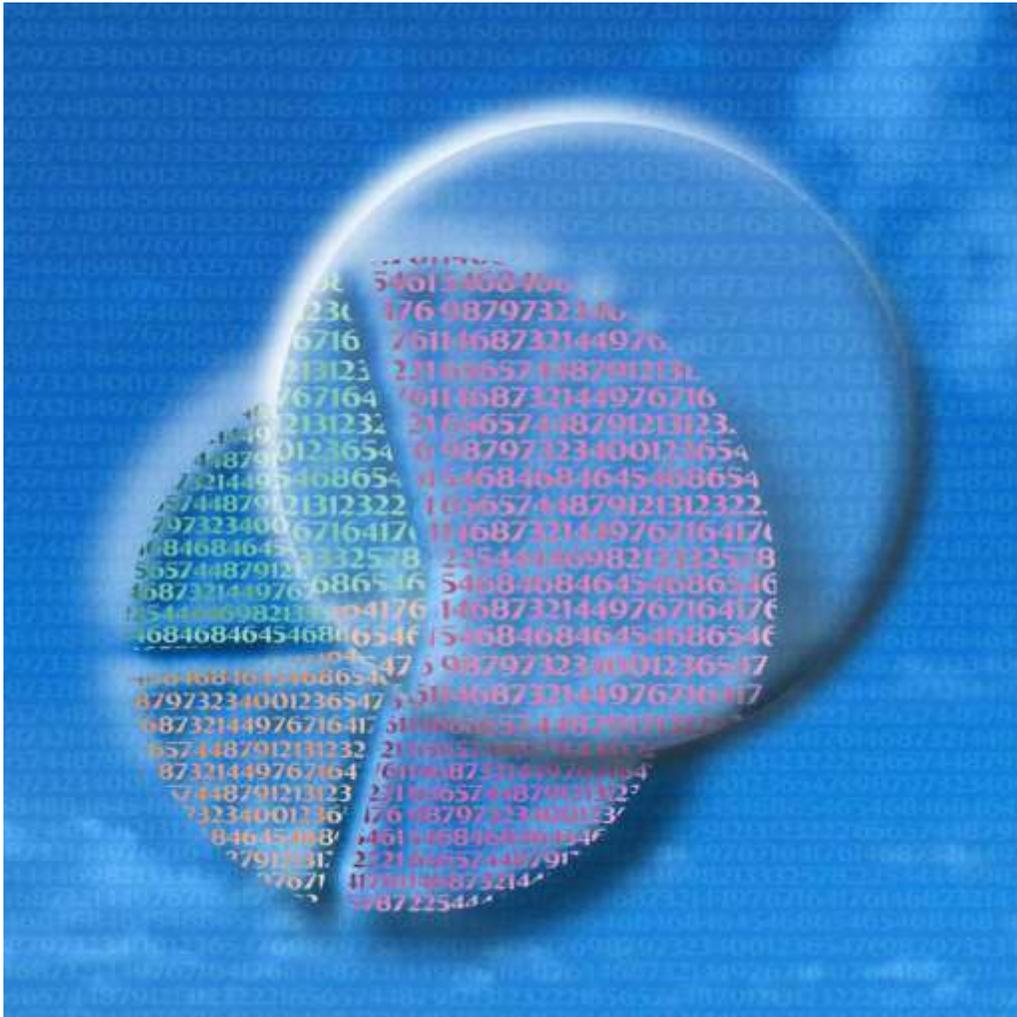


Crisis? What crisis?

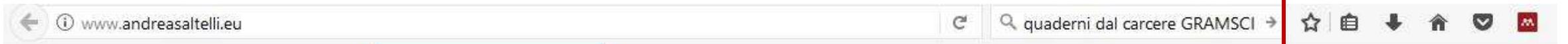
Andrea Saltelli

Centre for the Study of the Sciences and the Humanities (SVT) – University of Bergen (UIB)
& visiting fellow at Open Evidence Research,
Universitat Oberta de Catalunya (UOC), Barcelona

Ciencia, Política, Activismo Y Ciudadanía –
Encuentro de Valencia 2018, June 1st
Instituto Lopez Piñero –



Where to find this talk: www.andreasaltelli.eu



Andrea
Saltelli

HOME

ABOUT ME

PUBLICATIONS

NEWS & VIDEOS

RESOURCES

PRESENTATIONS

OTHER RESOURCES

CAETERIS ARE
NEVER PARIBUS

Tweets by @AndreaSalte

andrea saltelli
@AndreaSaltelli

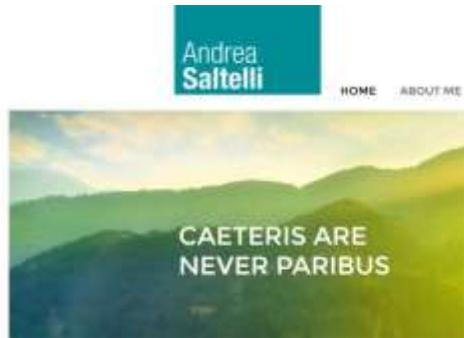
Thoughts on Ioannidis' latest article:
onlinelibrary.wiley.com/doi/10.1111/ec...
theconversation.com/sciences-credi... via
@TC_Africa



Science's credibility crisis: why it will g...
We are observing two new phenomena...
theconversation.com



4h



= more material at www.andreasaltelli.eu

The
Economist

Washington's lawyer surplus
How to do a nuclear deal with Iran
Investment tips from Nobel economists
Junk bonds are back
The meaning of Sachin Tendulkar

OCTOBER 14TH - 21TH 2013

Economist.com

HOW
SCIENCE
GOES
WRONG

On the radar:
October 2013



The Economist

**HOW
SCIENCE
GOES
WRONG.**

Why Most Published Research Findings Are False

2005

John P. A. Ioannidis

... for most study designs and settings, it is more likely for a research claim to be false than true ...



John P. A.
Ioannides

J. P. A. Ioannidis, Why Most Published Research Findings Are False, PLoS Medicine, August 2005, 2(8), 696–701.

Failed replications, entire subfields going bad,
fraudulent peer reviews, predatory publishers,
perverse metrics, statistics on trial, ...

... misleading science advice, institutions on
denial, post-truth, ...

