Why doing reproducible research?

Francisco Rodríguez-Sánchez

@frod_san

https://frodriguezsanchez.net

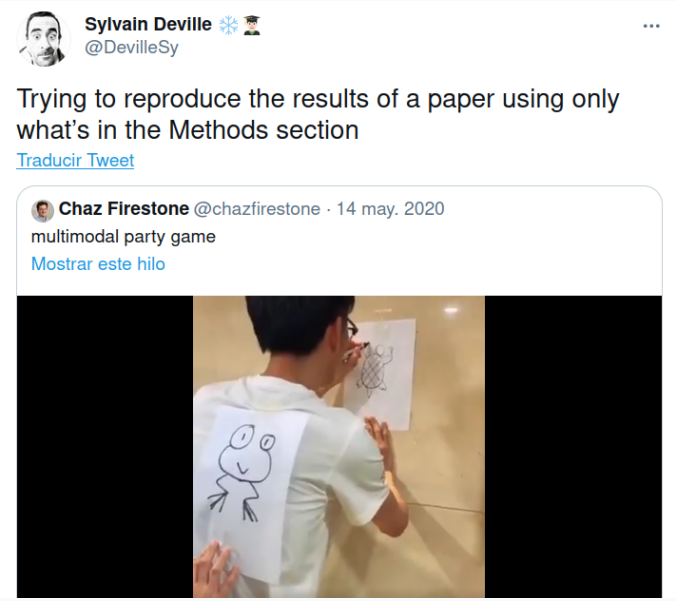
Reproducibility: good for you, good for everyone

Automation (good code) saves time

Trevor Branch
@TrevorABranch

My rule of thumb: every analysis you do on a dataset will have to be redone 10–15 times before publication. Plan accordingly. #Rstats

Code = fully traceable, reproducible analysis



Code advantages:

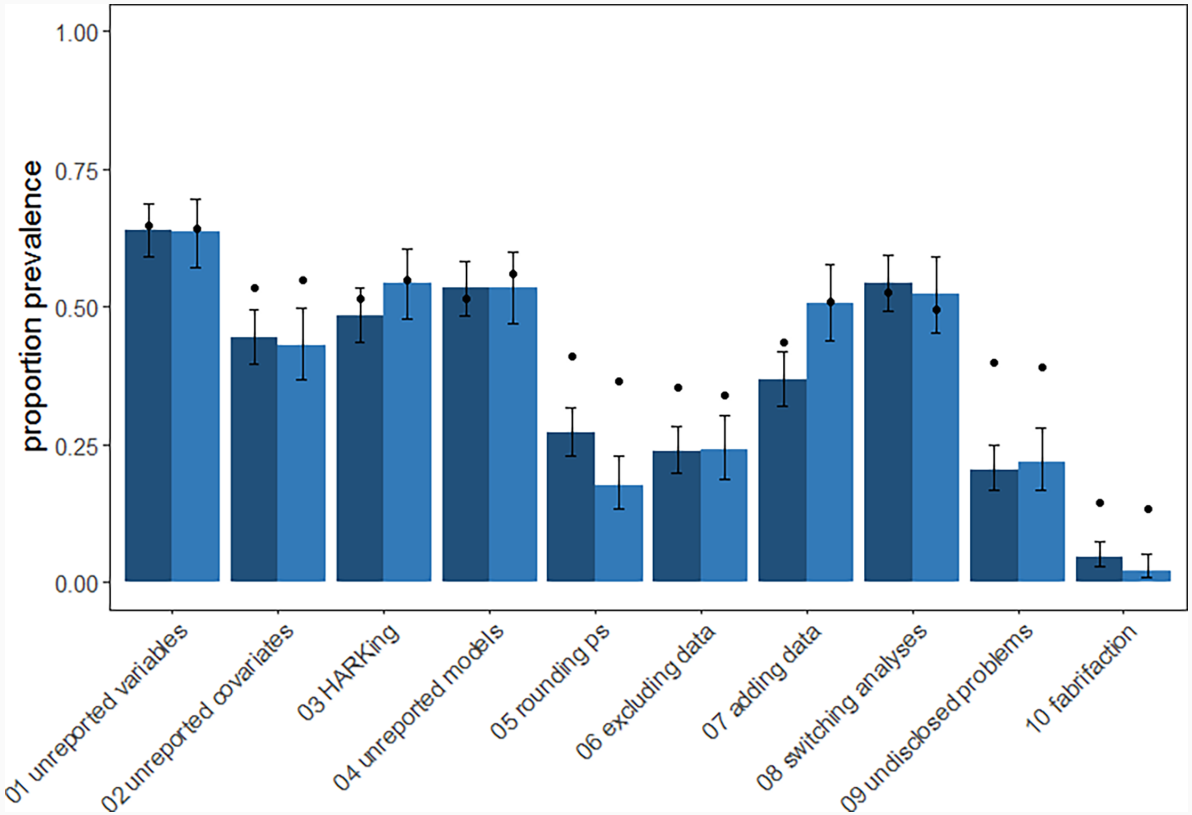
- Easier writing
- Easier, deeper review
- Reusable

