



Complexity and science misinformation

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Science Feedback

8 June 2023
ESMH Summer School 2023

THE SCIENCE NEWS CYCLE

JORGE CHAM © 2009

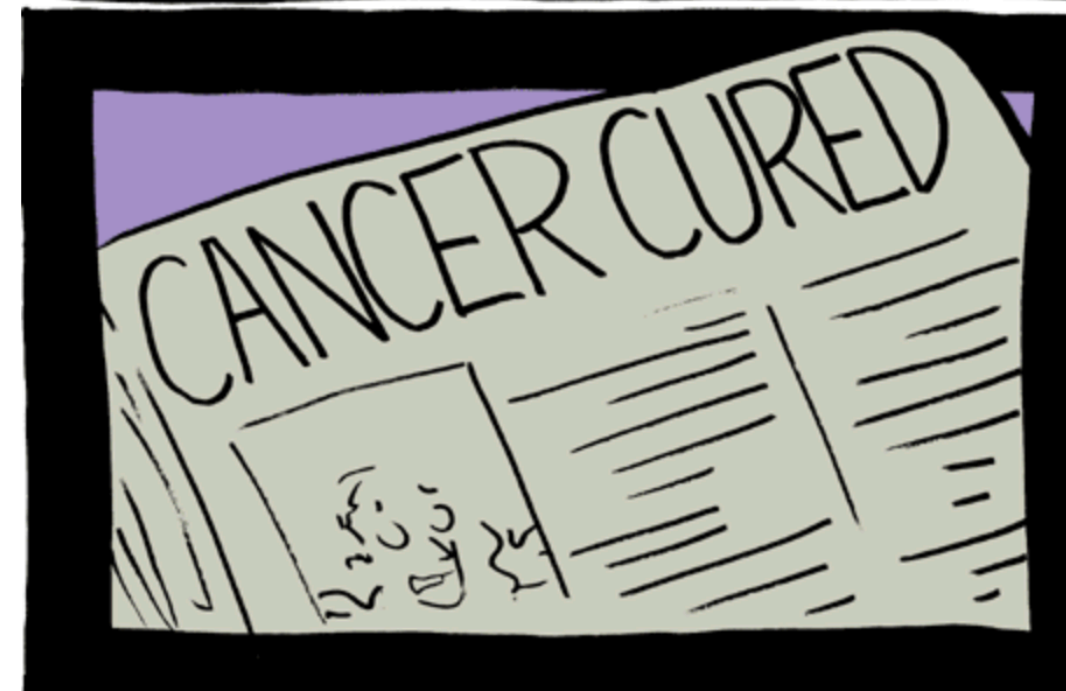


Science is complex




- “Everything should be made as simple as possible, but no simpler”
- A lot of science misinformation comes from stripping out complexity in scientific research
 - Not giving enough context (e.g. important caveats)
 - Logical fallacies (esp. about correlations)

HOW SCIENCE REPORTING WORKS:




Credit: Saturday Morning Breakfast Cereal
www.smbc-comics.com

justsaysinmice @justsaysinmice · Feb 27
IN MICE



independent.co.uk
Drinking Coke may increase testicle size and testosterone productio...
Researchers claim the study “demonstrated a high dose of Pepsi or Coca-Cola could promote testis growth and development”

Zebrafish Rock! @ZebrafishRock · Oct 1, 2022
IN FISH!