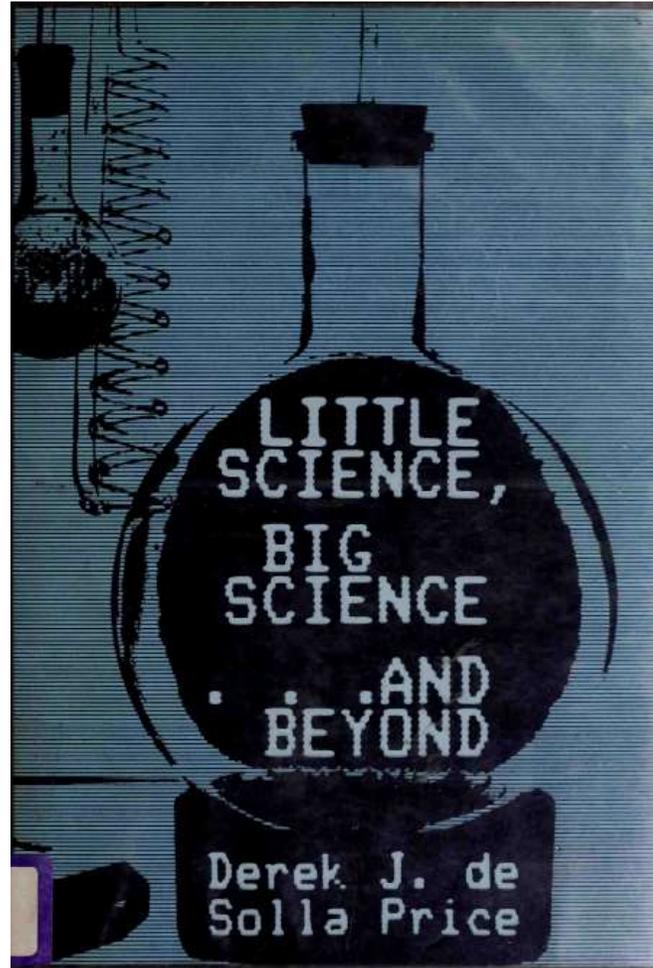
The crisis is methodological, epistemological,
ethical and metaphysical

Scholars who saw it coming

...

and how they were vindicated

In 1963 Derek J. de Solla Price prophesized that Science would reach saturation (and in the worst case senility) under its own weight, victim of its own success and exponential growth (pp 1-32).



Derek J. de Solla Price



de Solla Price, D.J., 1963, Little science big science, Columbia University Press.

~ 1.5 million
articles a year
(2009) over
~ 30,000 journals

newsblog

Nature brings you breaking news from the world of science

NEWS BLOG

Global scientific output doubles every nine years

07 May 2014 | 16:46 GMT | Posted by Richard Van
Noorden | Category: Policy, Publishing

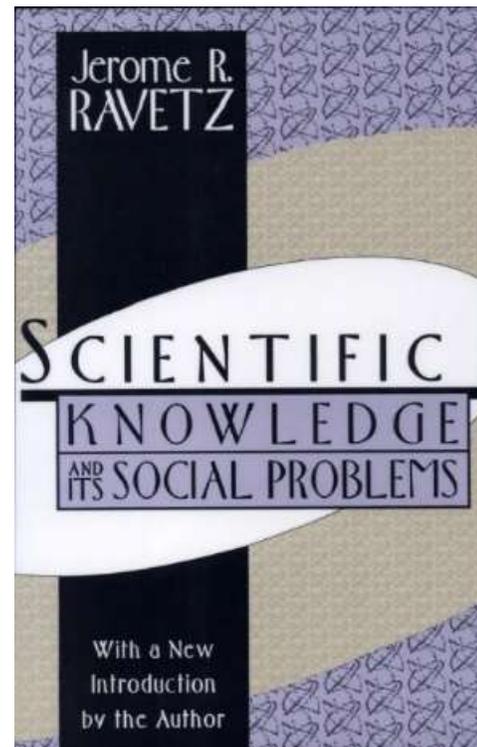
https://www.researchgate.net/publication/229062236_Article_50_million_An_estimate_of_the_number_of_scholarly_articles_in_existence

<http://blogs.nature.com/news/2014/05/global-scientific-output-doubles-every-nine-years.html>

p.22: [...] The problem of quality control in science is thus at the centre of the social problems of the industrialized science of the present period.”



Ravetz, J., 1971, *Scientific Knowledge and its Social Problems*, Oxford University Press.

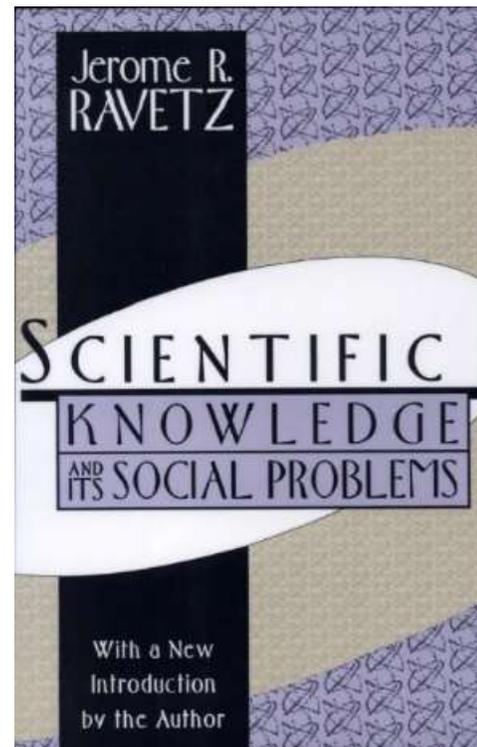


Jerome R.
Ravetz

“If [science] fails to resolve this problem [...] then the immediate consequences for morale and recruitment will be serious; and those for the survival of science itself, grave”



Ravetz, J., 1971, *Scientific Knowledge and its Social Problems*, Oxford University Press.



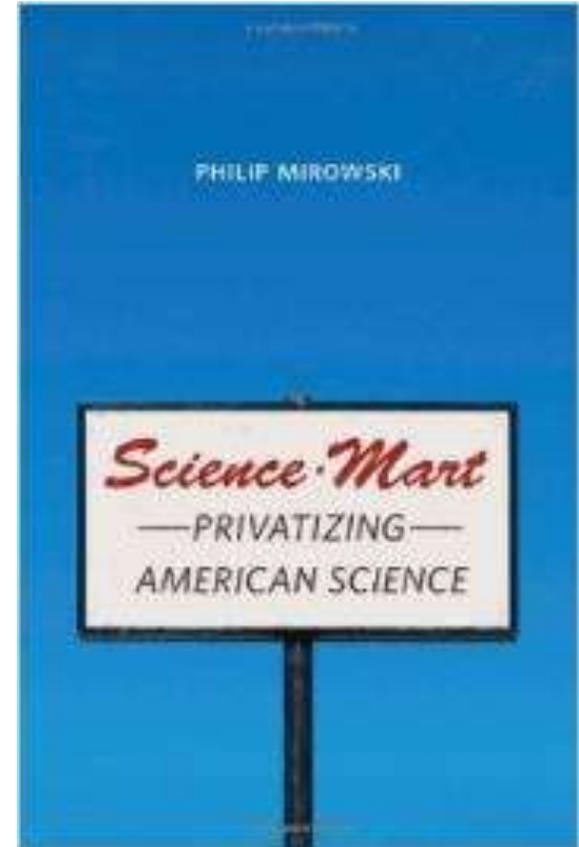
Jerome R.
Ravetz

... neoliberal ideologies decreasing state funding of science, which becomes privatized ...
knowledge as a monetized commodity replaces knowledge as public good ... collapse of quality