Transparency prevents bad practices

RESEARCH ARTICLE

Questionable research practices in ecology and evolution

Hannah Fraser[1]*, Tim Parker[2], Shinichi Nakagawa[3], Ashley Barnett[1], Fiona Fidler[1,4]



p-hacking, HARKing, data fabrication...

Fraser et al 2018

Transparency avoids unnecessary disputes

DOI:10.1063/PT.6.1.20180822a

22 Aug 2018 in Research & Technology

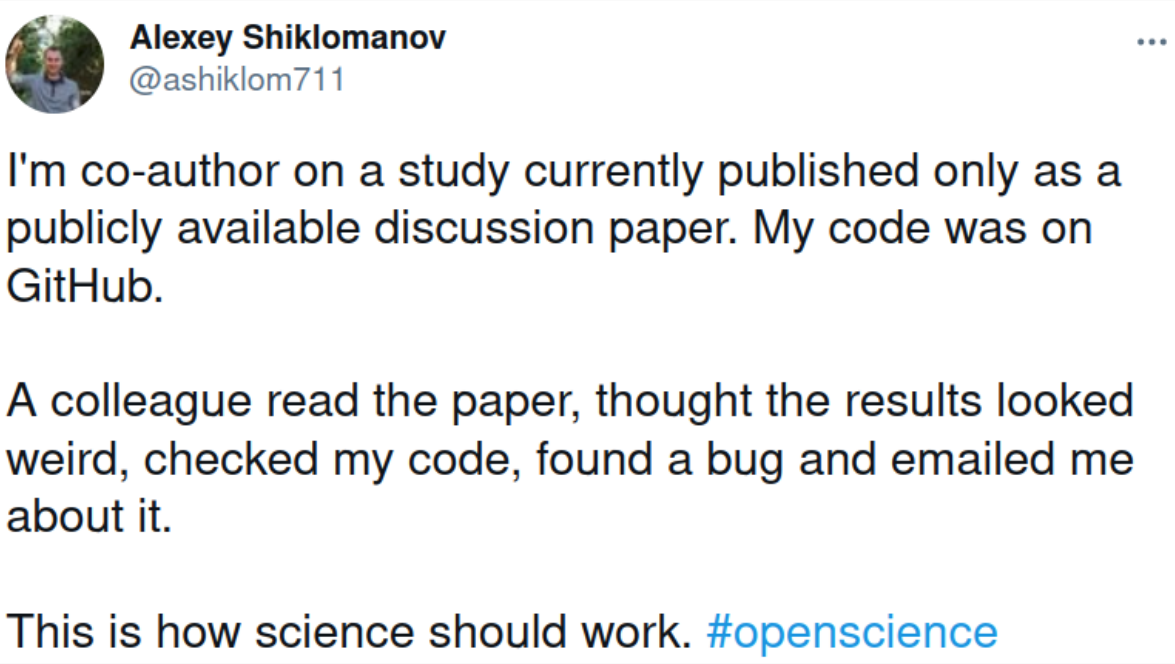
The war over supercooled water

How a hidden coding error fueled a seven-year dispute between two of condensed matter's top theorists.

