

Introduction

- Who am I?
- Who are you? Which university are you from? What is your background? What is your favourite TV show/movie?
- Please take this short survey: tinyurl.com/XX



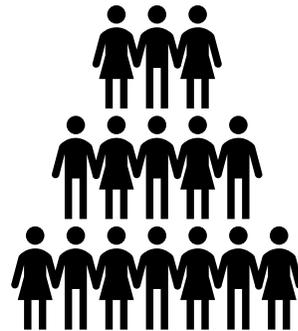
What's ahead?

- Combination of input, research results, and discussions
 - 1. **Why** is public trust important?
 - 2. **Where/When** do we lose public trust?
 - 3. Can we **repair** trust?
 - 4. What does **open science** have to do with trust?
-
- Conversational format
 - Questions? Please ask!

Science & Society

Why is trust in science necessary?

- No time & resources to become an expert in every field → trust in science necessary (Hendriks et al., 2015)
- Science & Society have a social contract (Gibbons, 1999)
 - In return for the public's support, science is required to **transparently** produce **reliable** knowledge about how the world operates



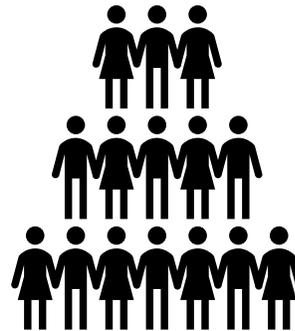


Science & Society

Regardless of the social contract:

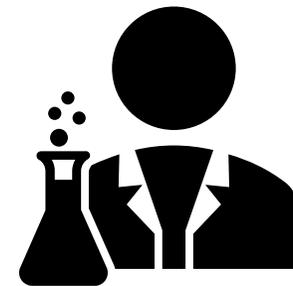
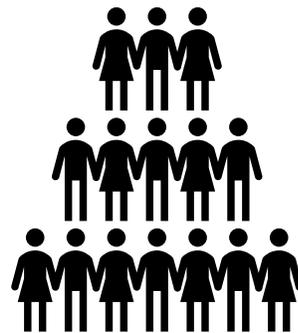
- What could be the **upsides** of close collaborations between scientists & the public?
- What do you think might go wrong at the moment?
- Think about the whole research process from research question to publication of findings.

Discuss these questions with your neighbor and share one upside and one pitfall.



Science & Society

- Upsides of close collaboration with the public (Eagleman, 2013)
 - Inspire critical thinking and public debates
 - Correct misinformation
 - Improve law and policy



Science & Society

Pitfalls

- Large numbers of scientists working competitively in silos without combining their efforts (Ioannidis, 2005)
- Low Replicability (Reproducibility Project: Psychology, 2012).
- Lack of science communication (Lakomý et al., 2019)
- Inaccessible materials, data, and publications (Hofner et al., 2016)