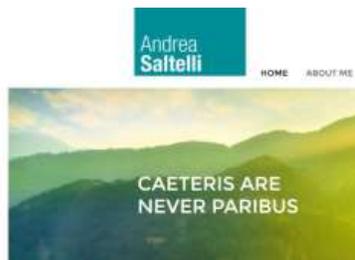


Philip Mirowski

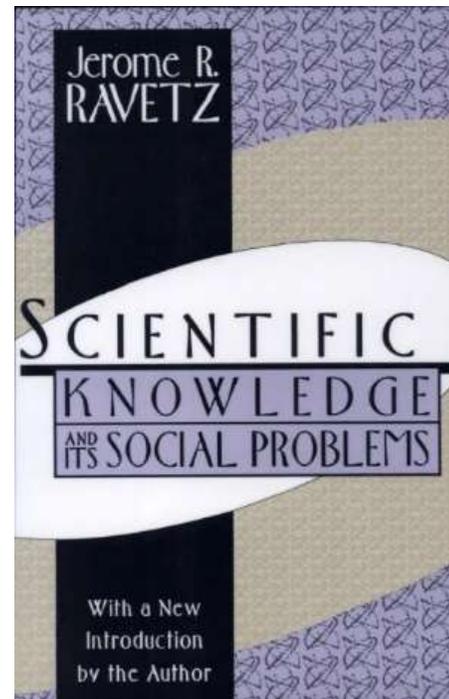
Mirowski, P. 2011. *Science-Mart: Privatizing American Science*, Harvard University Press.



p. 179. For it is possible for a field to be diseased [...] reforming a diseased field is a task of great delicacy [...] not even an apparatus of institutional structures, can do anything to maintain or restore the health of a field in the absence of an essential ethical element operating through the interpersonal channel of communication.



Ravetz, J., 1971, *Scientific Knowledge and its Social Problems*, Oxford University Press.



Jerome R.
Ravetz

 OPEN ACCESS

ESSAY

June 21, 2017

Why Most Clinical Research Is Not Useful

John P. A. Ioannidis 

Published: June 21, 2016 • <https://doi.org/10.1371/journal.pmed.1002049>

THE POWER OF BIAS IN ECONOMICS RESEARCH*

John P. A. Ioannidis, T. D. Stanley and Hristos Doucouliagos

October 27, 2017

Rather than isolated instances
of corruptions now entire fields
of research are found diseased

Bad science reproduces
better than the good sort

ROYAL SOCIETY
OPEN SCIENCE

rsos.royalsocietypublishing.org

Research



CrossMark
click for updates

Cite this article: Smaldino PE, McElreath R.

2016 The natural selection of bad science.

R. Soc. open sci. **3**:160384.

<http://dx.doi.org/10.1098/rsos.160384>

Received: 1 June 2016

Accepted: 17 August 2016

The natural selection of bad science

Paul E. Smaldino¹ and Richard McElreath²

¹Cognitive and Information Sciences, University of California, Merced, CA 95343, USA

²Department of Human Behavior, Ecology, and Culture, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

 PES, 0000-0002-7133-5620; RME, 0000-0002-0387-5377

Poor research design and data analysis encourage false-positive findings. Such poor methods persist despite perennial calls for improvement, suggesting that they result from something more than just misunderstanding. The persistence of poor methods results partly from incentives that favour them, leading to the natural selection of bad science. This dynamic requires no conscious strategizing—no deliberate cheating nor loafing—by scientists, only that publication is a principal factor for

[redacted] As in the real world, successful labs produce more 'progeny,' such that their methods are more often copied and their students are more likely to start labs of their own. Selection for high output leads to poorer methods and increasingly high false discovery rates. [redacted]

[redacted] Improving the quality of research requires change at the institutional level.

Smaldino PE, McElreath R., 2016 The natural selection of bad science. R. Soc. open sci. 3: 160384. <http://dx.doi.org/10.1098/rsos.160384>

Bad science is 'sticky'

Article | **Open Access**  

Do rebuttals affect future science?

Jeannette A. Banobi , Trevor A. Branch, Ray Hilborn

First published: 30 March 2011 | <https://doi.org/10.1890/ES10-00142.1> | Cited by: 13

“We examined seven high-profile original articles and their rebuttals, finding that original articles were cited 17 times more than rebuttals, and that annual citation numbers were unaffected by rebuttals”

Bad science is not confined
to bad scientists or bad
journals

The 1st most cited journal in Psychology



frontiers

in Human Neuroscience



Prestigious Science Journals Struggle to Reach Even Average Reliability

“...an accumulating body of evidence suggests that methodological quality & reliability of published research works in several fields may be decreasing with increasing journal rank” (20 February, 2018)

