

# Normalize Transparency

The role of  
Open Science Communities



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# OUTLINE



- One Crisis (or More)
- Open Science as a solution
- Problem: slow adoption
- OSCs to facilitate adoption

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# REPRODUCIBILITY CRISIS



## Estimating the reproducibility of psychological science

Open Science Collaboration\*<sup>†</sup>  
+ See all authors and affiliations


Science 28 Aug 2015:  
Vol. 349, Issue 6251, aac4716  
DOI: 10.1126/science.aac4716

## Estimating the Reproducibility of Experimental Philosophy

[Florian Cova](#) , [Brent Strickland](#), [...][Xiang Zhou](#)

*Review of Philosophy and Psychology* 12, 9–44 (2021) | [Cite this article](#)

## Phosphine gas in the cloud decks of Venus

Jane S. Greaves , Anita M. S. Richards, William Bains, Paul B. Rimmer, Hideo Sagawa, David L. Clements, Sara Seager, Janusz J. Petkowski, Clara Sousa-Silva, Sukrit Ranjan, Emily Drabek-Maunder, Helen J. Fraser, Annabel Cartwright, Ingo Mueller-Wodarg, Zhuchang Zhan, Per Friberg, Iain Coulson, E'lisa Lee & Jim Hoge

*Nature Astronomy* (2020) | [Cite this article](#)

426k Accesses | 30 Citations | 10629 Altmetric | [Metrics](#)



## Evaluating replicability of laboratory experiments in economics

Colin F. Camerer<sup>1,1†</sup>, Anna Dreber<sup>2,†</sup>, Eskil Forsell<sup>2,†</sup>, Teck-Hua Ho<sup>3,4,†</sup>, Jürgen Huber<sup>5,†</sup>, Magnus Johannesson<sup>2,†</sup>, Michael Kirchler<sup>5,6,†</sup>, Johan Almenberg<sup>7</sup>, Adam Altmeld<sup>2</sup>, Taizan Chan<sup>8</sup>, Emma Heikensten<sup>2</sup>, Felix Holzmeister<sup>5</sup>, Taisuke Imai<sup>1</sup>, Siri Isaksson<sup>2</sup>, Gideon Nave<sup>1</sup>, Thomas Pfeiffer<sup>9,10</sup>, Michael Razen<sup>5</sup>, Hang Wu<sup>4</sup>

Science 25 Mar 2016:  
Vol. 351, Issue 6280, pp. 1433-1436  
DOI: 10.1126/science.aaf0918

## Science Forum: An open investigation of the reproducibility of cancer biology research



Timothy M Errington , Elizabeth Iorns, William Gunn, Fraser Elisabeth Tan, Joelle Lomax, Brian A Nosek 

## Re-analysis of the 267 GHz ALMA observations of Venus

### No statistically significant detection of phosphine\*

I. A. G. Snellen<sup>1</sup>, L. Guzman-Ramirez<sup>1</sup>, M. R. Hogerheijde<sup>1,2</sup>, A. P. S. Hygate<sup>1</sup> and F. F. S. van der Tak<sup>3,4</sup>

Issue A&A  
Volume 644, December 2020  
Article Number L2  
Number of page(s) 3  
Section Letters to the Editor  
DOI <https://doi.org/10.1051/0004-6361/202039717>  
Published online 01 December 2020

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# REPRODUCIBILITY CRISIS



## Variability in the analysis of a single neuroimaging dataset by many teams

Rotem Botvinik-Nezer, Felix Holzmeister, [...]Tom Schonberg

*Nature* 582, 84–88 (2020)

Data analysis workflows in many scientific domains have become increasingly complex and flexible. Here we assess the effect of this flexibility on the results of functional magnetic resonance imaging by asking 70 independent teams to analyse the same dataset, testing the same 9 ex-ante hypotheses

no two teams chose identical workflows to analyse the data. This flexibility resulted in sizeable variation in the results of hypothesis tests, even for teams whose statistical maps were highly correlated at intermediate stages of the analysis pipeline.

prediction markets of researchers in the field revealed an overestimation of the likelihood of significant findings, even by researchers with direct knowledge of the dataset analytical flexibility can have substantial effects on scientific conclusions,

International Journal of Psychophysiology

Volume 156, October 2020, Pages 18–39

## Comparing the effects of different methodological decisions on the error-related negativity and its association with behaviour and gender

Aislinn Sandre <sup>a</sup>, Iulia Banica <sup>a</sup>, Anja Riesel <sup>b</sup>, Jessica Flake <sup>a</sup>, Julia Klawohn <sup>c,d</sup>, Anna Weinberg <sup>a</sup>

### Highlights

- Multiple common methods to error-related negativity (ERN) measurement were compared.
- This included different references, baselines, amplitudes, and electrode site scorings.
- These data processing choices influenced the reliability of ERN estimates.
- These choices also influenced associations with target variables.
- We discuss steps to more reliable measurement of the ERN.