Ashley G. Smart

Over the next seven years, the perplexing discrepancy would ignite a bitter conflict, with junior scientists caught in the crossfire. At stake were not only the reputations of the two groups but also a peculiar theory that sought to explain some of water's deepest and most enduring mysteries. Earlier this year, the dispute was finally settled. And as it turns out, the entire ordeal was the result of botched code.

Transparency brings better science



Many journals (and funders) value/require reproducibility

As a condition for publication in ESA journals, all underlying data and statistical code pertinent to the results presented in the publication must be made available in a permanent, publicly accessible data archive or repository, with rare exceptions (see

Many journals value reproducibility

'Papers with exemplary **data and code archiving**

are **more valuable** for future research and [...]

will be given **higher priority** for publication'

(*Molecular Ecology*)

Higher impact: cites, reuse, reputation

RESEARCH ARTICLE

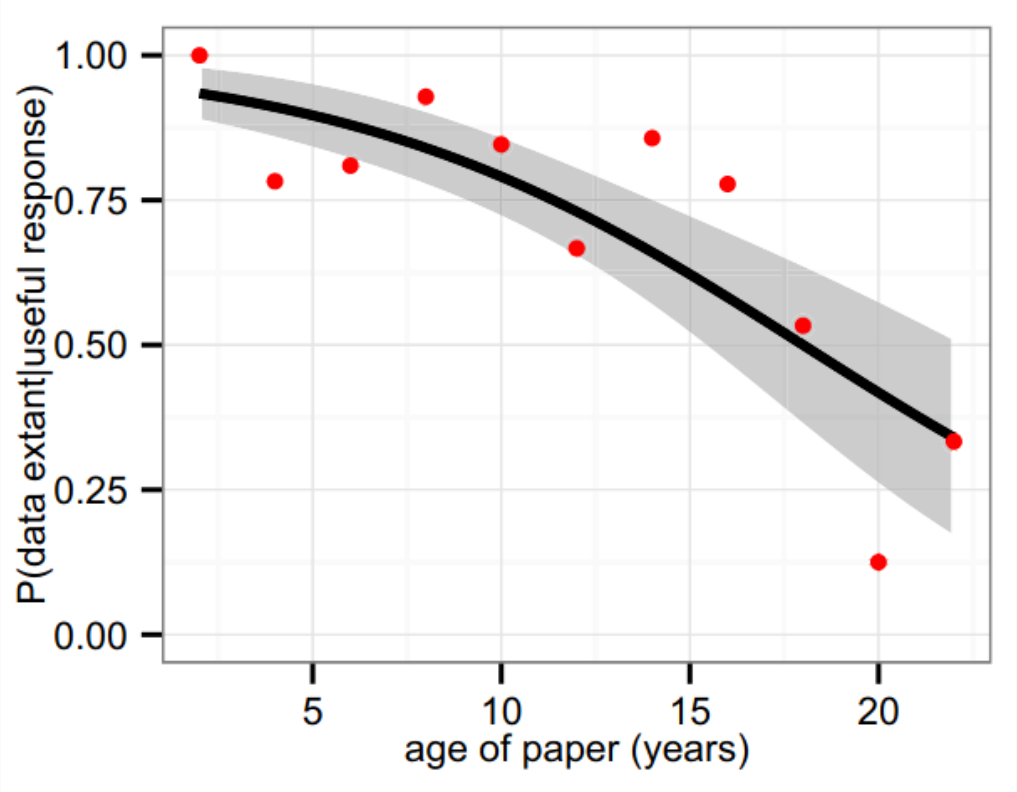
The citation advantage of linking publications to research data