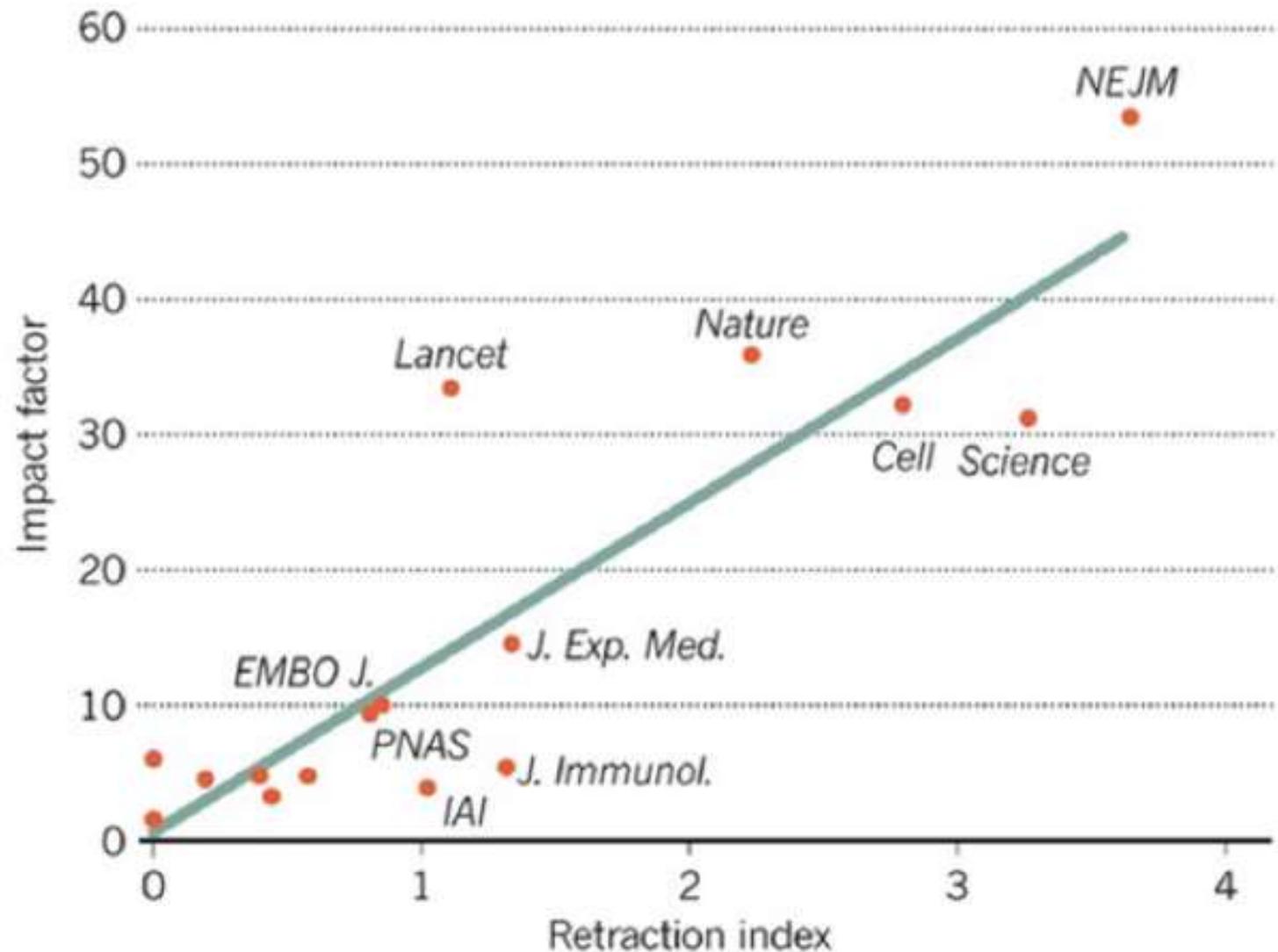


Björn Brembs*

Institute of Zoology—Neurogenetics, Universität Regensburg, Regensburg, Germany

RETRACTION RELATION

Journals with higher impact factors also have a higher rate of retractions.



Fang FC, Casadevall A and Morrison R (2011) Retracted science and the retraction index. *Infection and Immunity* 79(10): 3855–3859

The 'bad' in bad science is
not just methodological



ELSEVIER

Contents lists available at [ScienceDirect](#)

Futures

journal homepage: www.elsevier.com/locate/futures



Original research article

What is wrong with evidence based policy, and how can it be improved?

Andrea Saltelli^{a,b,c,*}, Mario Giampietro^{a,c,d}

Futures 91 (2017) 62–71



ELSEVIER



CrossMark

Journal of Clinical Epidemiology 73 (2016) 82–86

**Journal of
Clinical
Epidemiology**

Evidence-based medicine has been hijacked: a report to David Sackett

John P.A. Ioannidis^{a,b,c,d,*}

Evidence based medicine hijacked to serve corporate agendas. “Under market pressure, clinical medicine has been transformed to finance-based medicine” (Ioannidis, 2016)

Power asymmetries in the framing of issues: those who have the deepest pockets marshal the best evidence; Instrumental use of quantification to obfuscate; (Saltelli and Giampietro, 2017)

Science settled in courts?

Renewable sources
100% of energy in US by
2050

\$10-million lawsuit



Los Angeles Times

A Stanford professor drops his ridiculous defamation lawsuit against his scientific critics

<http://www.latimes.com/business/hiltzik/la-fi-hiltzik-jacobson-lawsuit-20180223-story.html>

Climate change scepticism

World court should rule on climate science to quash sceptics, says Philippe Sands

International Court of Justice ruling would settle the scientific dispute and pave the way for future legal cases on climate change, says high-profile lawyer

Adam Vaughan

@adamvaughan_uk

Friday 18 September 2015 10.34 BST



Shares 1,805
Comments 710

Save for later



Philippe Sands QC says a court ruling would carry more weight with public opinion than science alone. Photograph: Antonio Zazueta Olmos/Antonio Olmos

Pollinators and fisheries

Insects Opinion

Insectageddon: farming is more catastrophic than climate breakdown

George Monbiot

The shocking collapse of insect populations hints at a global ecological meltdown

🐦 @GeorgeMonbiot

Fri 20 Oct 2017 12.11 BST



From science's crisis to
science wars?

A science war against trump, predicted in 2016



January 27, 2017

To tackle the post-truth world, science must reform itself

Andrea Saltelli, *University of Bergen* and Silvio Oscar Funtowicz, *University of Bergen*

Scientists must bear some responsibility for the post-truth era and the current crisis in democracy.



November 16, 2016

Science wars in the age of Donald Trump

Andrea Saltelli, *University of Bergen* and Silvio Oscar Funtowicz, *University of Bergen*

Is the election of Donald Trump going to reignite a futile war between science and anti-science?



What the present science war looks like:

Opinion: Is science really facing a reproducibility crisis, and do we need it to?

Daniele Fanelli

PNAS March 12, 2018. 201708272; published ahead of print March 12, 2018. <https://doi.org/10.1073/pnas.1708272114>



“The new “science is in crisis” narrative is not only empirically unsupported, but also quite obviously counterproductive. Instead of inspiring younger generations to do more and better science, it might foster in them cynicism and indifference. Instead of inviting greater respect for and investment in research, it risks discrediting the value of evidence and feeding antiscientific agendas.”

What the present science war looks like:

Crisis or self-correction: Rethinking media narratives about the well-being of science

Kathleen Hall Jamieson

PNAS March 13, 2018. 115 (11) 2620-2627; published ahead of print March 12, 2018. <https://doi.org/10.1073/pnas.1708276114>



“Because those whose work is prominently cited to certify that science is broken ... are spearheading efforts to solve identified problems, their work is evidence of the resilience of science.”

THE IRREPRODUCIBILITY CRISIS OF MODERN SCIENCE

Causes, Consequences, and the Road to Reform



DAVID RANDALL AND CHRISTOPHER WELSER
NATIONAL ASSOCIATION OF SCHOLARS
APRIL 2018
ISBN: 978-0-9988635-5-5



On the other (conservatives,
corporations) side:

“31. Congress should pass an
expanded Secret Science
Reform Act to prevent
government agencies from
making regulations based on
irreproducible research.
...”



National Association of Scholars

THE GLOBAL WARMING
POLICY FOUNDATION

Director: Dr Benny Peiser



Common Sense on
Climate Change

PEER REVIEW

Why skepticism is essential

Donna Laframboise

Date: 27/10/16 | Global Warming Policy Foundation

On the other (conservatives, corporations) side:

“If half of published, peer-reviewed papers ‘may simply be untrue’, half of the papers cited by the IPCC may also be untrue...”

Where to?

- Reformation
- Collapse
- Techno-split

Fixing science?



John and
Laura
Arnold



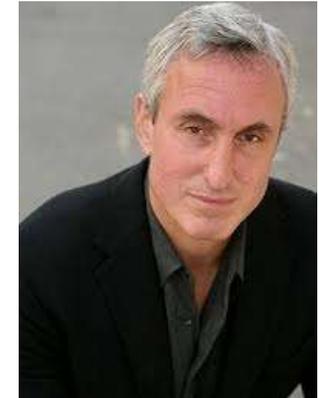
Brian Nosek, the
Reproducibility
Project.



