

Dr Avazeh Ghanbarian
Department of Genetics

Slides given as part of the “Improving the research process: discussing an ‘open research’ policy” event held on the 8th of June 2016.

“Two-thirds of researchers ... said...
reproducibility is a major problem”

nature International weekly journal of science

Home | News & Comment | Research | Careers & Jobs | Current Issue | Archive | Audio & Video | For Authors

Archive | Volume 533 | Issue 7004 | Editorial | Article

NATURE | EDITORIAL

Reality check on reproducibility

A survey of Nature readers revealed a high level of concern about the problem of irreproducible results. Researchers, funders and journals need to work together to make research more reliable.

25 May 2016

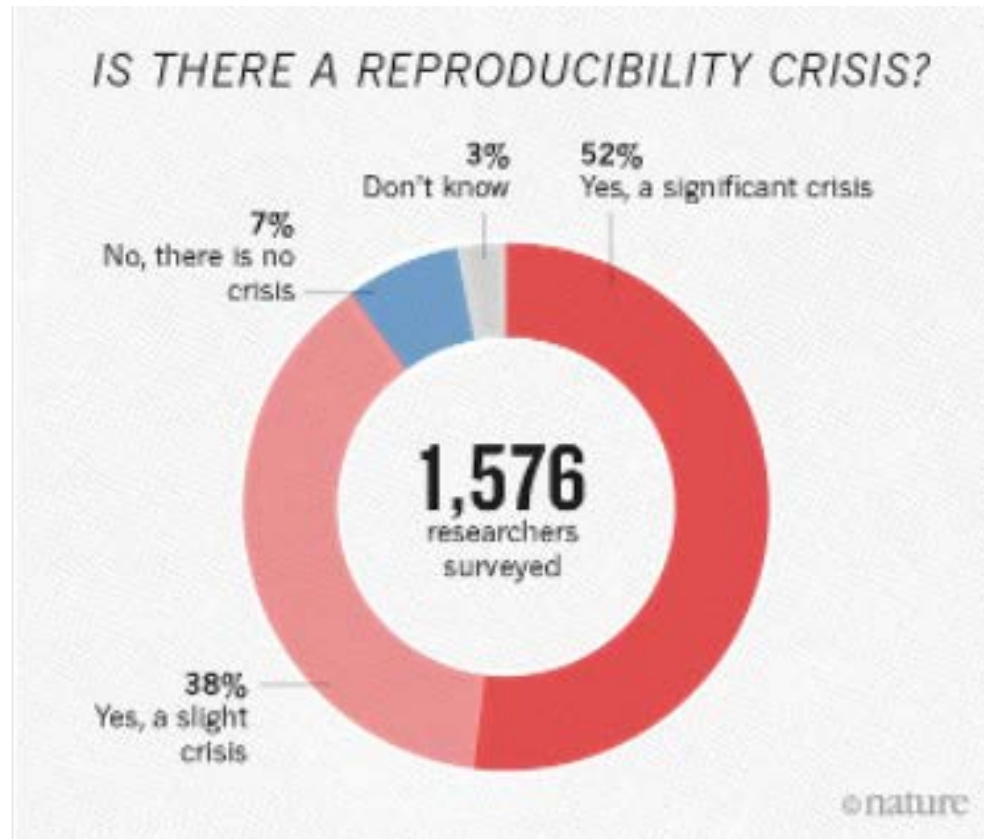
PDF | Rights & Permissions

Is there a reproducibility crisis in science? Yes, according to the readers of Nature. *Two-thirds of researchers who responded to a survey by this journal said that current levels of reproducibility are a major problem.*

The ability to reproduce experiments is at the heart of science, yet failure to do so is a routine part of research. Some amount of irreproducibility is inevitable: profound insights can start as fragile signals, and sources of variability are infinite. But, the survey

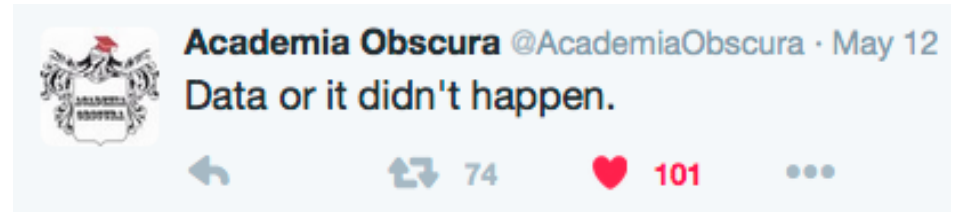
Related stories

- [The pressure to publish pushes down quality](#)
- [Research data: share](#)



Why do we publish the data?