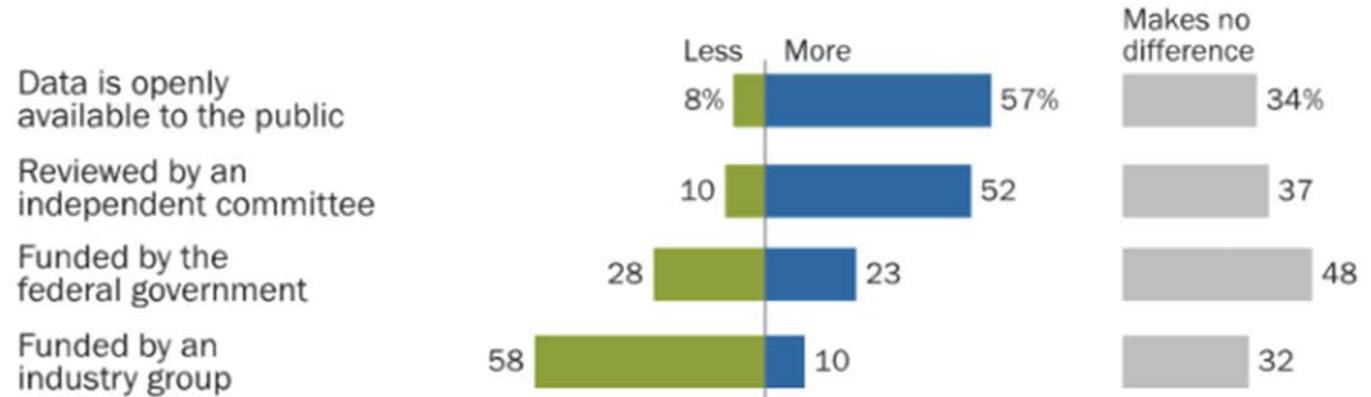


Science & Society

Pitfalls

Majority of Americans say they are more apt to trust research when the data is openly available

% of U.S. adults who say when they hear each of the following, they trust scientific research findings ...

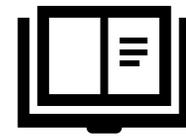


Pew Research Center, 2019



Science &
Society

How about you?



Science & Society

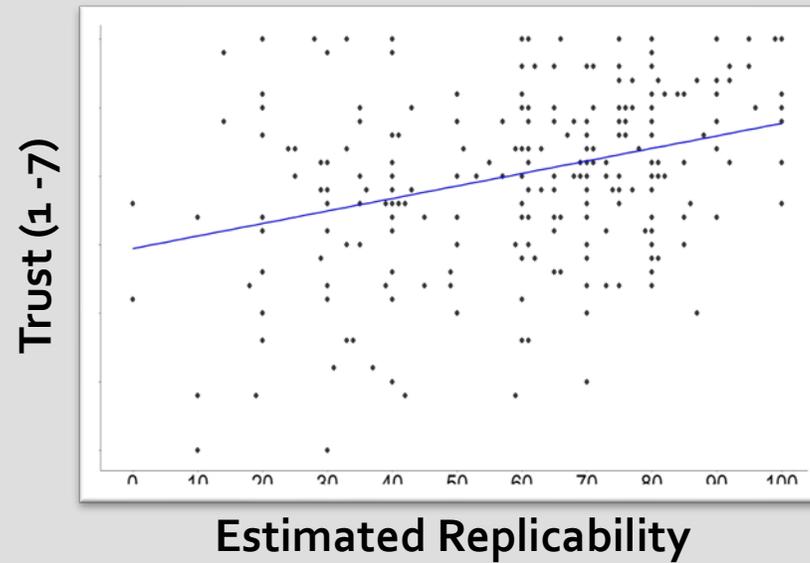
Pitfalls

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Wingen, Berkessel, English (2020): Replicability & Trust in Psychological Science

1. Information about the Reproducibility Project: Psychology



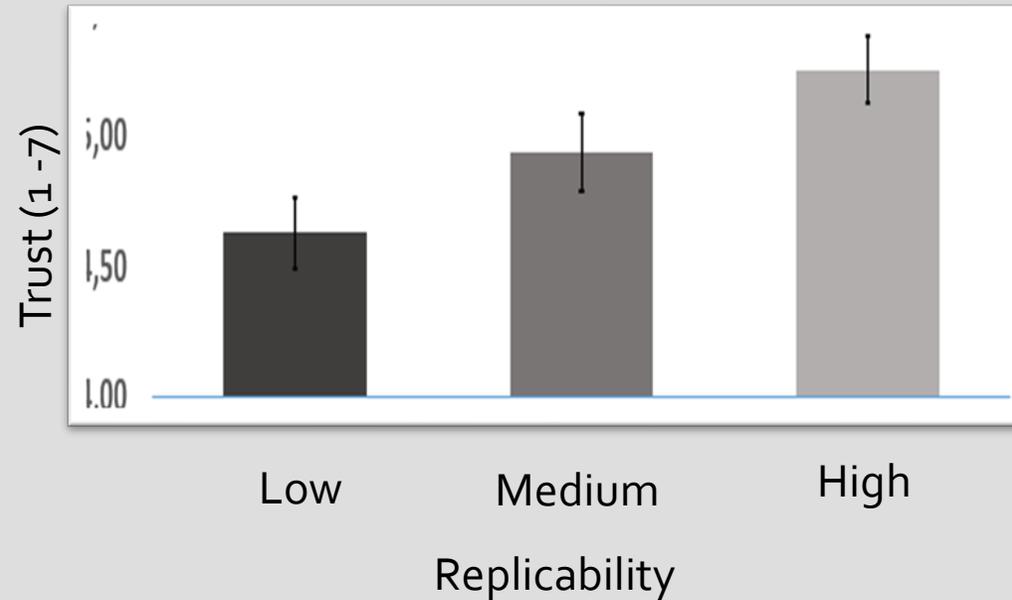
Science &
Society

How about you?