John Ioannidis, Meta-
research innovation
centre at Stanford

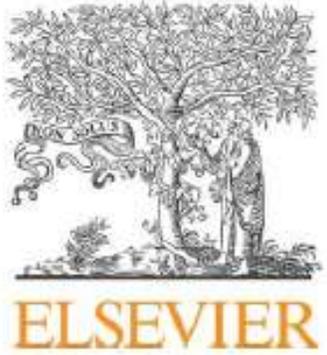


Ben Goldacre,
alltrials.net



Gary Taubes, The
case against sugar

<https://www.wired.com/2017/01/john-arnold-waging-war-on-bad-science/>



Contents lists available at [ScienceDirect](#)

Futures

journal homepage: www.elsevier.com/locate/futures



What is science's crisis really about?

Andrea Saltelli^{a,b,*}, Silvio Funtowicz^a

^a *Centre for the Study of the Sciences and the Humanities (SVT), University of Bergen, Norway*

^b *Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Spain*



END



@andreasaltelli

What happens
when science
looses trust?



BULOS

Ni te fumigan ni quieren provocar sequía: vuelve la conspiración de los 'chemtrails'

- El bulo es tan popular que un eurodiputado español llegó a preguntar por él en el Parlamento Europeo.

f t < 352



PABLO CANTÓ - 2 MAR 2018 - 17:23 CET

EL PAÍS
verne

Italy rebuked for failure to prevent olive-tree tragedy

European Commission reveals widespread delays by the country's authorities to halt spread of deadly plant disease.

Alison Abbott

07 June 2017

nature International weekly journal of science

Home | News & Comment | Research | Careers & Jobs | Current Issue

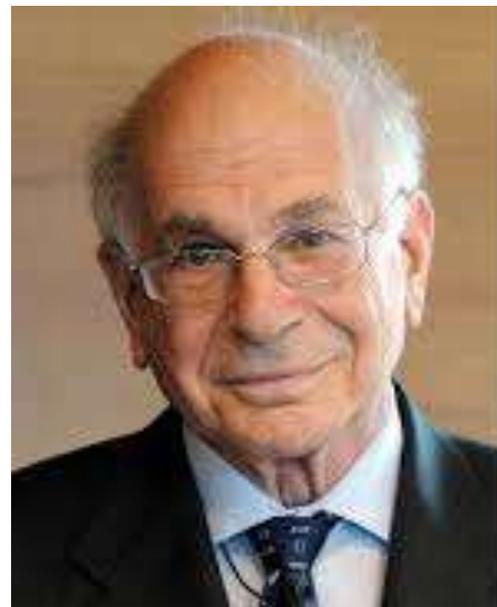
Archive > Volume 546 > Issue 7657 > News > Article

*Xylella
fastidiosa*





Reconstruction of a Train Wreck: How Priming Research Went off the Rails



THINKING,
FAST AND SLOW



DANIEL
KAHNEMAN

WINNER OF THE NOBEL PRIZE IN ECONOMICS

“[...]questions have been raised about the robustness of priming results ... your field is now the poster child for doubts about the integrity of psychological research...”

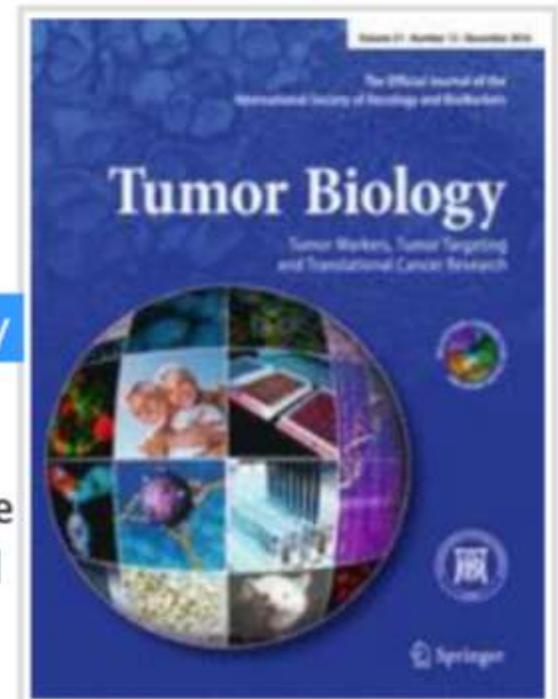
<https://replicationindex.wordpress.com/2017/02/02/reconstruction-of-a-train-wreck-how-priming-research-went-off-the-rails/comment-page-1/>

A new record: Major publisher retracting more than 100 studies from cancer journal over fake peer reviews