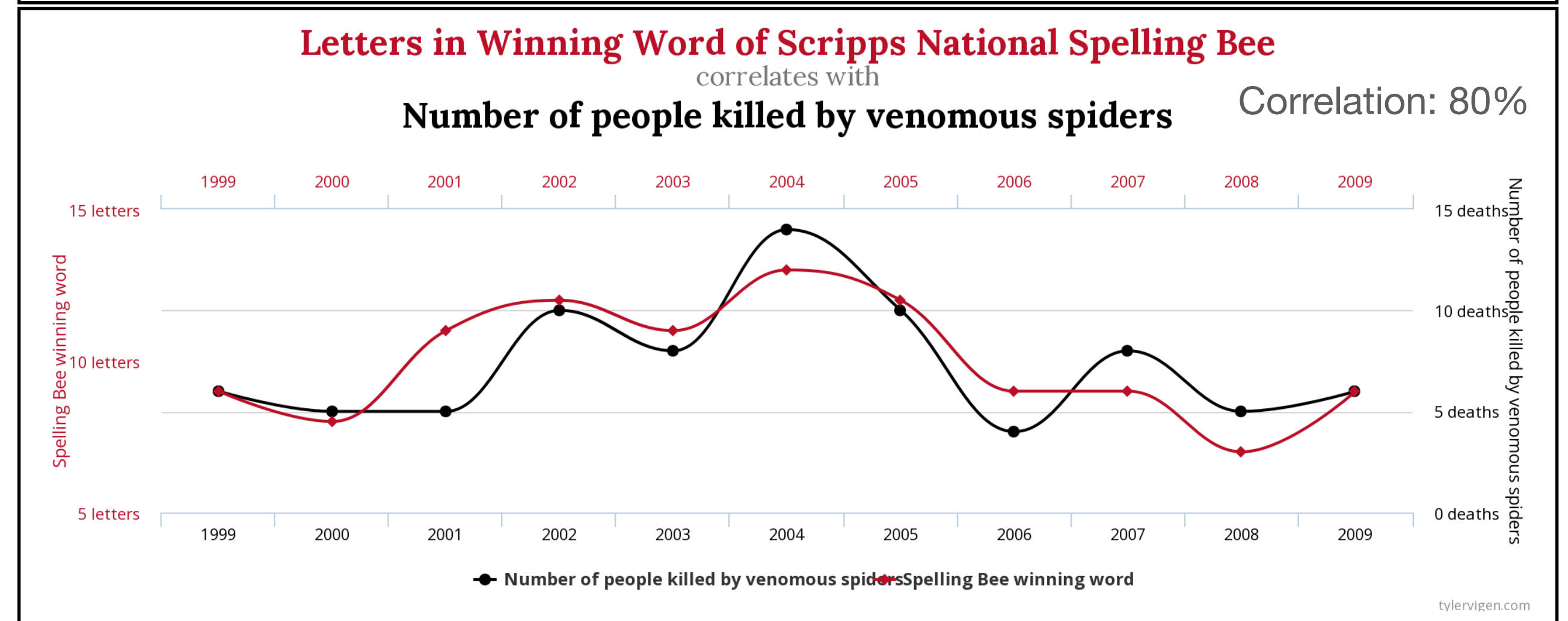
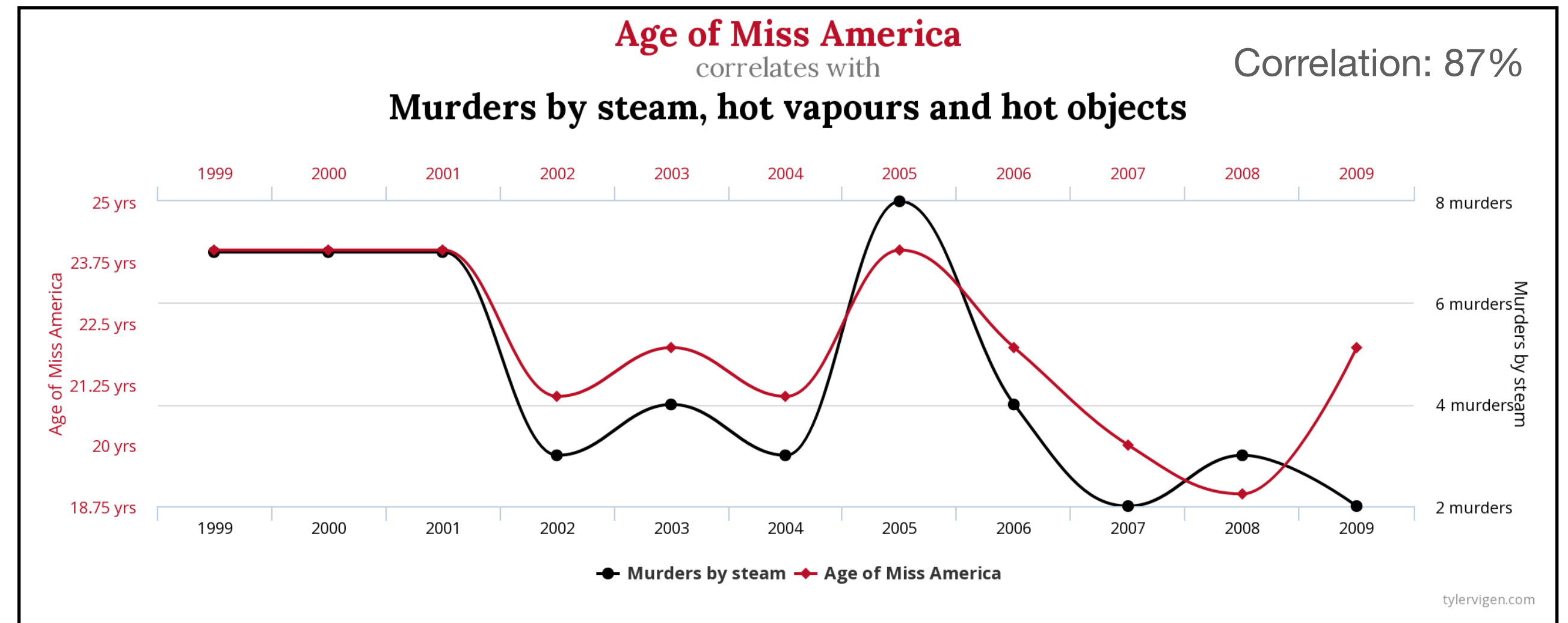