Giovanni Colavizza[1,2], Iain Hrynaszkiewicz[3,4], Isla Staden[1,5], Kirstie Whitaker[1,6], Barbara McGillivray[1,6]*

Colavizza et al 2020

Let’s stop losing data & code

The Availability of Research Data Declines Rapidly with Article Age



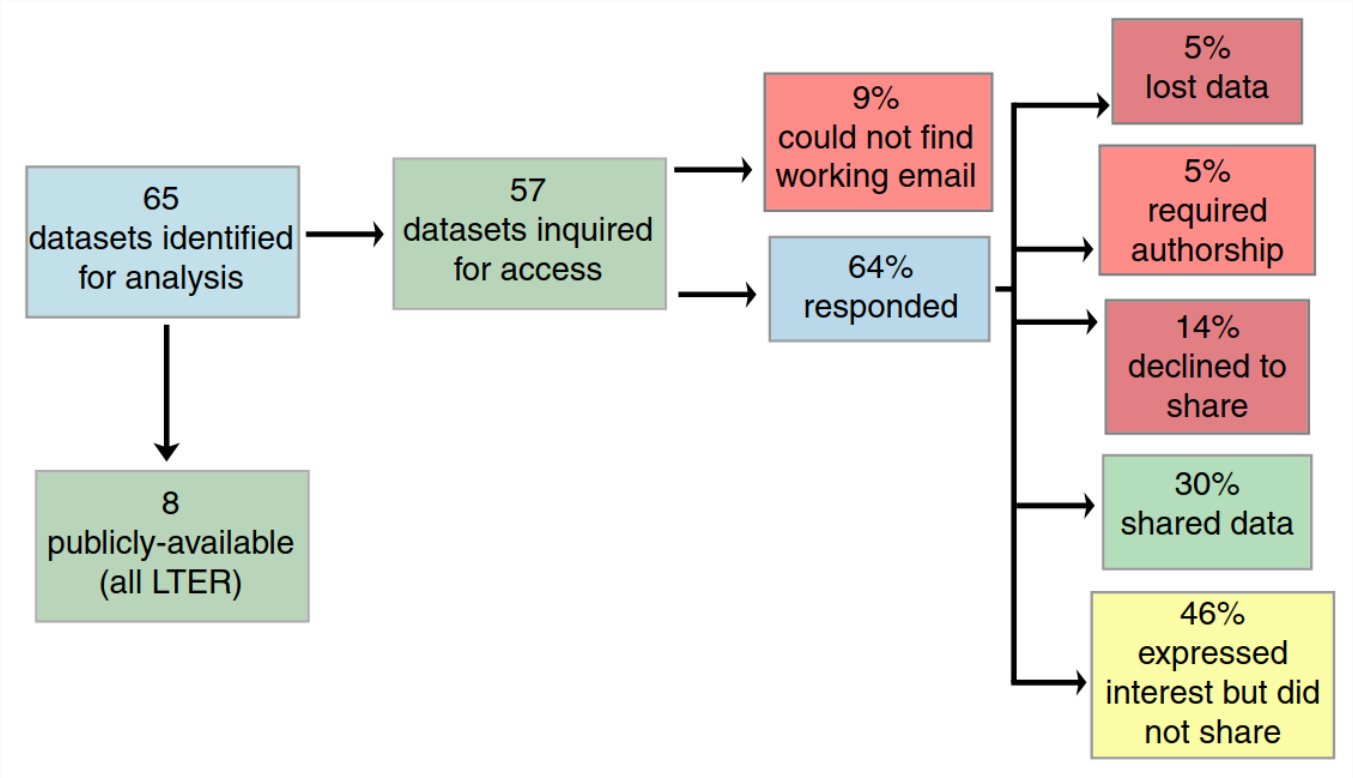
Vines et al 2014

Open data & code enable synthesis

REVIEW

Advances in global change research require open science by individual researchers