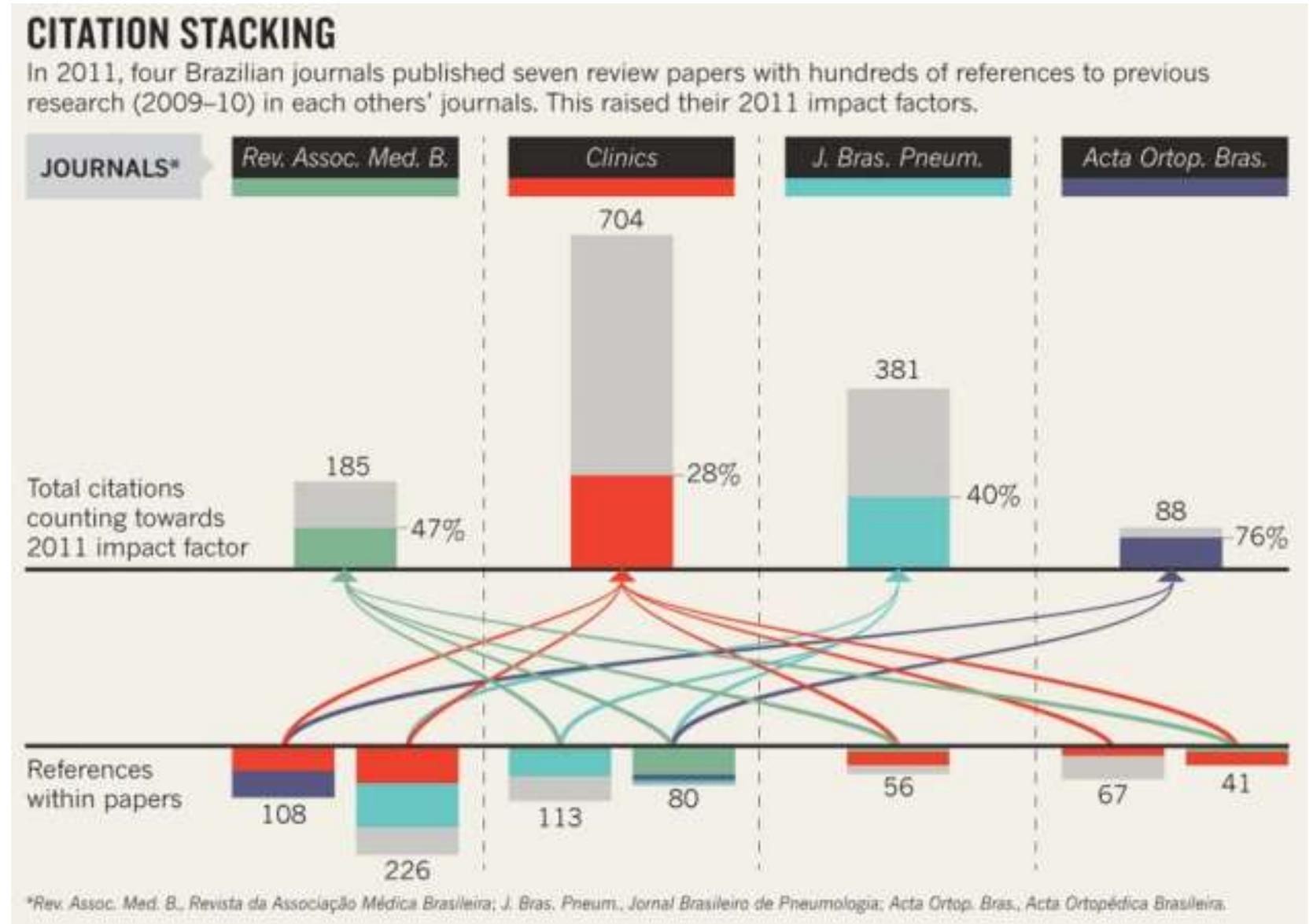
with 11 comments

Springer is [retracting 107 papers](#) from one journal after discovering they had been accepted with fake peer reviews. Yes, 107.

To submit a fake review, someone (often the author of a paper) either makes up an outside expert to review the paper, or suggests a real researcher — and in both cases, provides a fake email address that comes back to someone who will invariably give the paper a glowing review. In this case, Springer, the publisher of *Tumor Biology* through 2016, told us that an investigation produced “clear evidence” the reviews were submitted under the names of real researchers with faked emails. Some of the authors may have used a third-party editing service, which may have supplied the reviews. The [journal is now published by SAGE](#).



Use and abuse of metrics: from self-citation to citation cartels to citation stacking



Richard Van Noorden, 2017, Brazilian citation scheme outed. Thomson Reuters suspends journals from its rankings for 'citation stacking'. Nature, 27 August 2013

JAMA Internal Medicine

Home Current Issue All Issues Online First Collections CME Multimedia

September 12, 2016



Online First >



Special Communication | September 12, 2016



Sugar Industry and Coronary Heart Disease Research



A Historical Analysis of Internal Industry Documents **FREE**



ONLINE FIRST

Cristin E. Kearns, DDS, MBA^{1,2}; Laura A. Schmidt, PhD, MSW, MPH^{1,3,4}; Stanton A. Glantz, PhD^{1,5,6,7,8}

[+] Author Affiliations

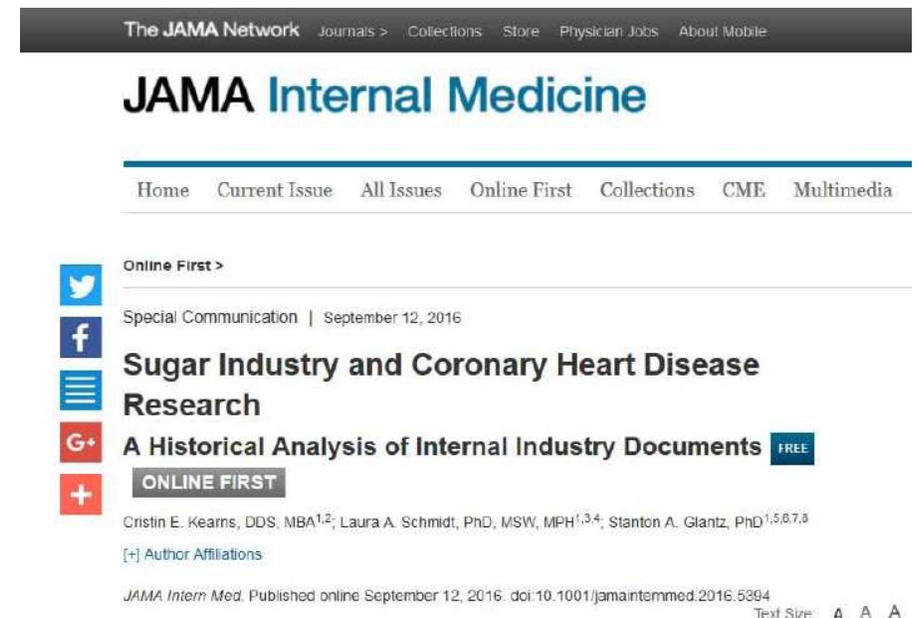
JAMA Intern Med. Published online September 12, 2016. doi:10.1001/jamainternmed.2016.5394

Text Size: **A** A A

See also <https://www.theguardian.com/society/2016/apr/07/the-sugar-conspiracy-robert-lustig-john-yudkin>, and the story of US President Dwight Eisenhower heart attack,...

“our findings suggest the industry sponsored a research program in the 1960s and 1970s that successfully cast doubt about the hazards of sucrose while promoting fat as the dietary culprit in CHD [coronary hearth disease]”

<http://archinte.jamanetwork.com/article.aspx?articleid=2548255>



The screenshot shows the top portion of a JAMA Internal Medicine article page. At the top is a dark navigation bar with the text "The JAMA Network" and links for "Journals >", "Collections", "Store", "Physician Jobs", and "About Mobile". Below this is the "JAMA Internal Medicine" logo. A secondary navigation bar contains links for "Home", "Current Issue", "All Issues", "Online First", "Collections", "CME", and "Multimedia". The main content area begins with "Online First >" and "Special Communication | September 12, 2016". The article title is "Sugar Industry and Coronary Heart Disease Research", followed by the subtitle "A Historical Analysis of Internal Industry Documents" with a "FREE" badge. A "ONLINE FIRST" badge is also present. The authors listed are "Cristin E. Kearns, DDS, MBA^{1,2}; Laura A. Schmidt, PhD, MSW, MPH^{1,3,4}; Stanton A. Glantz, PhD^{1,5,6,7,8}". There is a link for "[+] Author Affiliations". At the bottom, the page number "5394" and the publication information "JAMA Intern Med. Published online September 12, 2016. doi:10.1001/jamainternmed.2016.5394" are visible, along with a "Text Size" option.

But there are reactions ...



SHARE

POLICY FORUM | HISTORY OF SCIENCE

Was there ever really a “sugar conspiracy”?



0



0

David Merritt Johns¹, Gerald M. Oppenheimer^{1,2}

+ See all authors and affiliations

Science 16 Feb 2018:
Vol. 359, Issue 6377, pp. 747-750
DOI: 10.1126/science.aaq1618

<http://science.sciencemag.org/content/359/6377/747>

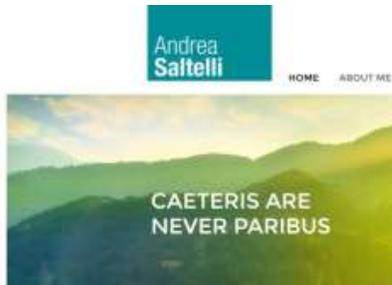
Old and new heroes, while history repeats itself (Love canal, Flint...)