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# MORE THAN ONE CRISIS



## MEASUREMENT

## THEORY

### Measurement Schmeasurement: Questionable Measurement Practices and How to Avoid Them

Advances in Methods and  
Practices in Psychological Science  
2020, Vol. 3(4) 456–465

Jessica Kay Flake<sup>1</sup> and Eiko I. Fried<sup>2</sup>

International Journal of Psychophysiology  
Volume 111, January 2017, Pages 57-67

Psychometric considerations in the measurement  
of event-related brain potentials: Guidelines for  
measurement and reporting

Peter E. Clayson, Gregory A. Miller

NeuroImage

Volume 203, December 2019, 116157

A decade of test-retest reliability of functional  
connectivity: A systematic review and meta-  
analysis

Stephanie Noble, Dustin Scheinost, R. Todd Constable

Psychological Inquiry >

An International Journal for the Advancement of Psychological Theory

Volume 31, 2020 - Issue 4

Reply

### Theories and Models: What They Are, What They Are for, and What They Are About

Eiko I. Fried

Pages 336-344 | Published online: 07 Jan 2021

Cortex

Volume 42, Issue 3, 2006, Pages 323-331

What has Functional Neuroimaging told us about  
the Mind (so far)? (Position Paper Presented to the  
European Cognitive Neuropsychology Workshop,  
Bressanone, 2005)

Max Coltheart

Cortex

Volume 42, Issue 3, 2006, Pages 422-427

Perhaps Functional Neuroimaging has not told us  
Anything about the Mind (So Far)

Max Coltheart

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# OPEN SCIENCE TO THE RESCUE!



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# DEFINITION



“Open Science represents a new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools. The idea captures a systemic change to the way science and research have been carried out for the last fifty years: shifting from the standard practices of publishing research results in scientific publications towards sharing and using all available knowledge at an earlier stage in the research process”.

*European Union (2016)*

A handwritten signature in black ink, appearing to read "Antonio Schettino".

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# THE ETHICS OF SCIENCE



## Honesty Transparency Collaboration

*The Ethics of Science: An Introduction (Resnik, 2005)*

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# THE ETHICS OF SCIENCE



## Netherlands Code of Conduct for Research Integrity (2018)

- **Principles**

- Honesty
- Scrupulousness
- Transparency
- Independence
- Responsibility

*NL CoC Research Integrity (2018)*

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# CODE OF CONDUCT



## Honesty

*Honesty means, among other things, reporting the research process accurately, taking alternative opinions and counterarguments seriously, being open about margins of uncertainty, refraining from making unfounded claims, refraining from fabricating or falsifying data or sources and refraining from presenting results more favourably or unfavourably than they actually are.*

*NL CoC Research Integrity (2018)*

*Antonio Schettino*



# CODE OF CONDUCT



## Transparency

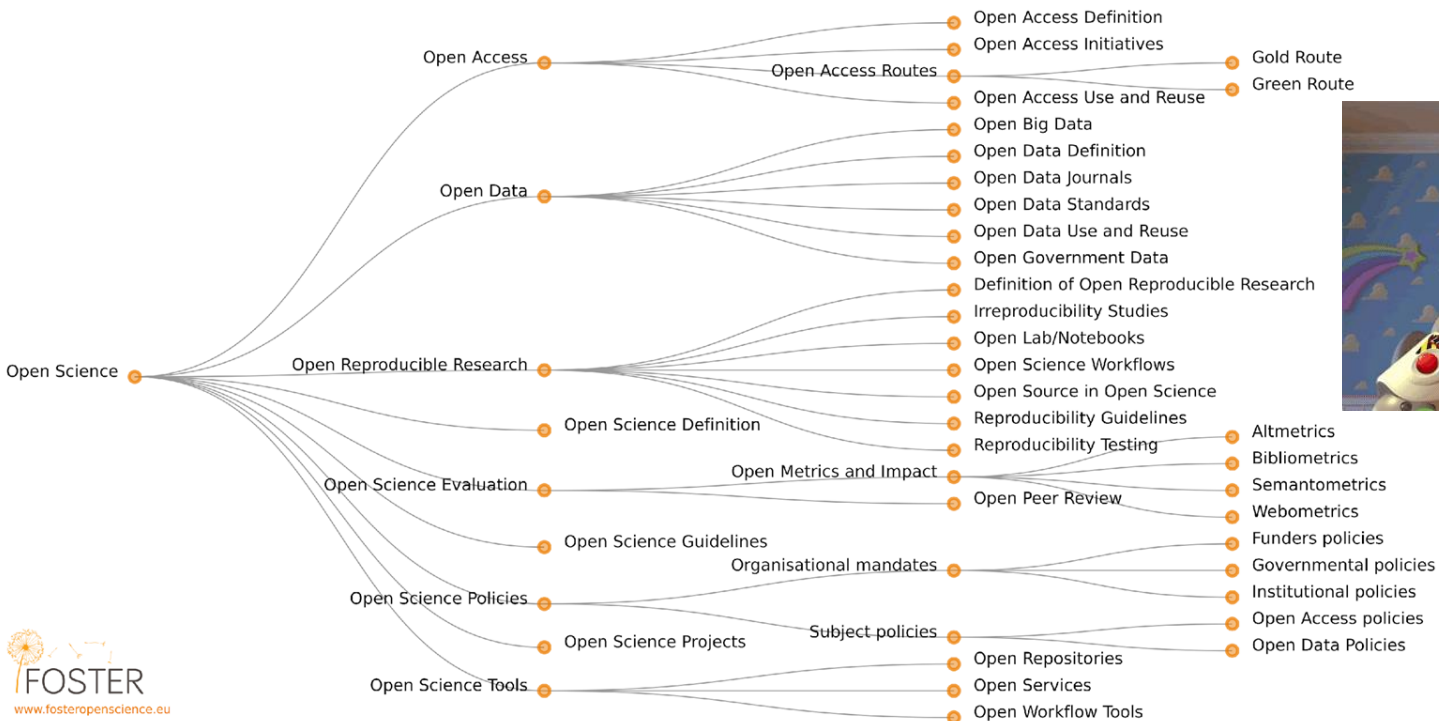
*Transparency means, among other things, ensuring that it is clear to others what data the research was based on, how the data were obtained, what and how results were achieved and what role was played by external stakeholders. **If** parts of the research or data are not to be made public, the researcher **must** provide a good account of why this is not possible. It must be evident, at least to peers, how the research was conducted and what the various phases of the research process were. At the very least, this means that the line of reasoning must be clear and that the steps in the research process must be **verifiable**.*

