(Don't be) Bullied into Bad Science

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Slides: http://bit.ly/eglen-cost (CC-BY license)

Declarations

1. Member of *Bullied into Bad Science* campaign
2. Affiliate editor of *bioRxiv*
3. Senior editor of *Scientific Data*

Acknowledgements

What does it mean to be bullied into bad science?

1. Science is a competitive arena; long work hours culture

2. Race to publish first

3. Not being allowed to shared resources

4. Career and family often in competition.

Problems

We are evaluated on where, not what, we publish

Evaluation of research by impact factor or journal title

$$I_y = \frac{C_{y-1} + C_{y-2}}{P_{y-1} + P_{y-2}}$$

C_y = number of citations in year y, P_y = number of publications in year y...

How could this possibly go wrong?

Strong pressure e.g. in China to pressure in journals with impact factor over some threshold (5).

So many ways to game the system: *A user's guide to inflated and manipulated impact factors* (Ioannidis and Thombs, 2019).

Reproducibility crisis

Crisis? What crisis? Science is getting better, right?

"Negative results are disappearing from most disciplines and countries" (Fanelli, 2012). Study of ~4600 papers:

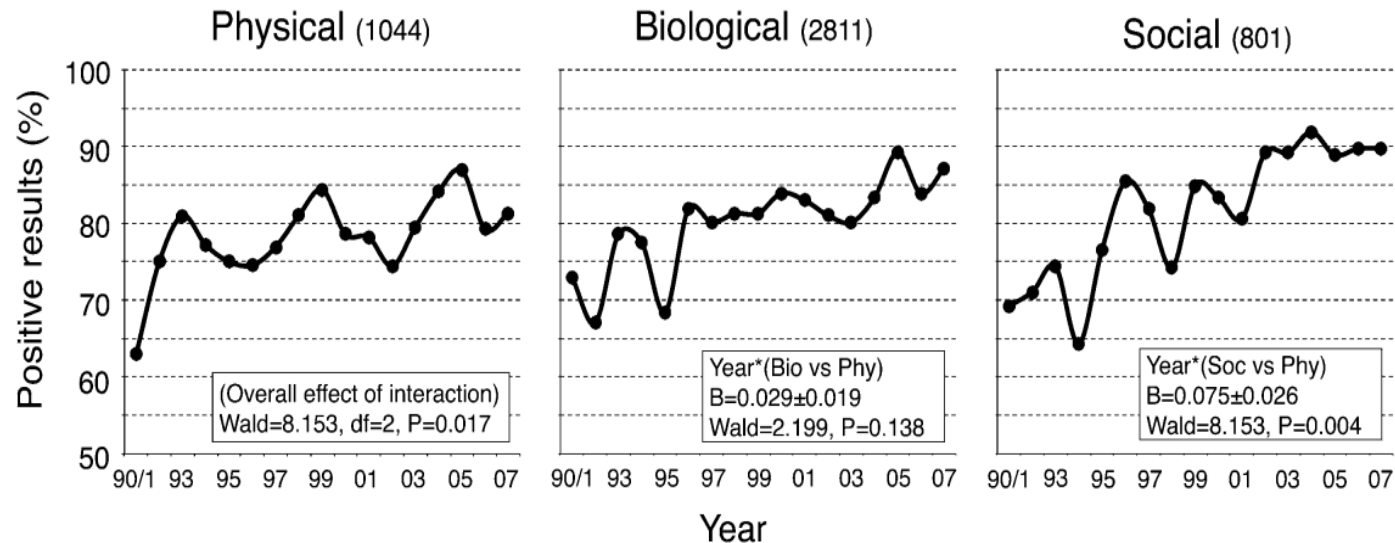Negative results are disappearing from most disciplines and countries   897

Physical (1044) — (Overall effect of interaction) Wald=8.153, df=2, P=0.017

Biological (2811) — Year*(Bio vs Phy) B=0.029±0.019 Wald=2.199, P=0.138

Social (801) — Year*(Soc vs Phy) B=0.075±0.026 Wald=8.153, P=0.004

Fig. 3 Percentage of papers reporting a support for the tested hypothesis plotted against year of publication and divided by scientific domain of the journal (physical, biological and social sciences). Logistic regression estimates are interaction effects in a hierarchically well-formulated model. The main effects of this model, calculated with interaction components removed, are reported in Table 1. Numbers in brackets are sample size

Solutions?

What can you as a researcher do?

- Forget about the journal title and its impact factor, share with your colleagues interesting research that you find (Twitter).

- Evaluating research: use the Sydney Brenner "trick" (Brenner, 1995)

  "we should remind ourselves that what matters absolutely is the scientific content of a paper and that nothing will substitute for either knowing it or reading it"

- Investigate preprints

- Registered reports

- Find a mutual network (open science / reproducibility crowd)

Preprints

Advantages: PLOS

1. Rapid dissemination of results

2. Establish priority

3. Increased attention/citations

4. Career advancement

5. Community

6. Unlimited / timely updates

7. Early feedback / error reduction

8. Some editors fish for papers on preprint servers

9. Preprints are valid research outputs for REF2021 Naomi Penfold.

Rχivist
TRENDING OPEN SCIENCE

Rxivist combines preprints from bioRxiv with data from Twitter to help you **find the papers being discussed** in your field. Currently indexing **88,687 bioRxiv papers** from **380,283 authors**.

Site-wide metrics

The numbers below represent the metrics for all papers hosted on bioRxiv.org, based on our indexing of the website.