Lois Gibbs



Marc Edwards



http://www.andreasaltelli.eu/file/repository/LOVE_CANAL.pdf
https://en.wikipedia.org/wiki/Flint_water_crisis; <http://flintwaterstudy.org/>;
<http://www.nytimes.com/2016/08/21/magazine/flints-water-crisis-and-the-troublemaker-scientist.html>

Different cultures, different reactions



Yoshiki Sasai 1962 – 2014

<http://www.nature.com/news/stem-cell-pioneer-blamed-media-bashing-in-suicide-note-1.15715>

Different cultures, different reactions



Aaron Swartz, 1986 – 2013

<https://www.rollingstone.com/culture/news/the-brilliant-life-and-tragic-death-of-aaron-swartz-20130215>



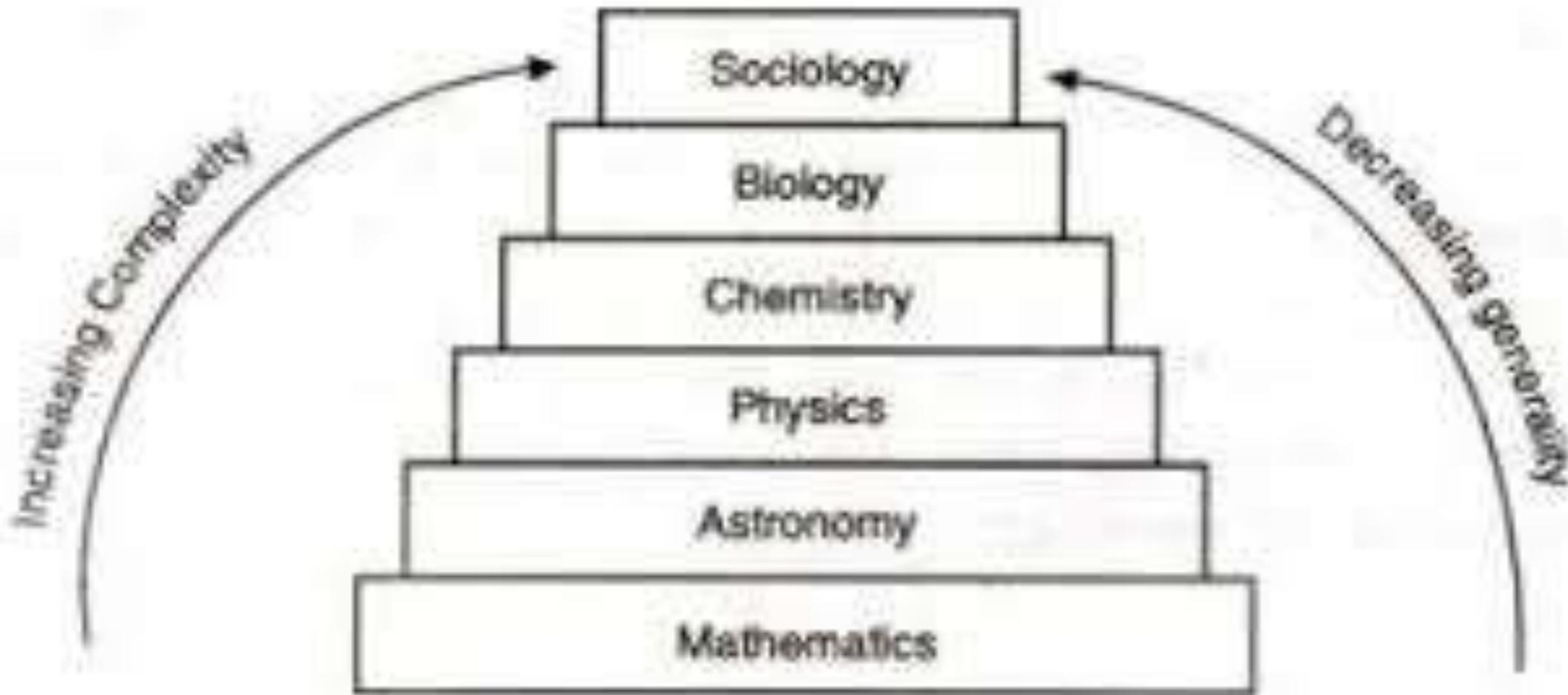
Discussion point of the discussion on the crisis:

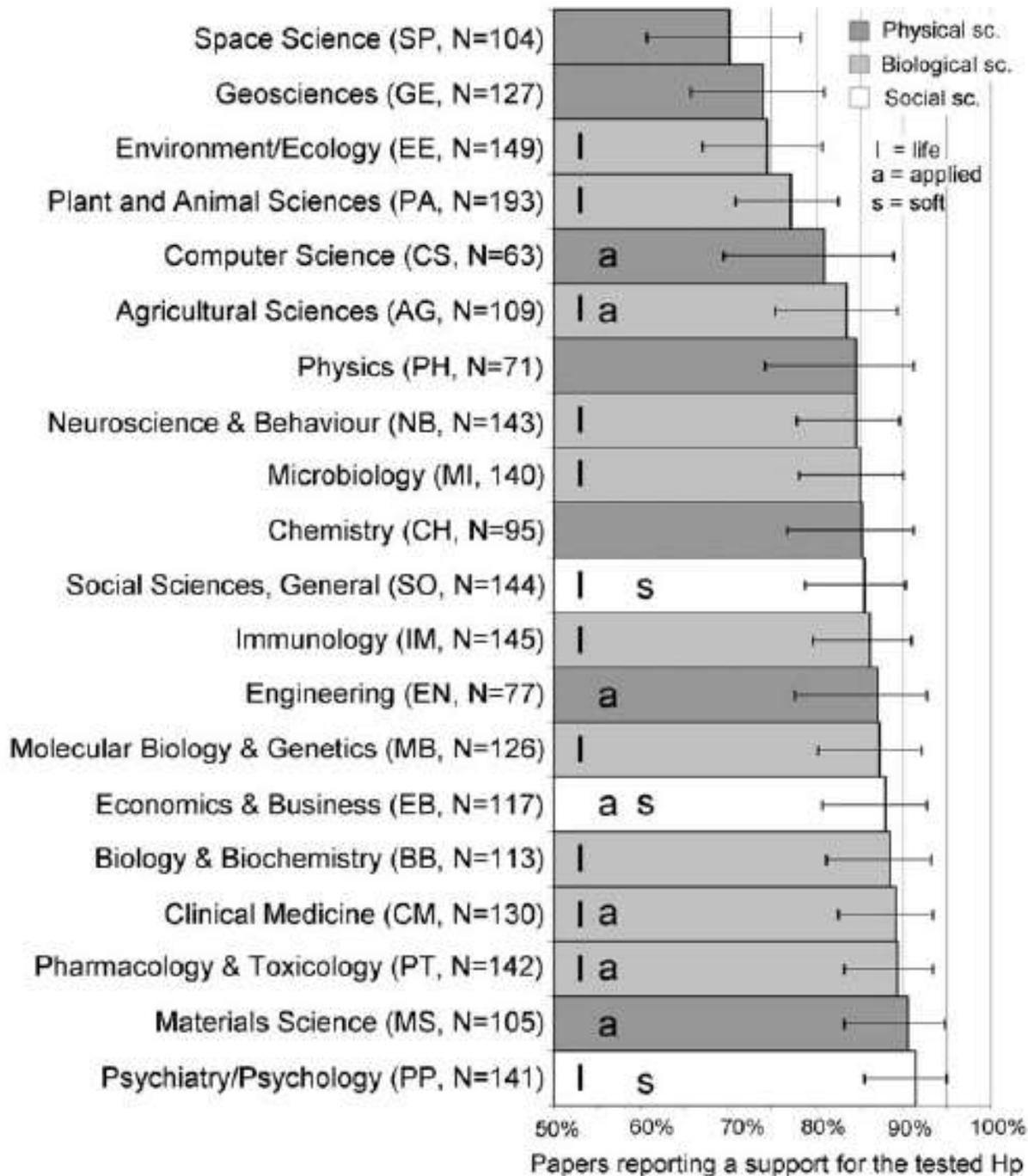
In a quest for a solution what to believe: 'Better incentives' or 'shared commitment'?

