

Debunking pseudoscience

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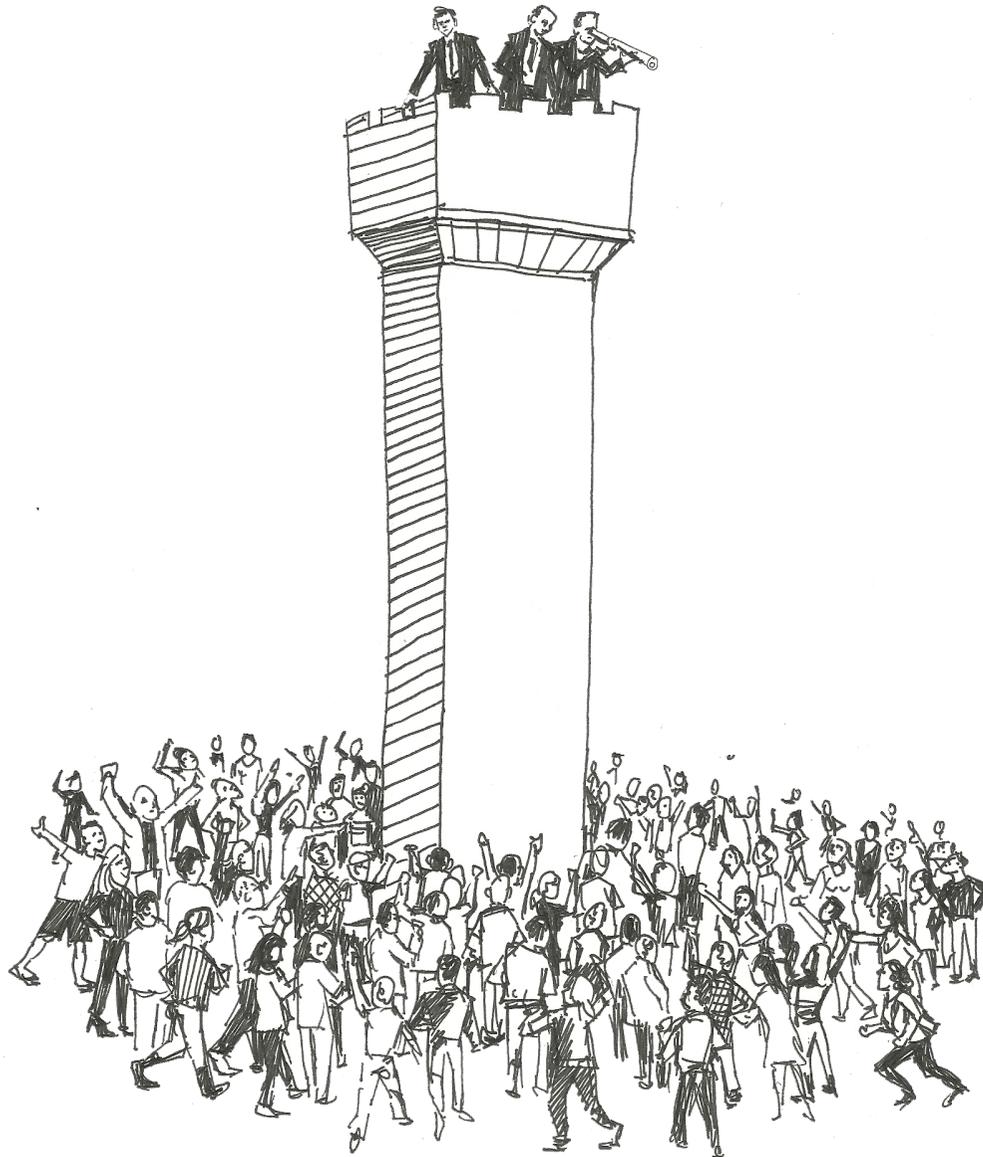
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Levitation by street “magician”





ivory tower

Conspiracy theories about 'scientific elite' have become a strategy among some to reject science.

Why are the conspiracy theorists trusted?