Wingen, Berkessel, English (2020): Replicability & Trust in Psychological Science

2. Experimental manipulation of replicability



Science & Society

Pitfalls

Wingen, Berkessel, English (2020): Replicability & Trust in Psychological Science

Effects of trust repair strategies

Cohen's d [95% CI]

Transparency
(Study 3, N = 304)

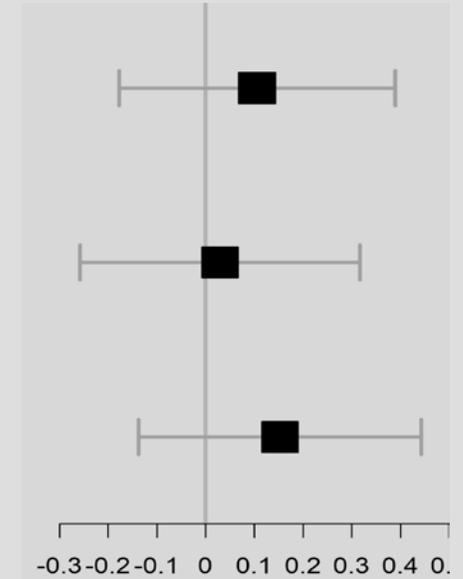
0.11 [-0.18, 0.39]

Context Sensitivity
(Study 4, N = 303)

0.03 [-0.26, 0.32]

Increased Replicability
(Study 5, N = 304)

0.15 [-0.14, 0.44]



→ **Trust is easy to lose and hard to repair**

(see also Anvari & Lakens, 2019 and Hendriks et al., 2020)



Science &
Society

How about you?



Science & Society

Pitfalls

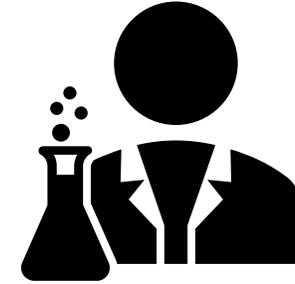
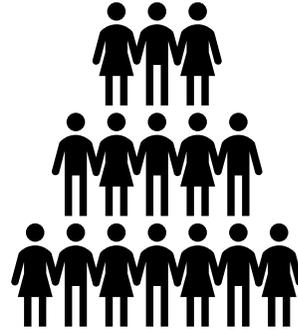
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- → **Room for improvement in fulfilling the social contract** (Munafò et al., 2017)
- → **Improvement necessary to not lose trust** (Wingen et al., 2020)



Open Science & Society

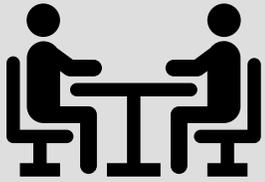
Opportunities



What now?

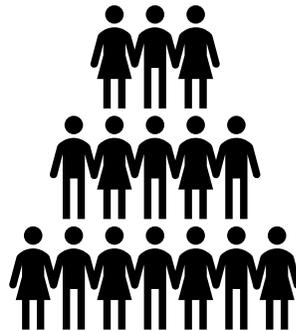
“Open Science is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods.”

- Foster Open Science



Science & Society

- You are called into your dean's office. He heard that you participated in an open science summer school and tells you: „The numbers just got in, the people in our town **don't trust** the research that comes from our institution. Do you think implementing **open science** techniques will bring this number up? What could **go wrong**? I'm worried that the public does not understand the scientific process.“
- Prepare a 1-2 minute answer for your dean.



Open Science & Society

Opportunities

Pre-Registration &
Registered Reports can prevent
cognitive biases
(Munafó et al., 2017)



MZES-GESIS Pre-Registration Challenge

Submit a hypothesis-driven research design and pre-registered analysis plan,
the best paper is awarded data collection free of charge.