NL CoC Research Integrity (2018)

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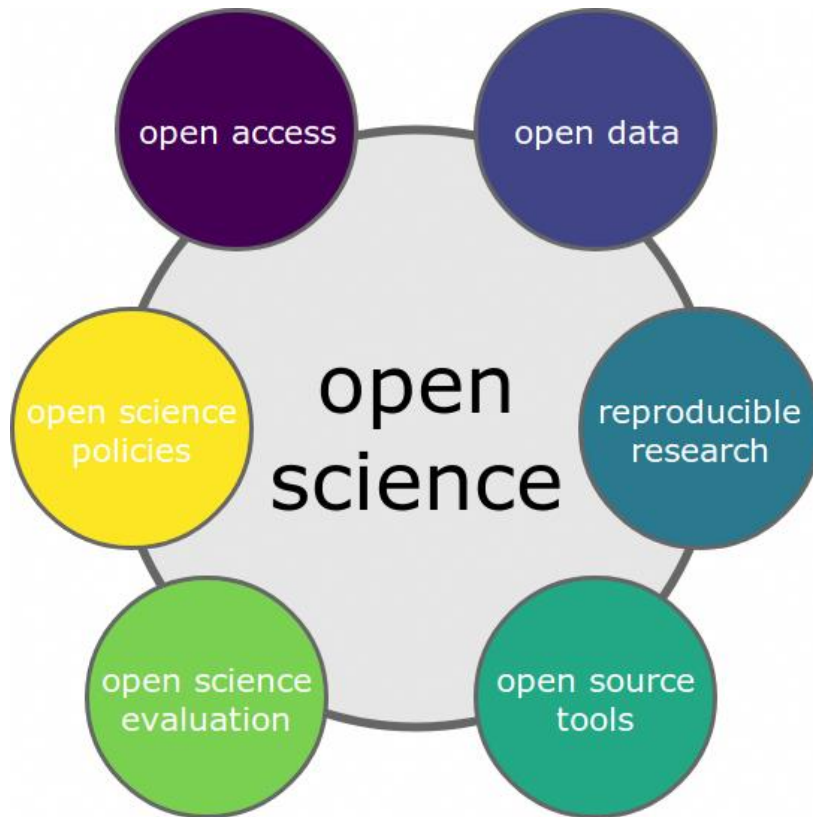


