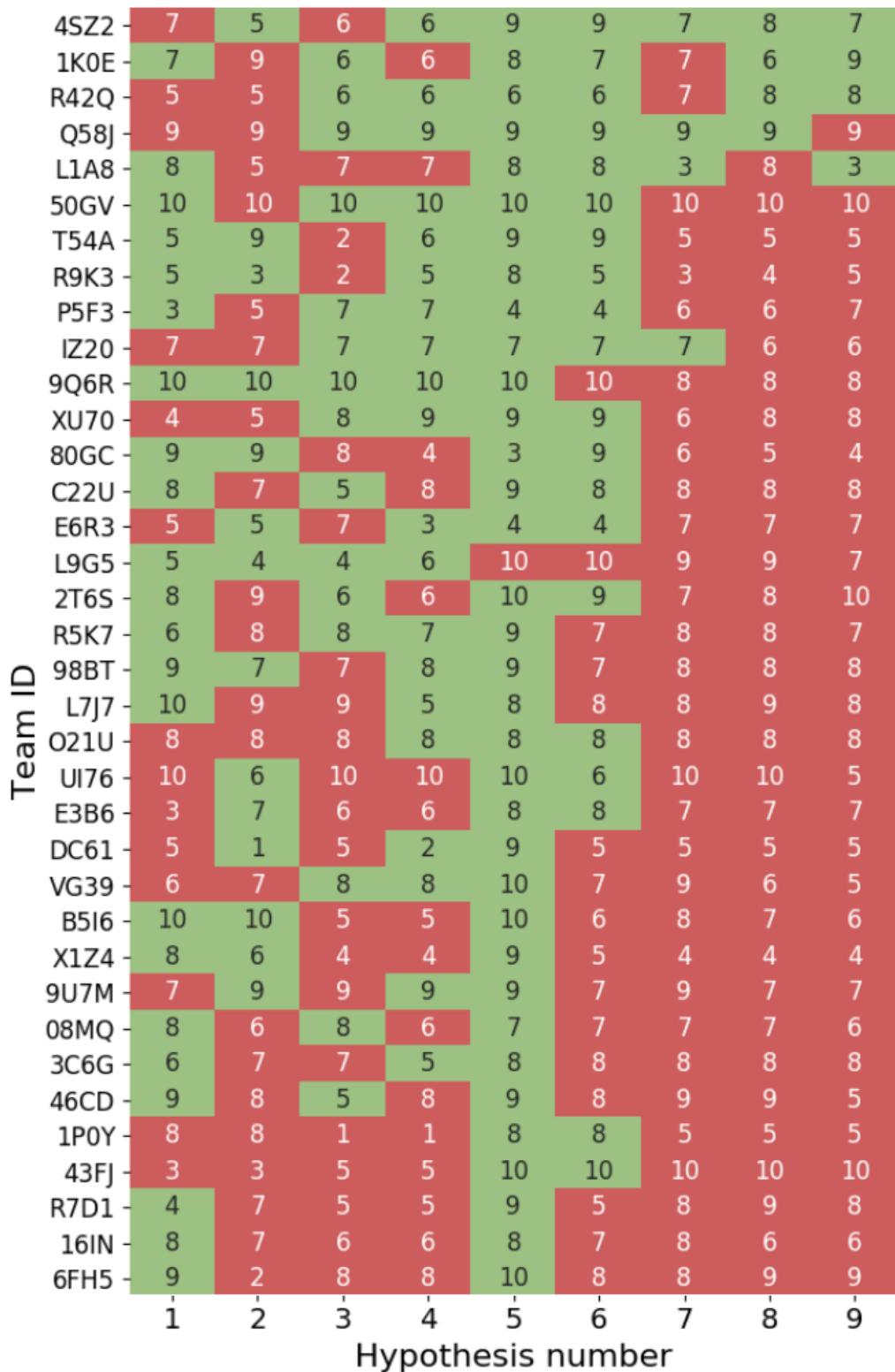
- Gustav Nilsonne
- Even if data is open, different teams can draw opposite conclusions with high confidence (12)
- This makes interpreting results even harder!

6.13 Science is more complex 2/4 (12)



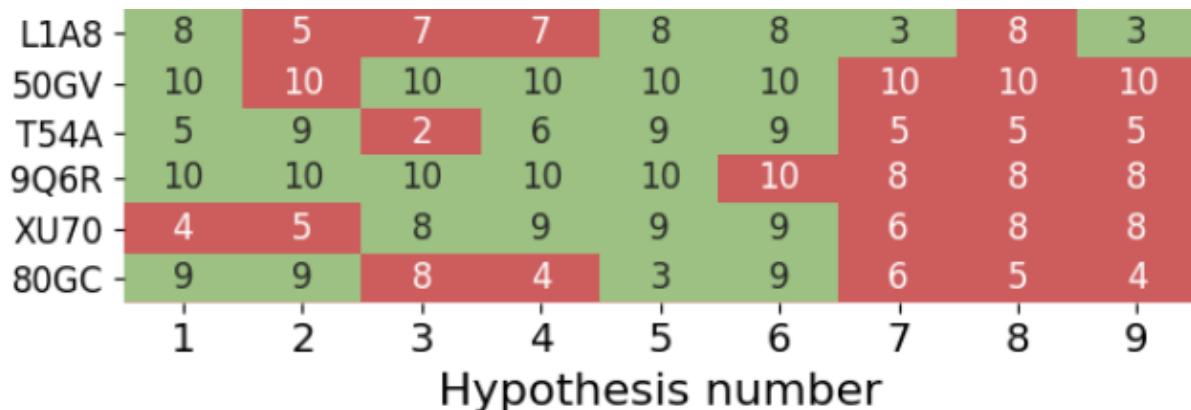
Hypotheses: 'There is [an effect] in [a brain area] between treatment A and B'