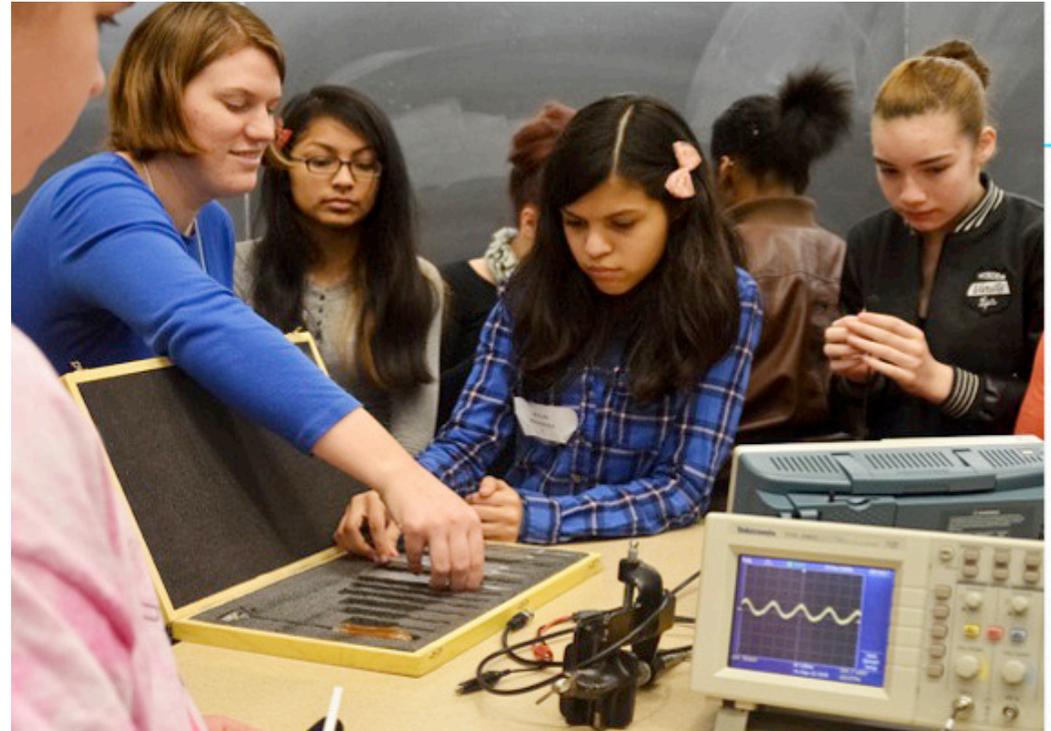
Popular science and outreach strives to help people understand.

Scientists (should) openly describe degrees and sources of uncertainty. This can be difficult!

Honest uncertainty in science is exaggerated by “science deniers”. They, in contrast, rarely mention uncertainty in their own claims.

Naomi Oreskes: Trust in science

https://www.youtube.com/watch?v=NwaThGHz8pY&list=PLH_J8DtGOvgPJsUj61-gEChsLzz2uWdrz



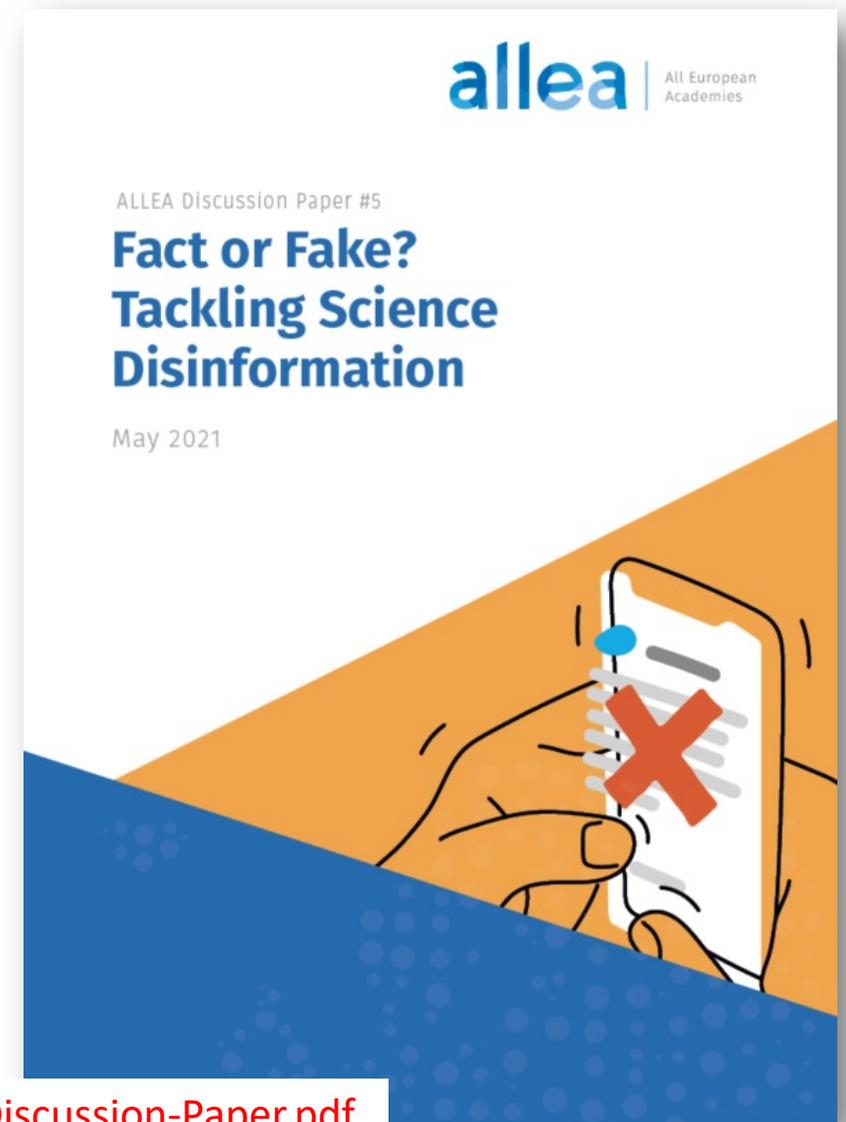
ALLEA Discussion Paper ALL European Academies