# OS TAXONOMY





# OS MULTIVERSE

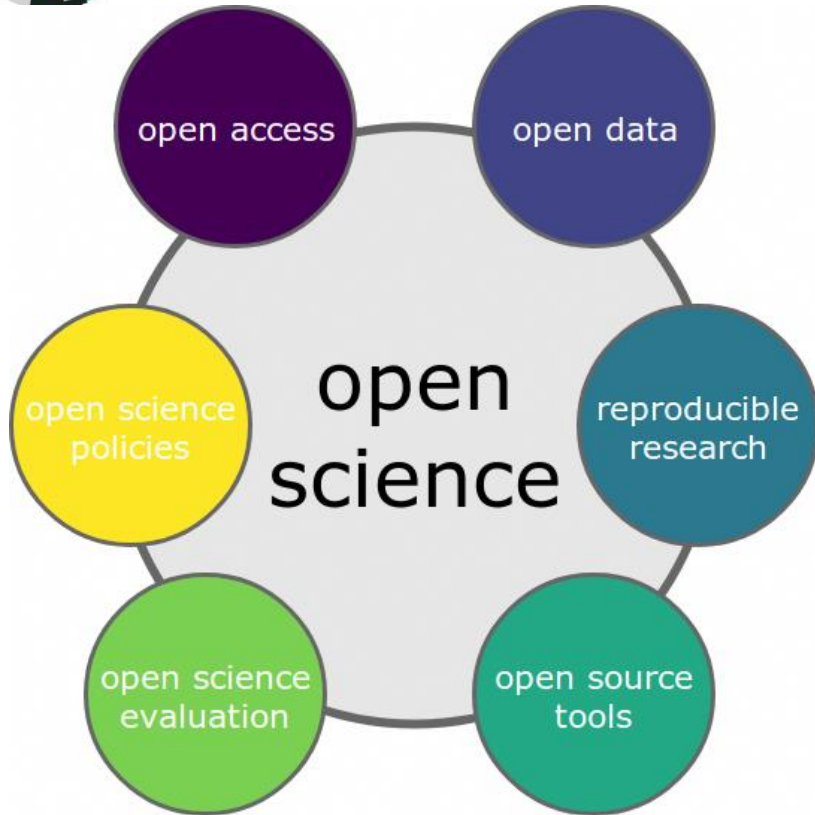


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# OS MULTIVERSE



## open access

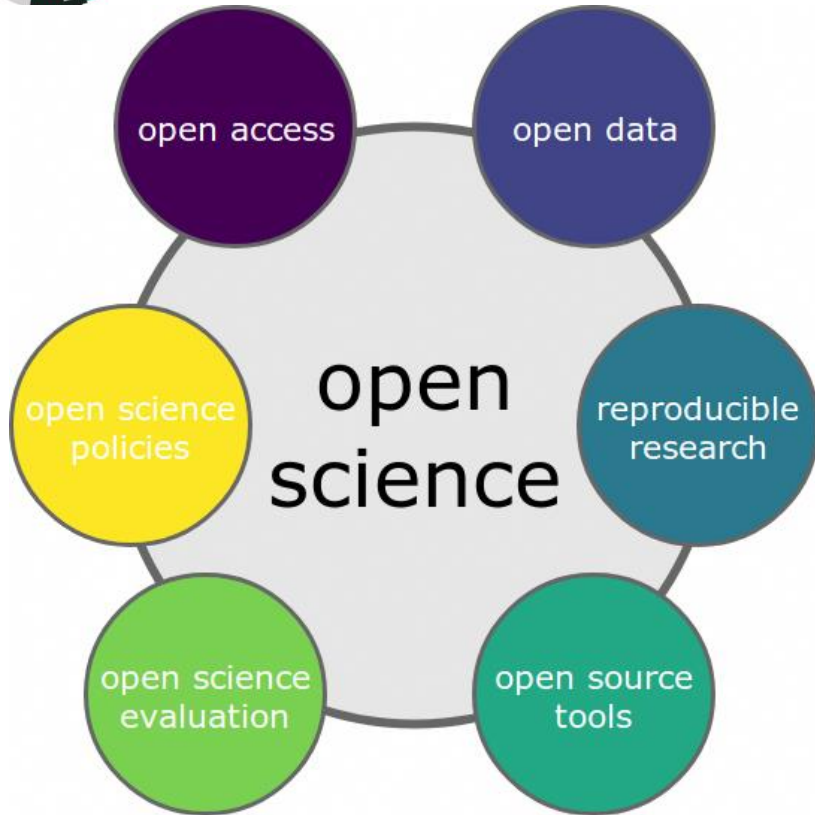
- online, peer-reviewed scholarly output
- free to read
- limited/no copyright/licensing restrictions
- popular *options*:
  - diamond (e.g., *Meta-Psychology*)
  - gold (e.g., *eLife*)
  - green (e.g., *bioRxiv*)
- *Sherpa Romeo*

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# OS MULTIVERSE



## open data

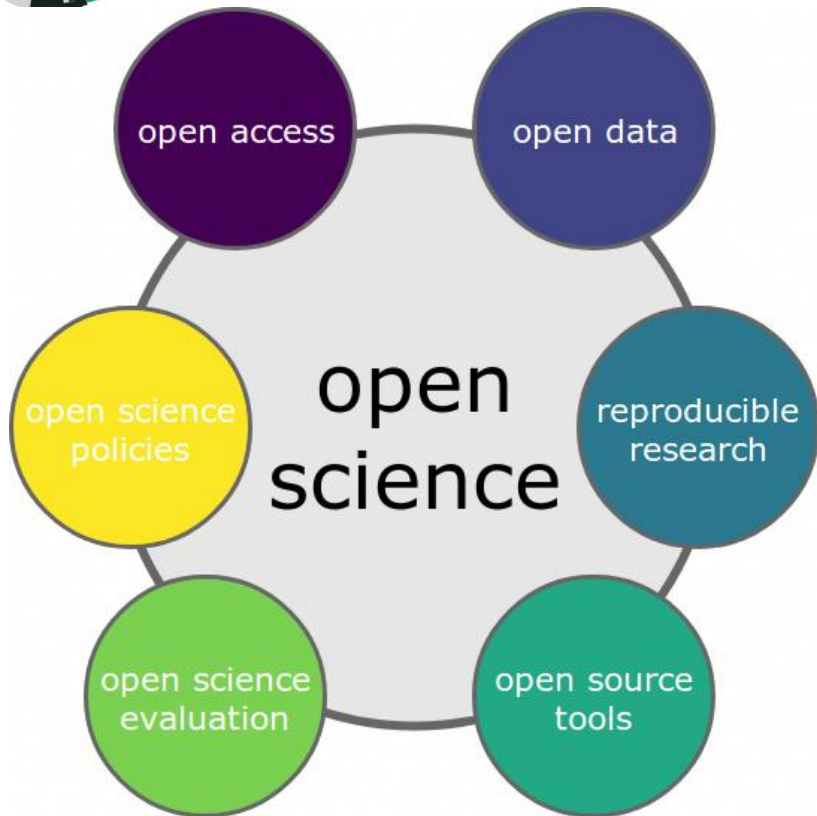
- online publication of data
- made available for access and re-use
- *FAIR principles*
- example:
  - *Brain Imaging Data Structure*