dailymail.co.uk
Love hormone repairs cells after heart attack, study finds
Oxytocin is produced by our bodies when we cuddle, have sex, and fall in love. Now scientists in Michigan have discovered it also appea...

Correlation (alone) is not causation



- It's important but is only the **first step** towards answering the question
- Correlations can denote a genuine relationship between two variables...but not always



Correlation (alone) is not causation



- Specious correlations can also emerge because of methodological flaws

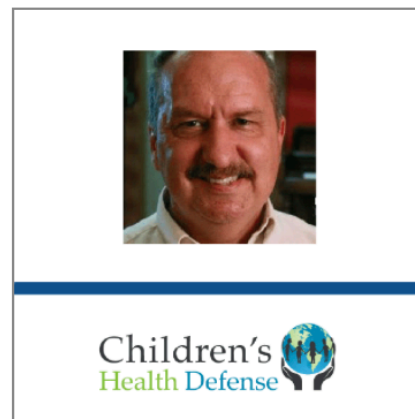
Debunked by Health Feedback

Significant methodological flaws in a 2020 study claiming to show unvaccinated children are healthier

1.3k
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CLAIM

Vaccinated children are more likely to have adverse health outcomes like developmental delays, asthma, and ear infections compared to unvaccinated children.

VERDICT [®]

UNSUPPORTED

SOURCE: Brian Hooker, Children's Health Defense, 28 May 2020 [↗](#)

Children's Health Defense



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MEMBERS ONLY

EBOOKS

MAY 28, 2020

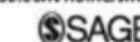
New Research Study Clarifies Health Outcomes in Vaccinated versus Unvaccinated Children

Original Article

SAGE Open Medicine

Analysis of health outcomes in vaccinated and unvaccinated children: Developmental delays, asthma, ear infections and gastrointestinal disorders

SAGE Open Medicine
Volume 8: 1-11
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DOI: 10.1177/2050312120925344
journals.sagepub.com/home/smo



Conclusion

In this study, based on a convenience sample of children born into one of three distinct pediatric medical practices, higher ORs were observed within the vaccinated versus unvaccinated group for developmental delays, asthma and ear infections.

Not all scientific communications are peer-reviewed



- Preprints
 - Uploaded to dedicated preprint servers (BioRxiv, MedRxiv, arXiv)
- Conference abstracts
 - Brief research summary
 - Data presented is superficial

Circulation

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Home > Circulation > Abstract 10712: Observational Findings of PULS Cardiac Test Findings for Inflammatory Markers...