Open Science & Society

Opportunities

Team Science Efforts can
prevent low power & non-
cooperative research
(Klein et al., 2014)



The Many Lab

ManyBabies

Multi-lab replications of influential experiments in



OSSC19 Crowdsourced Replication Initiative

Become one among many authors:

Replicate and enhance a cross-national quantitative study



Open Science & Society

Opportunities

Open Materials & Data make
research accessible &
facilitate collaboration
(Hofner et al, 2016)

Initial Name Set

Nett, Dorrough, Glöckner & 1 more

Source of the initial name set to be entered in the validation

Collected Measurements

Nett, Dorrough, Glöckner & 1 more



Project Implicit®

Collection



Open Science & Society

Opportunities

Reproducible & improved
analyses can increase
reproducibility and statistical
inferences
(Nosek et al., 2015)

9:00–10:30 a.m. **Workshop: Reproducible Research, Part 1** Juli Nagel (Central Institute of Mental Health, Mannheim)

stackoverflow About Products For Tear

Home **Doing a T.test in R**

```
a <- dist(st)
c <- hclust(d)
plot(c)
```

R Programming Tutorial - Learn the Basics of Statistical Computir
1.080.115 Aufrufe • 06.06.2019 18.029 663 TEILEN



Open Science & Society

Opportunities

Preprints, Open Review,
Open Access open up peer-
review and access to final
publications

1:30–3:30 p.m.

**Revealing the Open Access
potential of my dissertation**

Dr. Philipp
Zumstein
(University of
Mannheim)

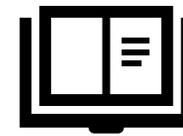
Open Peer Review

This course will introduce you to Open Peer Reviewing and let you know how you can get started

9:00–10:30 a.m.

**Workshop: The Boom of Pre-
Print-Publishing and its
Challenges for the Public
Communication of Research
Results – Part I**

Prof. Markus
Lehmkuhl
(Karlsruhe
Institute of
Technology)



Open Science & Society

Opportunities

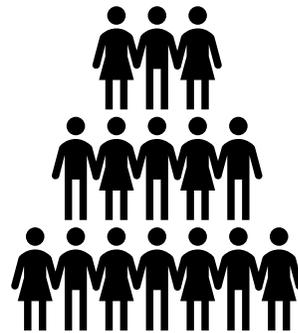
Science Communication can
increase trust in and support
of science
(Lakomý et al., 2019)

The screenshot shows a YouTube video player. At the top, the channel name 'The Inquisitive Mind' is visible with a logo. Below it, navigation links include 'the magazine', 'blog', 'book reviews', 'videos', 'the foundation', and 'donate'. The video title is 'SCIENTISTS' and the channel name is 'mailab'. The video content features a woman speaking with the text 'YOGASCIENCE' and 'INFLUENZA' overlaid. The video description asks 'Wie sinnvoll ist eine Grippeimpfung?' and mentions '423.429 Aufrufe • vor 11 Monaten'.

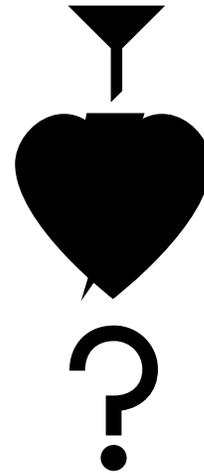


Open Science & Society

Pitfalls



Open Science



Open Science & Society

Pitfalls

„Unfiltered“ information without necessary context?