Science disinformation

Prof Dan Larhammar

President of the Royal Swedish Academy of Sciences
Chair of the ALLEA Project Committee on Science Disinformation

<https://allea.org/wp-content/uploads/2021/04/Fact-or-Fake-Discussion-Paper.pdf>



Three focus areas

- Climate change
- Vaccines
- Covid-19 pandemic

Characteristics & Mechanisms of Science Disinformation

- 'Stickiness' of false information
- Knowledge resistance
- **Science-like jargon in pseudoscientific claims**
- Confirmation bias
- The Dunning-Kruger effect
- Filter bubbles, echo chambers
- Conspiracy theories

Pseudoscience

Nobody says that they do or believe in pseudoscience.

Almost everybody claims that they are scientific.

Everybody wants to sound scientific.

Science has great trust!

Definition of pseudoscience (Wikipedia)

Pseudoscience is an alleged body of knowledge, methodology, belief or practice that is claimed to be scientific or made to appear scientific, but does not adhere to the scientific method.

This can be deliberate (deception) or due to ignorance (misinformed).

Pseudoscience is old

Astrology and horoscopes

Dowsing

Parapsychology

belief in spirits

remote viewing, precognition, etc



Creationism (anti-evolution)

Alternative medicine

homeopathy

acupuncture

Vaccine hesitancy – also old!

Use pseudoscience to practise critical thinking

Examples:

Homeopathy

Acupuncture

Global warming denial

Covid vaccin hesitancy (anti-vaxx)



Read articles that are critical towards these pseudosciences.

Then examine articles by pseudoscience proponents to see how they mislead.

Strategies for debunking

Check sources

- financial interests?
- ideology? (religion, politics)
- conspiracy theories?
- scientific journals with peer review or social media?

Bullshit detection

- jargon
- “empty” or non-sensical phrases?
- “explanatory power” of claims or just words?

“On the reception and detection of pseudo-profound bullshit.”
Pennycook et al., 2015

Inoculation – seeds of doubt

- What has the source or “expert” claimed in other contexts?
 - Other pseudoscience?
- Does the Dunning-Kruger effect apply? (overconfidence)

Is information missing (left out)?

Is information distorted?

The Debunking Handbook 2020 ...



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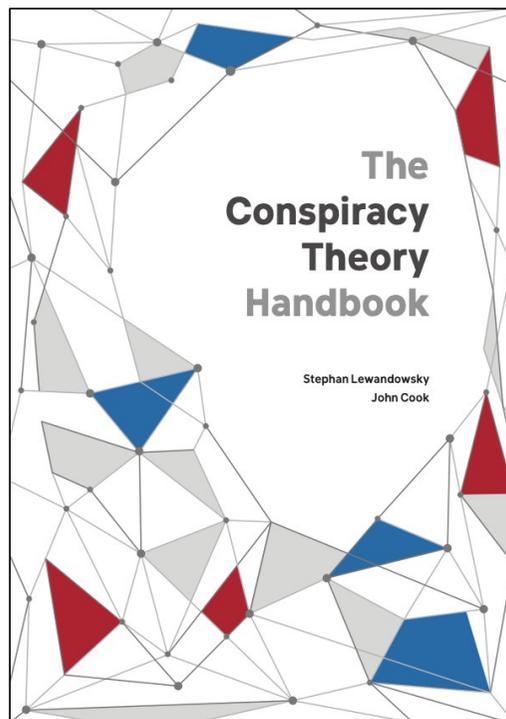
+ 20 more

<https://www.climatechangecommunication.org/debunking-handbook-2020/>

The Covid-19 Vaccine Communication Handbook
Lewandowsky & Cook et al.

<https://osf.io/f6a48/>

with many links and references



The COVID-19 Vaccine COMMUNICATION HANDBOOK

A practical guide for improving vaccine
communication and fighting misinformation

The Conspiracy Theory Handbook (on climate change denial)
Lewandowsky & Cook 2020

<https://www.climatechangecommunication.org/wp-content/uploads/2020/03/ConspiracyTheoryHandbook.pdf>



Understanding gives satisfaction.

Methods to analyze systematically and empirically can be used in different contexts.

Summary

Although science disinformation and pseudoscience are threats to our societies, they can be used to practise critical thinking, to inoculate and immunize against disinformation

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