Monthly submissions, overall
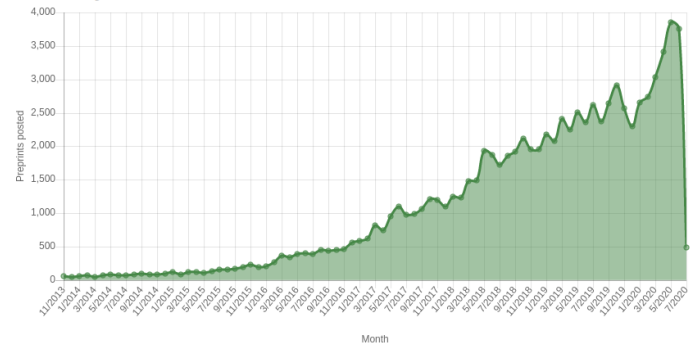
Pre-registered reports

"Registered Reports is a publishing format used by over 200 journals that emphasizes the importance of the research question and the quality of methodology by conducting peer review prior to data collection. High quality protocols are then provisionally accepted for publication if the authors follow through with the registered methodology." https://www.cos.io/our-services/registered-reports

One key advantage, noted by Dorothy Bishop, is that reviewers get to critique experimental methodology BEFORE the experiment is done, improving science, rather than just critiquing it after.

Open science for the win

- "Open science" refers to freely sharing your resources (data/code/protocols).

- Allows others to build on your work, and see exactly what you did.

- I hope in a few years, the "open" adjective can be dropped once "open science" becomes the norm. Who wants to do "closed science"?

- Transparency encourages faith in what you have done. (Yes, there will be errors, but is it better to keep them in the dark, or find out about them?)

"Most models are wrong, but some are useful". (George Box)

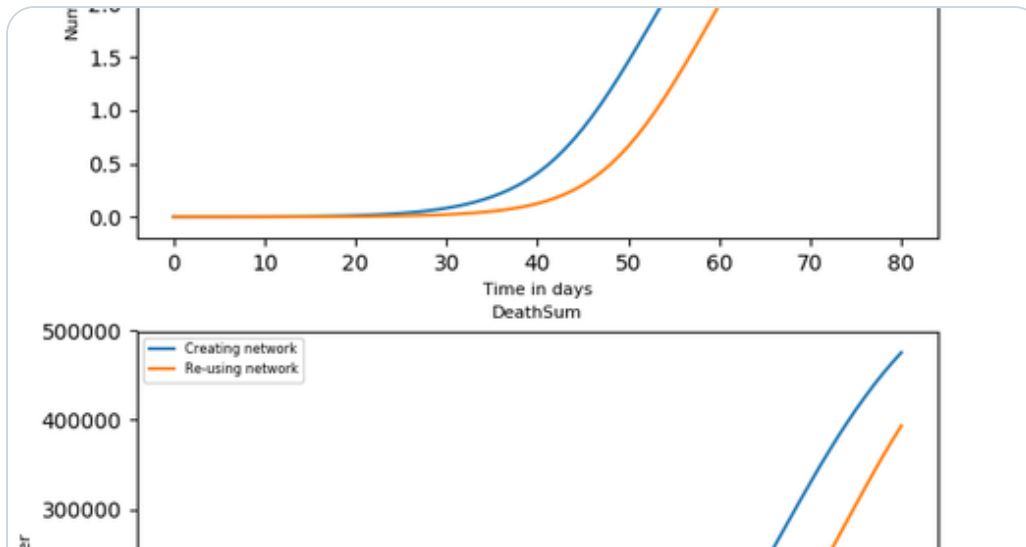"Most papers are wrong, but some are useful". (Me).

The Imperial College modelling of COVID-19

David Davis ✔
@DavidDavisMP

Everybody who is concerned about the Imperial College model must read this immediately. If true, it is scandalous.

Code Review of Ferguson's Model – Lockdown Sceptics
by Sue Denim (not the author's real name) [Please note: a follow-up analysis is now available here.] Imperial finally released a ...
🔗 lockdownsceptics.org

10:15 PM · May 6, 2020

♡ 3.3K 💬 2.9K people are Tweeting about this

"It ain't pretty, but it works" (Hilda Bastian)

Sabine L.van Elsland
@SabineLvE

Independent review @StephenEglen confirmed that
@MRC_Outbreak team's #COVID19 simulation is
reproducible: thumbs up from code-checking efforts
@nature #COVID19 #covid19science

Thomas Angus/Imperial College London

Critiqued coronavirus simulation gets thumbs up from code-che...
Influential model judged reproducible — although software
engineers called its code 'horrible' and 'a buggy mess'.
🔗 nature.com

7:47 PM · Jun 10, 2020

Conclusions

- Many reasons to feel bad...

- But there are lots of reasons for optimism at new ways of doing science.

- Learn how to become an open scientist and use modern tools.

- Science improves one preprint submission at a time.

- Read more at http://bulliedintobadscience.org and sign up!

Evaluate journal subscription model

Think about which journals you support, by sending papers and reviewing.

Support OA journals as authors and reviewers. (Ever asked a journal for permission to republish one of your own figures?)

Check out status of journal via Sherpa/Romeo service.

What can your institutions & funders do?

- sign up to DORA (Declaration of Research Assessment) (Wellcome Trust have solved this problem). Signing is easy, enforcing is hard.

- Give ECR a voice within institutions.

- Recognise all research artefacts, not just papers, as valuable outputs.

- Give academics more ownership of funds. "Do you really want to spend 5K on an APC, versus other uses in your lab?"

- Routes to OA need to be generate less admin for librarians / funders, not more. Green OA achieves that.

- Support diamond OA initiatives led by academics and academic societies.