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# OS MULTIVERSE



## reproducible research

- independent reproducibility of results
- (ideally) without author input
- examples:
  - *fMRIprep*, *EEG PREP pipeline*
  - reproducible manuscript (*R* + *papaja*)

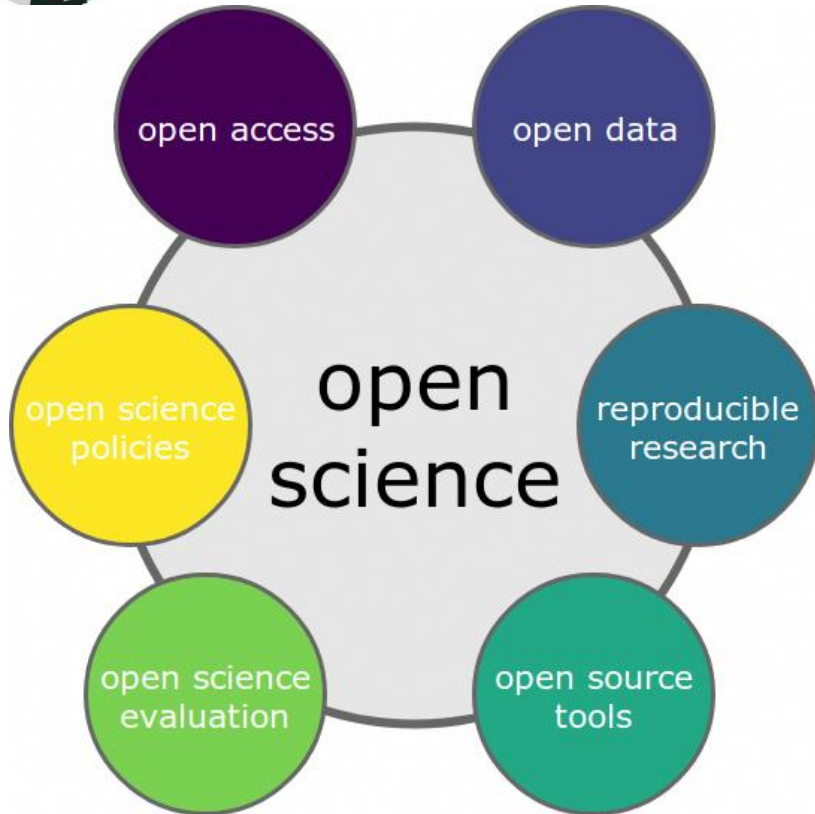
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## open source tools

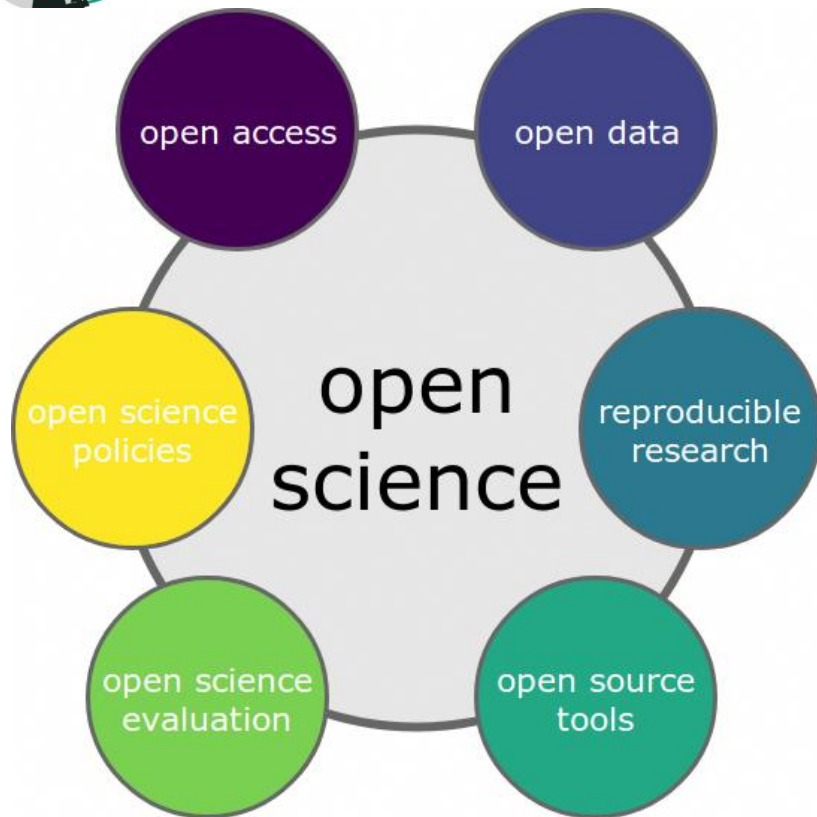
- can be accessed online for free
- allows use, derivatives, and distribution
- examples:
  - reference managers (*Zotero*)
  - data repositories (*OSF*)
  - statistical analyses (*JASP*, *jamovi*)
  - programming languages (*R*, *python*, ...)