- Journals ask for it!
- Validate the story/claim by presenting the evidence



To advance science:

- **Reproducibility:**

- If someone finds/claims the opposite:

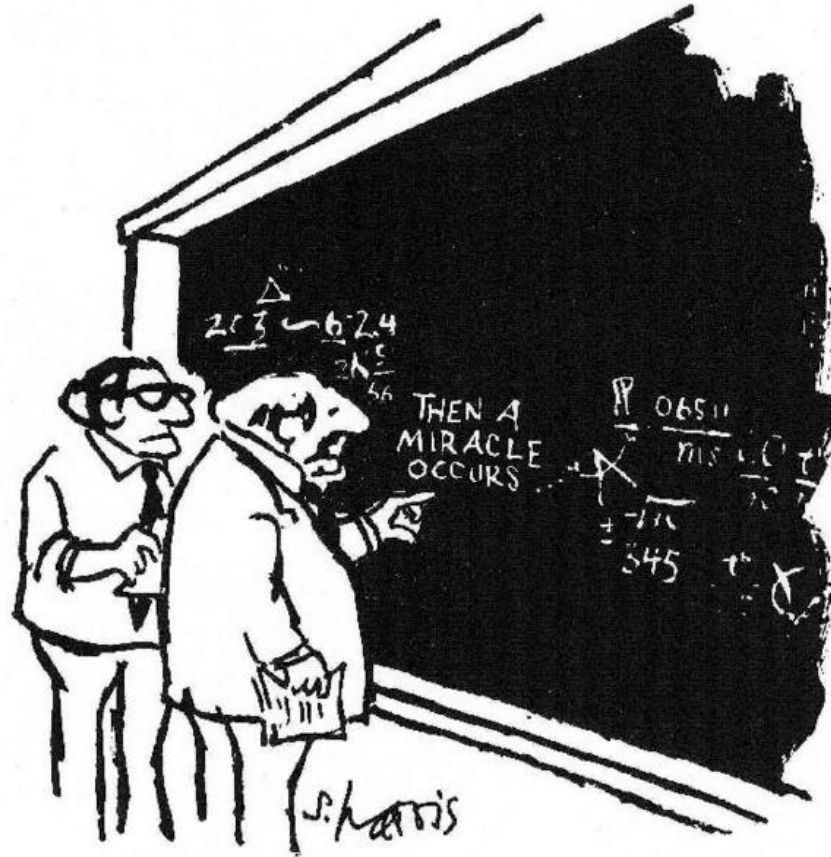
- Analysis (Is the code published too?)
- Underlying Data (Is the RAW data published?)

- **Reusability:**

- Often your data can be used to answer other important questions (+1 citation anyone?)

- (Detailed methods published?)

Most of the published data don't satisfy
neither reproducibility nor reusability



"I think you should be more explicit here in step two."

How to improve reproducibility and reusability?

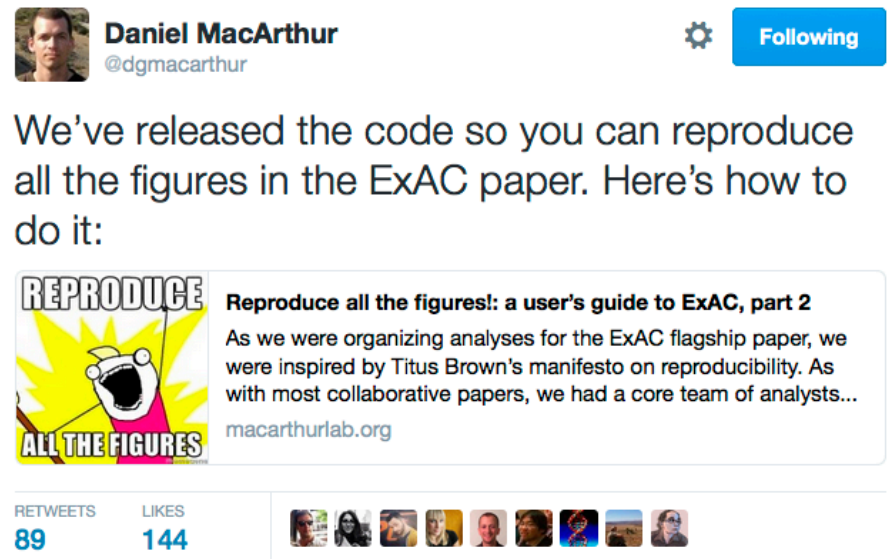
- Publish **RAW**

- Novel Technology or methods

- Publish **Code**

- Analysis of protein-coding genetic variation in 60,706 humans, BioRxiv

- **Methods** should be detailed enough to ensure reusability



Why these RICH journals do NOT invest in improving the science??

- Employ an expert In-house Bioinformatician/data scientist
- At least one Bioinformatician/data scientist reviewer
- Ask for the data to be deposited in a public repository, e.g. EBI
 - Clear requirements, e.g. on data format + QC
- Ask for the code to be published
- Ask for detailed methods

But is this only the journals responsibility?

- **Funding bodies**

Mostly prefer to fund the novel research to produce novel data!

- Reward reproducible research (grant renewal, ...)
- Employ reproducibility and reusability measures in grant reviews
- Fund researchers to reproduce and validate each others' papers
- Require data deposition on a public server in a reusable format

- **Universities and research institutes**

- Reward reproducible research
- Educating the next generation of scientists
- Employment criteria