Fear of Errors and the Power of Open Science

Johannes Vosskuhl

July 18, 2025

Do you agree with this statement?

The way errors, mistakes and subsequent blame are dealt with in science have resulted in a reluctance to publish data!

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NFDI: German initiative for RDM

Consortia
Domain specific

Sections
Cross-cutting topics

- (Meta)data, Terminologies, Provenance
- Common Infrastructures
- Training & Education
  - WP 8: *Error culture in science*
- Ethical, Legal and Social Aspects
- Industry Engagement

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Different Categories of Flawed Research

Fabrication, Falsification, Plagiarism

Misconduct

- Faking data
- Stealing ideas

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Different Categories of Flawed Research

Honest Error

Fabrication, Falsification, Plagiarism

Following Good Research Practice

Misconduct

- Contamination of samples
- Software bugs

- Faking data
- Stealing ideas

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Different Categories of Flawed Research

Honest Error	**Questionable Research Practice**	**Fabrication, Falsification, Plagiarism**
Following Good Research Practice	Sloppy Science Cutting Corners	Misconduct
- Contamination of samples - Software bugs	- Missing citations - Using "degrees of freedom" - P-hacking	- Faking data - Stealing ideas

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Accidental	Negligent	Intentional

Different Categories of Flawed Research
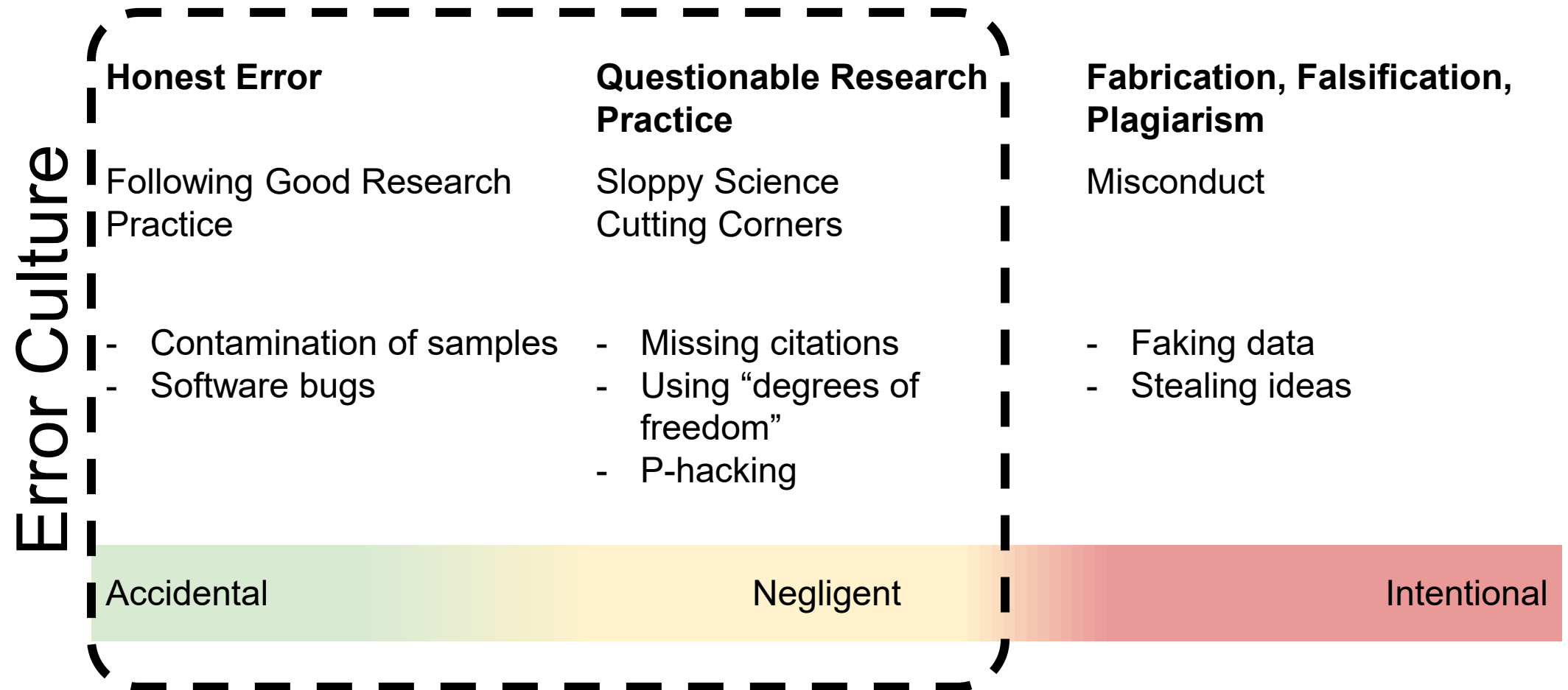
Error Culture

Honest Error	**Questionable Research Practice**	**Fabrication, Falsification, Plagiarism**
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Accidental — Negligent — Intentional

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One example:

My self-written code leads to wrongly significant results

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One example:

My self-written code leads to wrongly significant results

– Reputation effect depends on external assessment NOT true intention

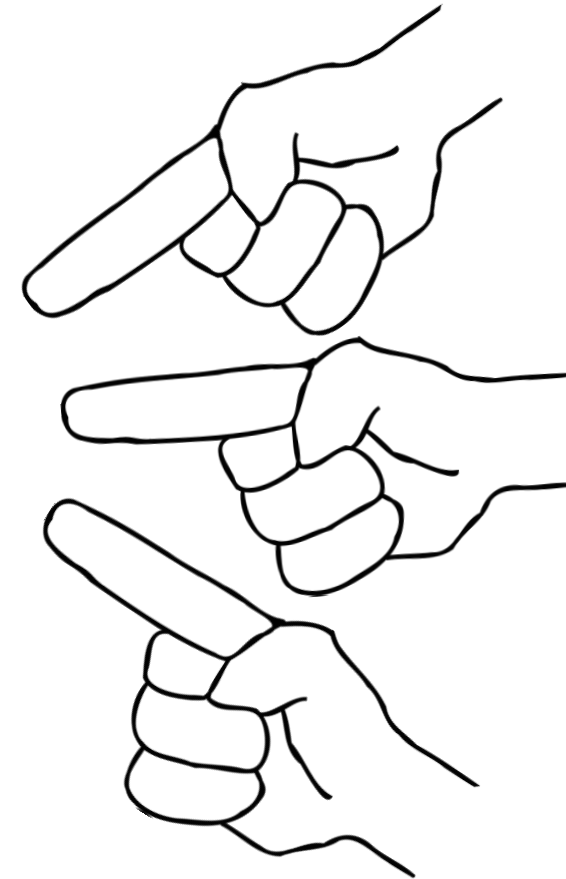– Community uses full spectrum of flawed research

 Fear of being falsely accused of misconduct

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Fear affects raw data publication

– Fear of reputation loss…

– … discourages data sharing

– … inhibits scientific progress

Is the fear reasonable?

What can we do about it?

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Open Science – transparent research

Benjamin de Haas,
Neuroscientist

High impact
publication, 2014

Susanne Stoll, PhD
student in 2019

"It was not until I ran a control analysis that I realized the patterns of results I quantified initially became clearer the more noisy measurements I kept in the data set. That was when I had first solid evidence that something had gone awry […]"

https://retractionwatch.com, 2020

"[…]I would go through my old data, if I could dig them up.
That was a challenge. Only months before, my current university had suffered a cyberattack, and access to my back-up drive was prohibited at first. It would have been easy to tell the others that the data were gone (as happens all too frequently)."

De Haas, 2021. 10.1038/d41586-021-00073-4

Therefore, we **no longer consider the reported results reliable** and wish to correct the scientific record by **voluntarily retracting our paper**. **We apologize** to the scientific community for any inconvenience caused and caution fellow researchers against the use of non-independent binning practices, which appear widespread in the field. Finally, **we would like to thank our colleague Susanne Stoll**, who first pointed out the problem to us and plans to publish in due course a more general exposition on the difficulties of this approach.

De Haas, 2020. 10.1016/j.cub.2020.11.015

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Open Science – transparent research

Myriam Sander
@myriam_sander · Follow

most difficult tweet ever, but here we go: MANUSCRIPT RETRACTION ALERT! We discovered a serious error in our preprocessing pipeline that affected our results presented in two recent papers: doi.org/10.1016/j.neur... and doi.org/10.1523/JNEURO...

9:53 AM · Mar 30, 2022

Myriam Sander,
Neuroscientist

Two publications. One dataset. 2021 / 2022

"My predoc […], who is the first-author of one of the papers, discovered the error while working on further analyses for another paper."

"[…] since we usually announce new papers on twitter, we should also say when we retract one. Quiet self-retraction doesn't make any sense […]."

https://retractionwatch.com, 2022

Eiko Fried
@EikoFried · Follow

Making mistakes in science is normal and ok—so sorry to see it leads to retractions here, but that should also be normal. Thanks for doing the right thing and sharing transparently. You're helping many others by normalizing mistakes.
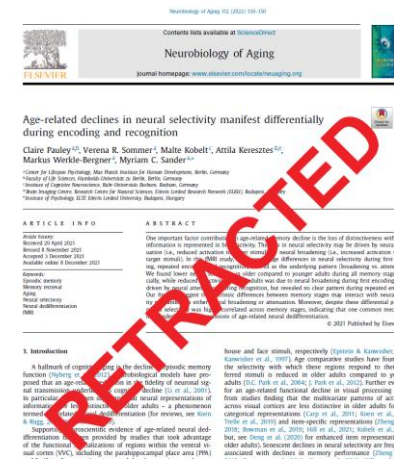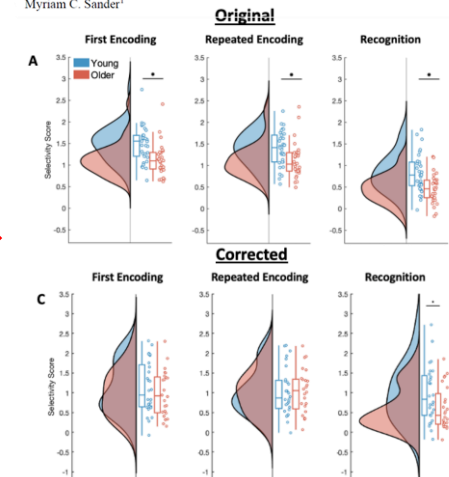
12:54 PM · Mar 30, 2022

Pauley, C et al. (2022).
10.1016/j.neurobiolaging.2021.12.001

Pauley, C., et al. (2022). https://osf.io/7n3mz/

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How to do it right

- Who discovers an honest error matters
  - Others: Debate on intention starts
  - Self: "do the right thing"
- How you react matters
  - Uncooperative / salami slicing
  - Cooperative / transparent
- The start matters
  - "Classic" data availability
  - Open Materials

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How to do it right – the power of Open Science

- – Who discovers an honest error matters
  - – Others: Debate on intention starts
  - – **Self: "do the right thing"**
- – How you react matters
  - – Uncooperative / salami slicing
  - – **Cooperative / transparent**
- – The start matters
  - – "Classic" data availability
  - – **Open Materials**

➡️ Open Science leads to a constructive error culture

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Error Needs Culture! Advancing Data Sharing by Acknowledging Errors

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