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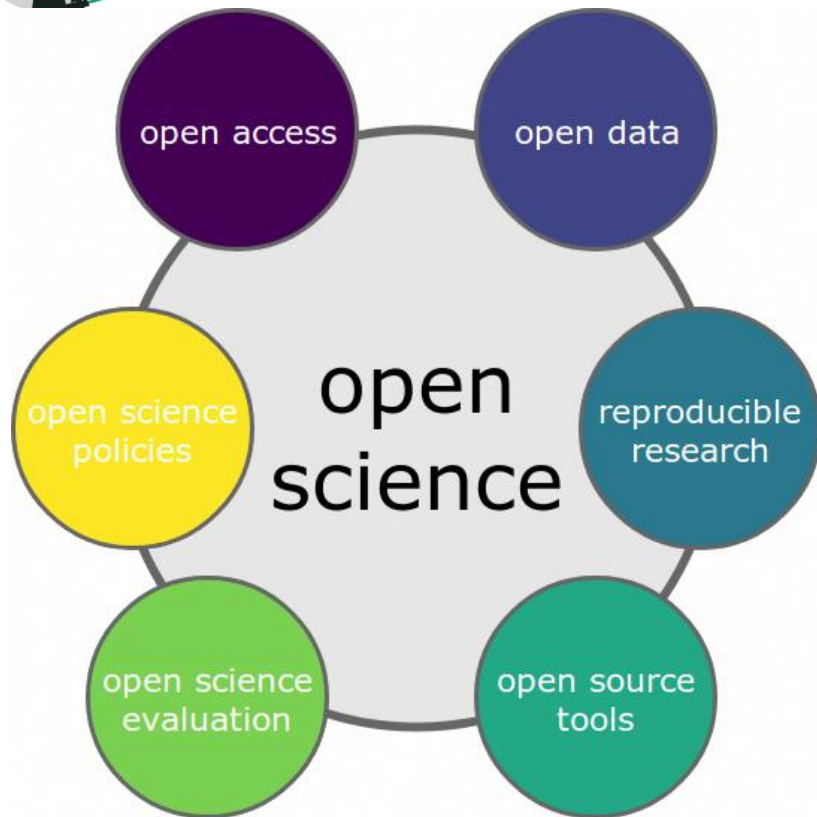
## open science evaluation

- multi-dimensional criteria evaluation
  - no *Impact Factor* or *h-index*
  - examples: *Leiden Manifesto*, *DORA*
- *open peer review*
  - disclose reviewer identity
  - publish review alongside paper
  - pre-publication (on preprint)
  - post-publication (e.g., *PubPeer*)

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## open science policies

- large-scale strategies & actions to promote OS principles and acknowledge OS practices
- established by publishers, funders, institutions, or governments
- examples:
  - *TOP* guidelines
  - *DFG* Open Access policy
  - *Horizon Europe*

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# PROBLEM: SLOW ADOPTION



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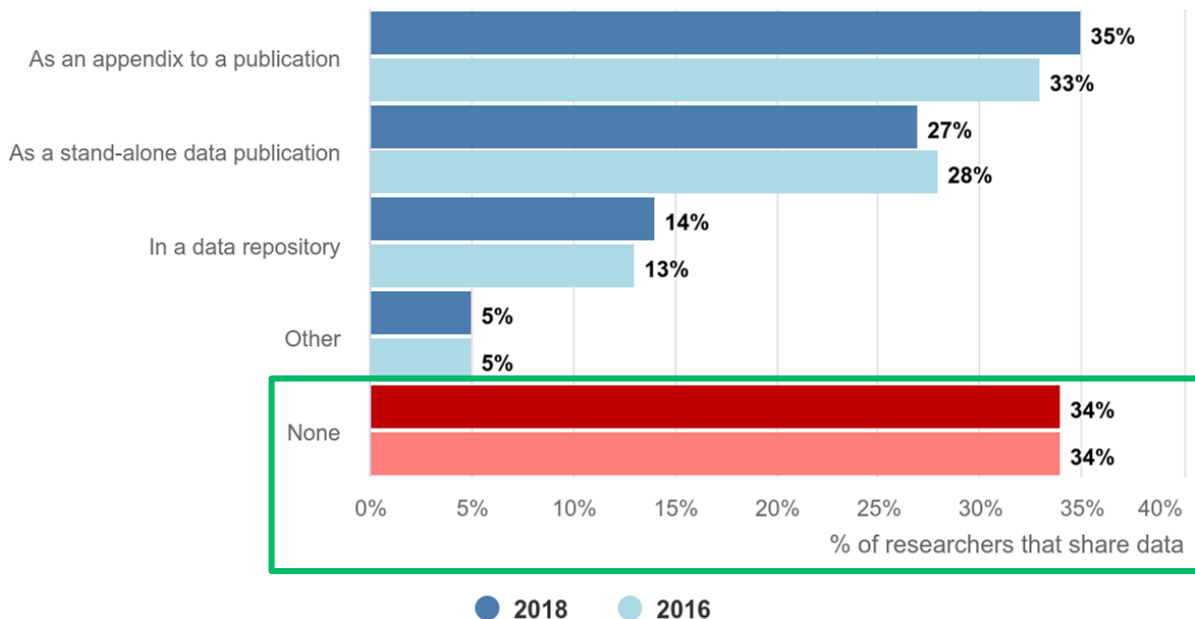