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Abstract 10712: Observational Findings of PULS Cardiac Test Findings for Inflammatory Markers in Patients Receiving mRNA Vaccines

Steven R Gundry

Originally published 8 Nov 2021 | https://doi.org/10.1161/circ.144.suppl_1.10712 | Circulation. 2021;144:A10712

* An Expression of Concern was later appended to the abstract

FACTCHECK POSTS > SCICHECK

Debunked by fact-checkers

No Credible Evidence COVID-19 mRNA Vaccines 'Dramatically Increase' Heart Attack Risk, Contrary to Flawed Abstract

AFP Fact Check

By Catalina Jaramillo
Posted on December 16, 2021

TOP NEWS | REGIONS | TOPICS

**Research summary misleadingly cited as evidence
Covid-19 shots are dangerous**

Peer review: important but not perfect



- It's not the end of the story
- It's not confirmation that the findings are "the truth"
- Peer review rigour differs from journal to journal



Research | [Open Access](#) | [Published: 24 January 2023](#)

The role of social circle COVID-19 illness and vaccination experiences in COVID-19 vaccination decisions: an online survey of the United States population

*** This study was later retracted**

[Mark Skidmore](#)

[BMC Infectious Diseases](#) 23, Article number: 51 (2023) | [Cite this article](#)

52k Accesses | 4463 Altmetric | [Metrics](#)