ELIZABETH M. WOLKOVICH*†, JAMES REGETZ‡ and MARY I. O'CONNOR†



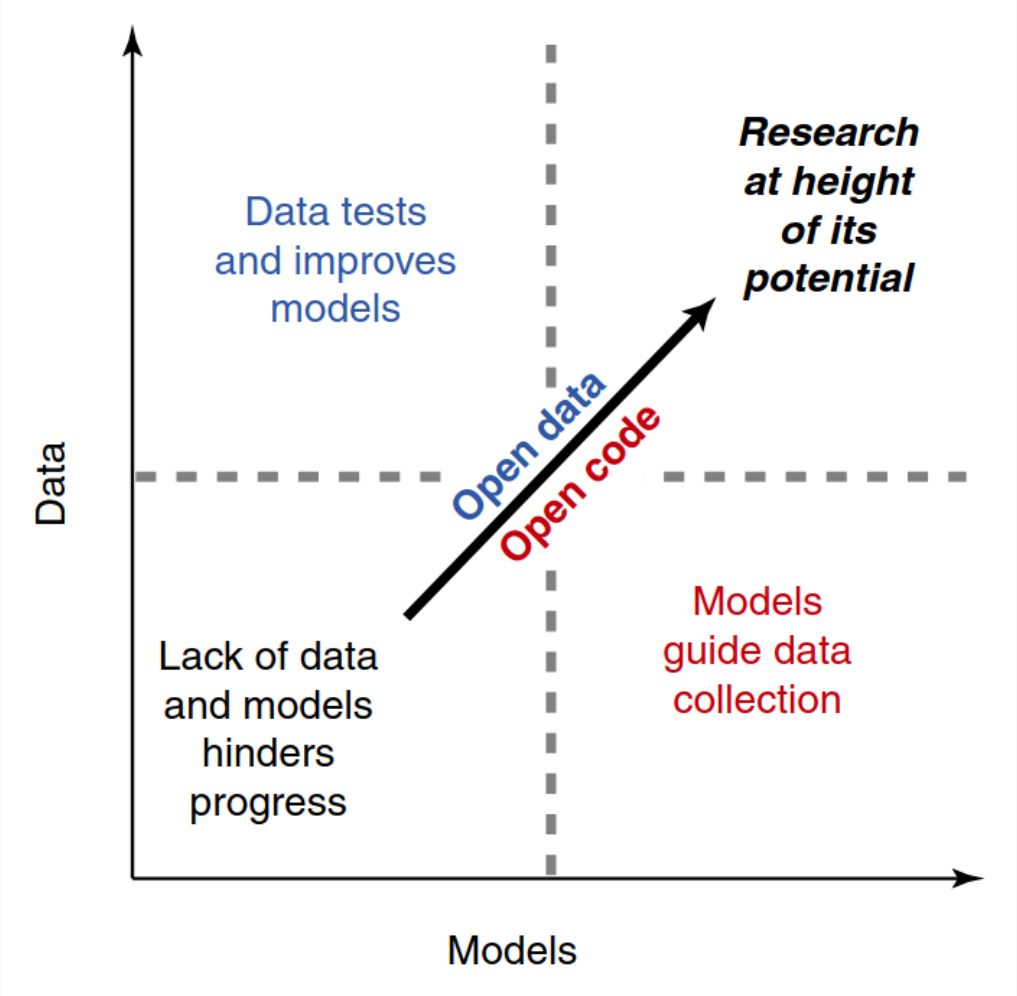
Wolkovich et al 2012

Open data & code enable synthesis

REVIEW

Advances in global change research require open science by individual researchers

ELIZABETH M. WOLKOVICH*†, JAMES REGETZ‡ and MARY I. O'CONNOR†



Reproducible workflows facilitate collaboration

and make everyone happier