# SLOW ADOPTION



Attitudes of researchers: % of researchers that share data, by modality

Reference dates: 2016 and 2018



*Facts and Figures for Open Research Data (European Union)*

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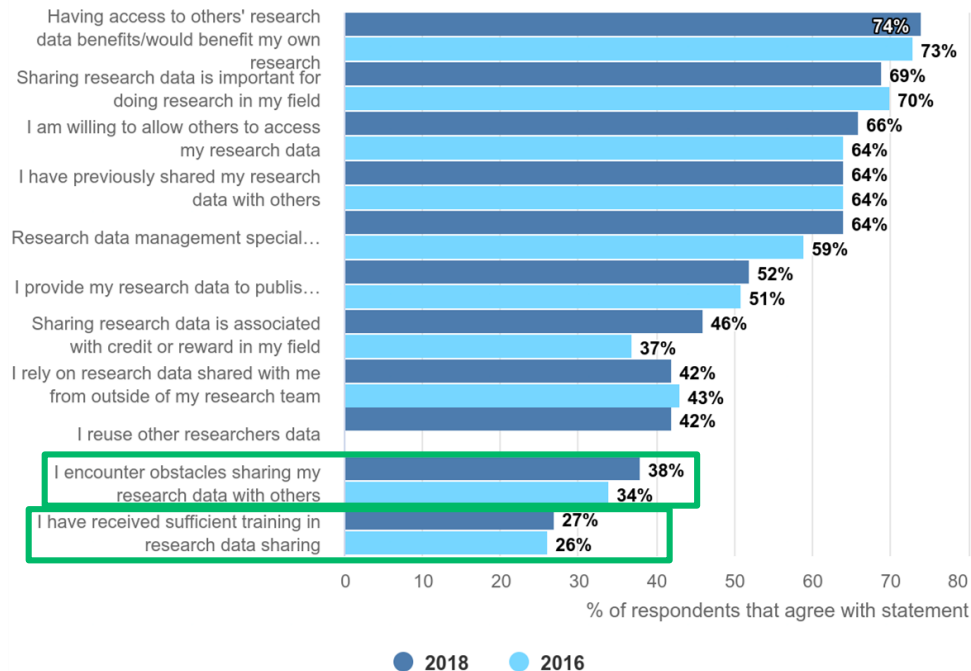


# TOOLS & TRAINING



Attitudes of researchers: % of respondents that agree with statement

Reference date: 2018 and 2016

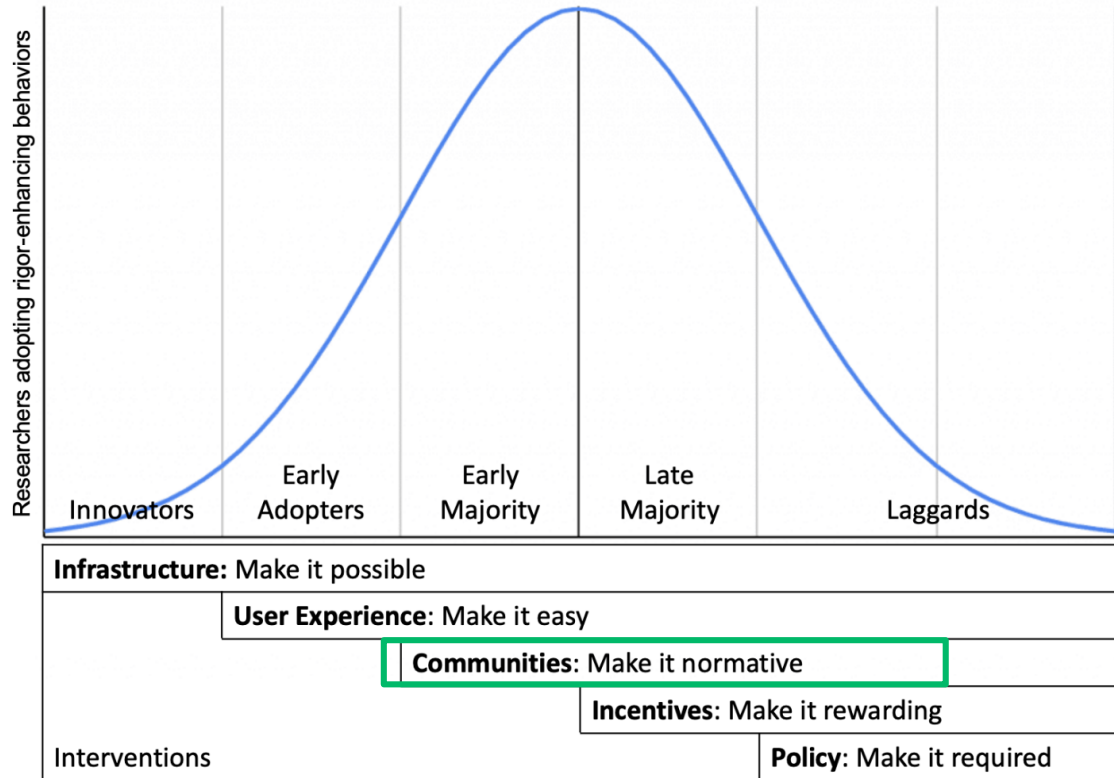


Facts and Figures for Open Research Data (European Union)

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# ADOPTING OS PRACTICES



*Replicability, Robustness, and Reproducibility in Psychological Science (Nosek et al., 2021)*

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# MEET INOSC!