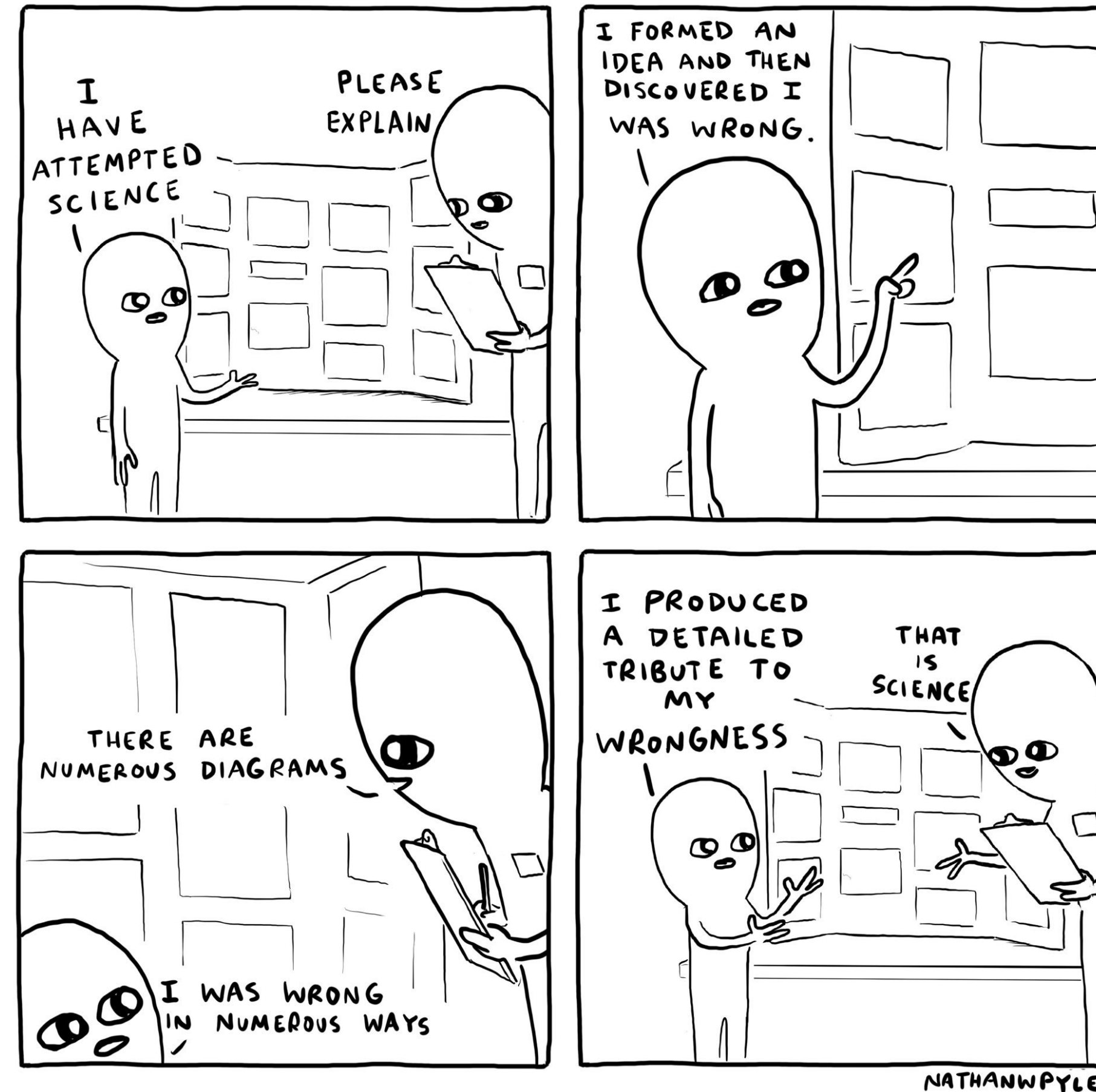
Results

A total of 2840 participants completed the survey between December 18 and 23, 2021. 51% (1383 of 2840) of the participants were female and the mean age was 47 (95% CI 46.36–47.64) years. Those who knew someone who experienced a health problem from COVID-19 were more likely to be vaccinated (OR: 1.309, 95% CI 1.094–1.566), while those who knew someone who experienced a health problem following vaccination were less likely to be vaccinated (OR: 0.567, 95% CI 0.461–0.698). 34% (959 of 2840) reported that they knew at least one person who had experienced a significant health problem due to the COVID-19 illness. Similarly, 22% (612 of 2840) of respondents indicated that they knew at least one person who had experienced a severe health problem following COVID-19 vaccination. With these survey data, the total number of fatalities due to COVID-19 inoculation may be as high as 278,000 (95% CI 217,330–332,608) when fatalities that may have occurred regardless of inoculation are removed.

Take-home messages



- Scientific studies take place under specific, controlled conditions
 - Generalisability and caveats
- Correlations can be useful, but its value depends on study methods
- Scientific communication comes in different forms
 - Validity and reliability
- Suggested reading
 - “Bad Science” by Ben Goldacre



Credit:
Nathan W. Pyle

Acknowledgements



Founder and Director
Emmanuel Vincent



Tech



Bastien Carniel



Charlotte Samson



Guillaume Guerdoux

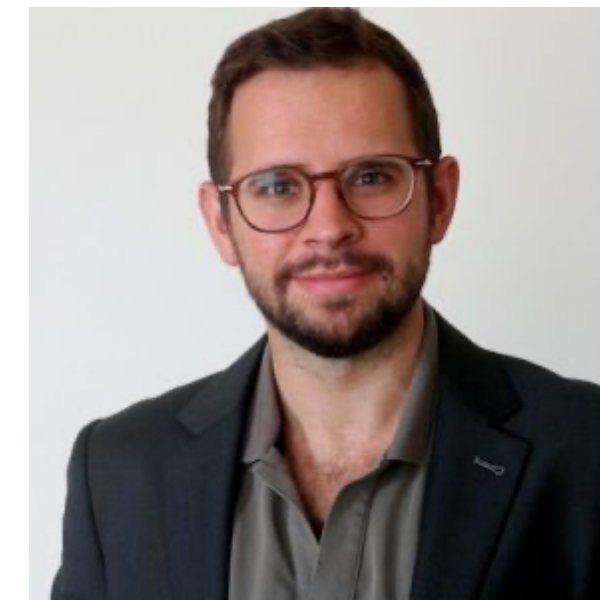


Quan Trinh

Editorial



Iria Carballo



John Doherty



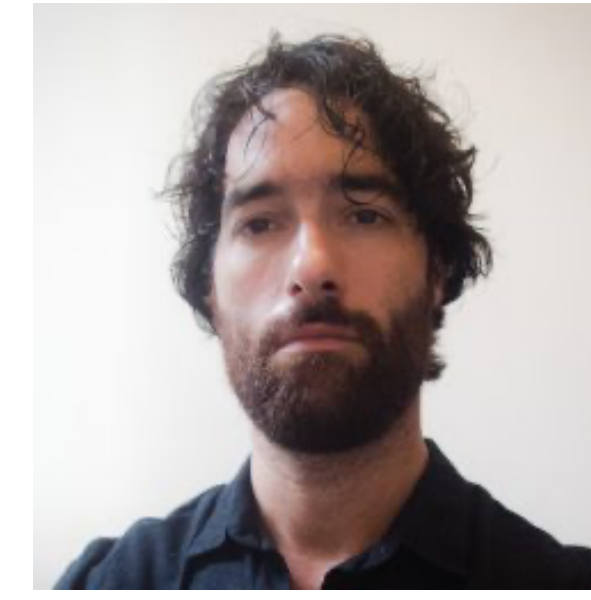
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