6.14 Science is more complex 3/4 (12)



Team ID	1	2	3	4	5	6	7	8	9
0H5E	4	7	7	6	8	5	8	7	1
V55J	4	5	7	7	4	7	5	7	7
51PW	8	8	8	8	8	8	6	6	7
4TQ6	7	9	10	9	7	8	10	10	9
I07H	3	3	3	3	9	9	9	9	9
3PQ2	9	8	7	7	7	8	8	8	7
L3V8	9	9	9	9	9	9	9	9	9
K9P0	10	10	10	5	10	8	9	9	10
SM54	5	9	5	8	8	6	8	8	8
O03M	3	8	8	2	8	7	7	7	7
OjOO	7	5	5	5	5	5	5	5	5
Q6O0	7	8	8	9	9	8	8	6	7
OI4U	4	7	6	8	9	9	9	9	9
X19V	6	7	8	5	9	6	9	9	9
X1Y5	6	6	7	7	8	6	8	8	8
OED6	7	9	8	7	8	8	9	9	6
U26C	8	8	8	8	10	8	8	8	9
C88N	7	8	7	4	9	7	8	8	6
27SS	4	6	7	7	7	7	6	8	4
O6R6	8	8	8	8	8	8	8	8	8
94GU	8	8	8	8	8	8	8	8	8
3TR7	2	2	3	4	8	5	8	6	5
J7F9	9	8	9	7	9	7	9	9	9
I52Y	8	8	8	8	8	8	8	8	8
0C7Q	7	7	8	8	8	7	10	10	9
6VV2	8	8	8	6	9	7	8	7	6
B23O	6	6	7	7	8	7	6	6	8
AO86	7	7	7	7	7	7	7	7	7
2T7P	8	8	8	8	8	8	8	8	8
1KB2	6	6	8	8	5	5	8	8	7
I9D6	7	7	7	7	1	7	7	6	7
UK24	4	4	4	4	4	4	4	4	4
5G9K	7	7	7	7	7	7	7	7	7
9T8E	5	5	5	5	5	5	5	5	4

6.15 Science is more complex 4/4 (12)

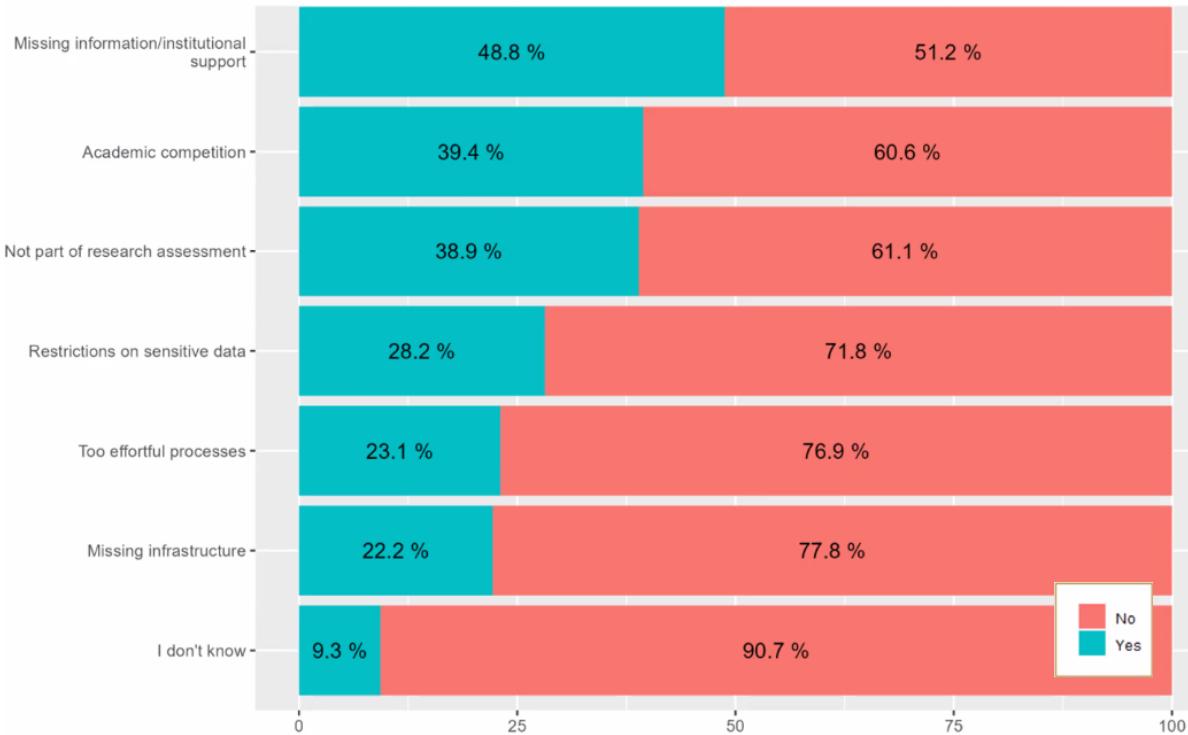


And we are confident! Compare hypothesis 2 for team 2 and 4!

7 Another community

7.1 ENLIGHT RISE and Arqus Alliance Ambassador

Where do you see the main 3 obstacles in opening science?



Previous webinar! 602 researchers. <https://zenodo.org/records/10528857>

8 Conclusion

- I hope to have convinced you that ...

`literature + community`

>

`literature + more_literature`

- ... is true, because people have broader ideas than you search the literature for
- This is a community too!

9 Questions?

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