# INOSC

## International Network of Open Science & Scholarship Communities

### WHO?

*Anyone* interested in open science, regardless of expertise (novice to expert), career stage (early-career to senior), or role (researchers, support staff, policy makers, ...)

### GOAL?

Discuss, learn, promote, and adopt open and transparent research practices  
at every stage of the research cycle

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# INOSC - CONNECTION



## CV and Contact Info

Click on the picture to send an email. The icons on the right redirect to the CV and so media pages.



## Expertise

reproducible analysis

open source software

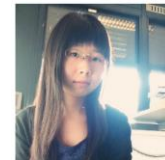
data sharing

open access

cat lover

data management

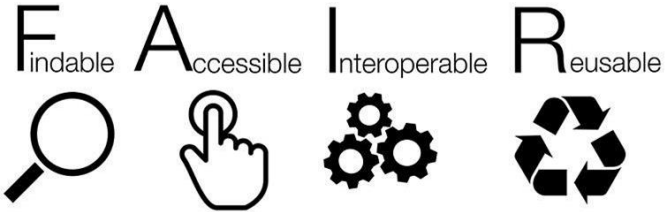
preregistration



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# INOSC - TRAINING



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# INOSC - SUPPORT



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# INOSC IN NL

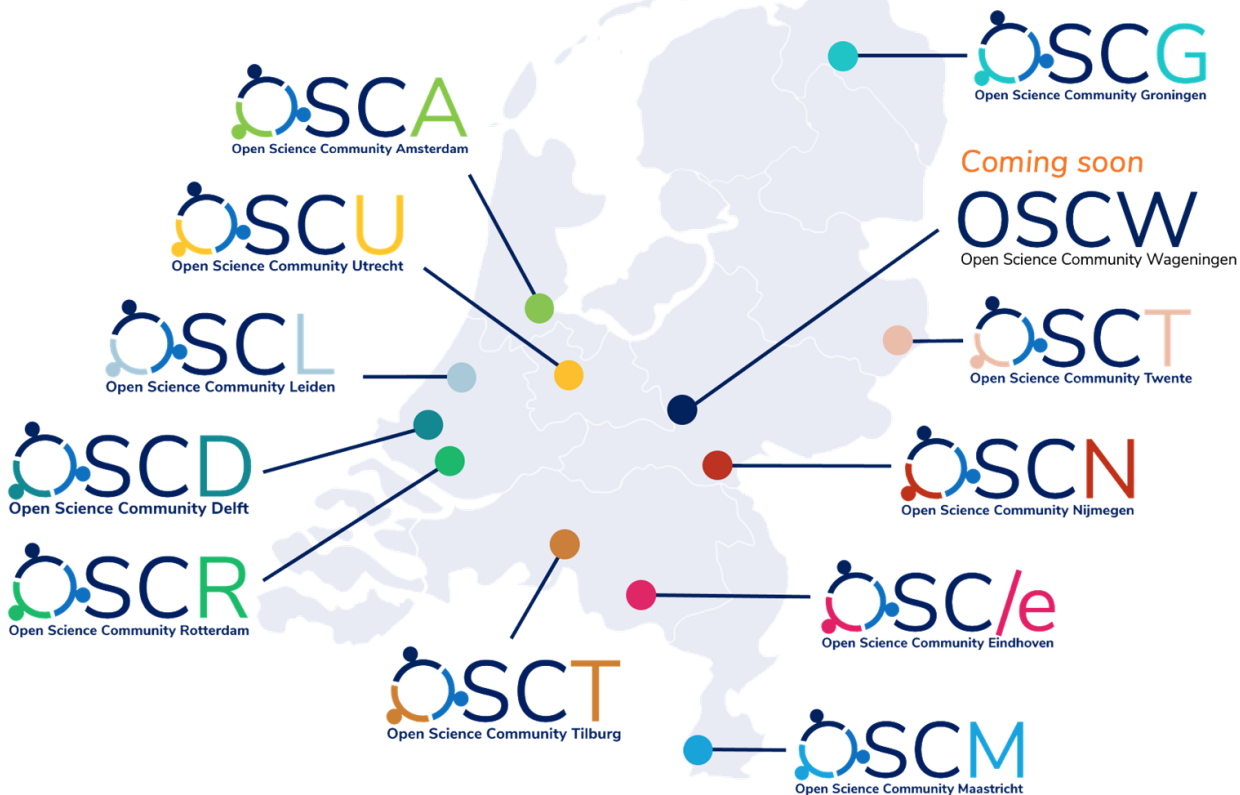


image by [Anita Eerland](#) (CC BY-ND 3.0)

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# INOSC IN THE WORLD



image by [Anita Eerland](#) (CC BY-ND 3.0)

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# JOIN INOSC!



- Watch our *video*
- Read the *INOSC whitepaper*
- Follow practical tips on the *INOSC Starter Kit*
- Contact us on Twitter ([OSCR](#), [OSCU](#), [OSCG...](#))

A stylized, handwritten signature in black ink that reads "Erasmus".



**THANKS FOR  
YOUR ATTENTION!**

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