- More public criticism (blogs, twitter, facebook)
 - → without training legitimate disagreement might be mistaken for “trouble” (Pittinsky, 2015)
- Scientific uncertainty reduces perceived value of scientific fields (Broomell & Kane, 2017; Howe et al., 2019)
- Preprints vs. Peer-reviewed papers (Wingen et al., 2022)
- Science Communication is not strictly controlled

Open Science & Society

Pitfalls

Editorial | Published: 29 October 2019

Scientific uncertainty

Nature Climate Change 9, 79

4098 Accesses | 26 Altmeter

Open access | Research article | First published online June 20, 2021

No harm in being self-corrective: Self-criticism and reform intentions increase researchers' epistemic trustworthiness and credibility in the eyes of the public

Marlene Sophie Altenmüller, Stephan Nuding and Mario Gollwitzer [View all authors and affiliations](#)

Volume 30, Issue 8 | <https://doi.org/10.1177/09636625211022181>

Contents | PDF / ePub | Cite article | Share options | Information, rights and permissions | Metrics and c

- **How** scientists express uncertainty matters (Howe et al., 2019)
 - Concrete range of possibilities → increased trust
 - Unpredictable impacts → reduced trust
- Being self-corrective and stating reform intentions can increase trust (Altenmüller et al., 2021)

→ **Uncertainty not necessarily bad!**

Open Science & Society

Pitfalls

Wingen, Berkessel, Dohle (2022, AMPPS): Caution, Preprint!

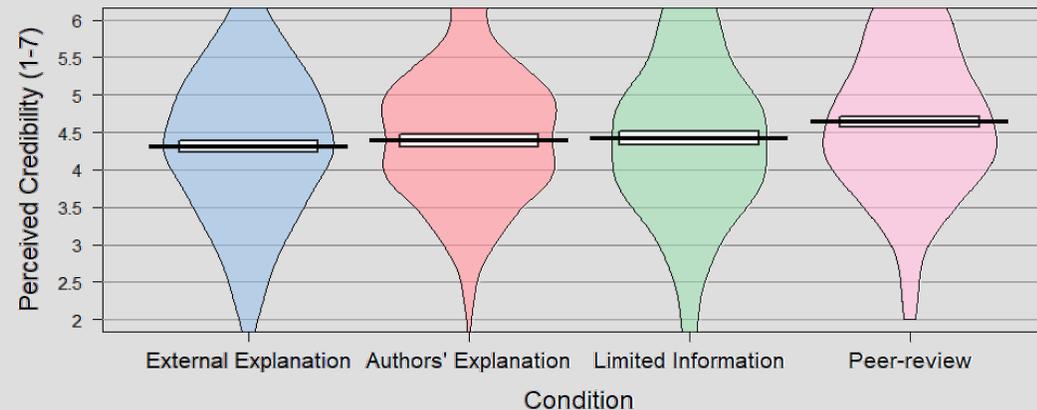
(5 studies, total N = 2,286)

If informed about the peer-review process, non-scientists trust peer-reviewed articles more than Preprints



Wingen, Berkessel, Dohle (2022, AMPPS): Caution, Preprint!

- No information about peer-review → no difference in trust!
- Only 26% marked as Preprints, only 12% explain peer-review
- Even brief explanations help



→ Readers differentiate, but need sufficient information, which is often missing

→ Solution: Short explanation of peer-review

Peer-Review in Science Communication



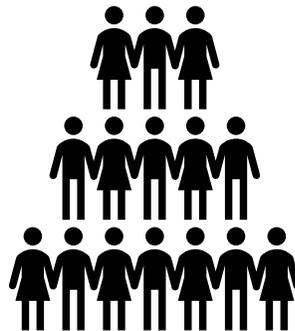
The Inquisitive Mind

What is Peer-Review?

In-Mind Magazine is a peer-reviewed magazine presenting research to a broad audience. What does peer-review entail? Peer-review means that experts in the field, who remain anonymous to the authors, evaluate the work.

Conclusion

- Science & Society have a social contract
- Science's compliance with this contract could be improved
- Open Science offers methods to do so
- These contain pitfalls that need to be kept in mind
- Solutions are already researched & implemented



Summary

- Science & Society have a social contract
 - Science should **transparently** produce **reliable** knowledge about how the world operates
 - Many pitfalls along the way (e.g., closed methods, data, & access)
- Science's compliance with this contract could be improved
- Open Science offers methods to do so (e.g., collaborative efforts, reproducible methods, open access publications)
- These contain pitfalls that need to be kept in mind (e.g., uncertainty reduces trust, preprint vs. peer-review)
- Solutions are already researched and implemented (e.g., framing of uncertainty, primer on peer-review, peer-review in science communication)