Are all disciplines the
same?

August Comte (1798-1857)

Hierarchy of Sciences





“Positive” Results Increase Down the Hierarchy of the Sciences

Daniele Fanelli*

INNOGEN and ISSI-Institute for the Study of Science, Technology & Innovation, The University of Edinburgh, Edinburgh, United Kingdom

“odds of reporting a positive result ~5 times higher among papers in the disciplines of Psychology and Psychiatry and Economics and Business than Space Science”

April 7, 2010

Publish or perish,
Metrics and peer
review

San Francisco Declaration on Research
Assessment (DORA),

The Leiden Manifesto

The Metric Tide

Initiatives calling for a step change in the
culture of metrics use

The Metric Tide



Report of the Independent Review
of the Role of Metrics in Research
Assessment and Management

July 2015

http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/Independentresearch/2015/The,Metric,Tide/2015_metric_tide.pdf

Note: this is part of Research Excellence Framework (REF)

San Francisco declaration, (2012), as of **today** 13/02/2018
signed by 11,740 individuals, and 447 organizations

“Do not use journal-based metrics, such as Journal Impact Factor, as a surrogate measure of the quality of individual research articles to assess an individual scientist’s contributions, or in hiring, promotion, or funding decisions”

Declaration: <http://ascb.org/dora/> , drafted by publishers, with separate recommendations for institutions, publishers, organizations that supply metrics and researchers.

Lancet, Editorial, 2015, Rewarding true inquiry and diligence in research, 385, p. 2121.

Wilsdon, J., 2015, We need a measured approach to metrics, Nature, 523, 129.

See also <http://ethics-and-integrity.net/>

How to Make More Published Research True (Ioannides 2014)

John P. A. Ioannides



“Modifications [] in the reward system for science, affecting the exchange rates for currencies (e.g., publications and grants) and purchased academic goods (e.g., promotion and other academic or administrative power) and introducing currencies that are better aligned with translatable and reproducible research”

Ioannidis, J. P. (2014). How to Make More Published Research True. PLoS medicine, 11(10), e1001747.

The Peer Reviewers' Openness Initiative: incentivizing open research practices through peer review

Richard D. Morey¹, Christopher D. Chambers¹, Peter J. Etchells², Christine R. Harris³, Rink Hoekstra⁴, Daniël Lakens⁵, Stephan Lewandowsky^{6,7}, Candice Coker Morey⁸, Daniel P. Newman⁹, Felix D. Schönbrodt¹⁰, Wolf Vanpaemel¹¹, Eric-Jan Wagenmakers¹² and Rolf A. Zwaan¹³

How peer reviewers might hold the key to making science more transparent

A new initiative published this week outlines how scientists can make a change to open science practices at an individual level



The Peer Reviewers' Openness (PRO) Initiative is a pledge: scientists who sign up to the initiative agree that, from January 1 2017, **will not offer to comprehensively review, or recommend the publication of, any scientific research papers for which the data, materials and analysis code are not publicly available, or for which there is no clear reason as to why these things are not available.**

How peer reviewers might hold the key to making science more transparent

A new initiative published this week outlines how scientists can make a change to open science practices at an individual level



The future(s) of open science

Philip Mirowski 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA

Social Studies of Science

2018, Vol. 48(2) 171–203

© The Author(s) 2018

Reprints and permissions:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/0306312718772086

journals.sagepub.com/home/sss



Abstract

Almost everyone is enthusiastic that ‘open science’ is the wave of the future. Yet when one looks seriously at the flaws in modern science that the movement proposes to remedy, the prospect for improvement in at least four areas are unimpressive. This suggests that the agenda is effectively to re-engineer science along the lines of platform capitalism, under the misleading banner of opening up science to the masses.

···crises of modern science were brought about by neoliberal initiatives in the first place. First off, it was neoliberal think tanks that first stoked the fires of science distrust amongst the populace that have led to the current predicament [tobacco, climate]

It was neoliberals who provided the justification for the strengthening of intellectual property;

it was neoliberals who drove a wedge between state funding of research and state provision of findings of universities for the public good;

it was neoliberal administrators who began to fragment the university into 'cash cows' and loss leader disciplines;

it was neoliberal corporate officers who sought to wrest clinical trials away from academic health centers and towards contract research organizations to better control the disclosure or nondisclosure of the data generated.

Discussion points of the discussion on publishing, peer reviewing, metrics:



Would you subscribe to pledges such as e.g. not to review certain papers or not to publish in certain journals?

Contradictions between integrity and publish or perish?

The last word to the
post moderns

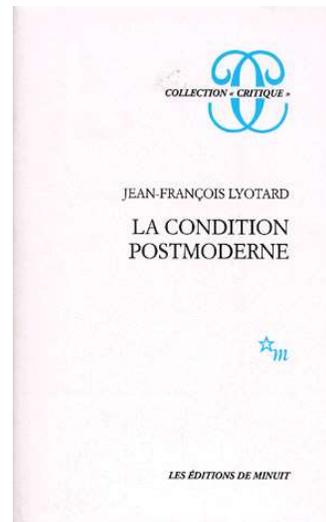
“The question of the legitimacy of science has been indissociably linked to that of the legitimation of the legislator since the time of Plato.



Jean-François
Lyotard

Lyotard, J.-F. 1979. La Condition postmoderne. Rapport sur le savoir, Paris : Minuit.

From this point of view, the right to decide what is true is not independent of the right to decide what is just, [...] there is a strict interlinkage between the kind of language called science and the kind called ethics and politics ...”

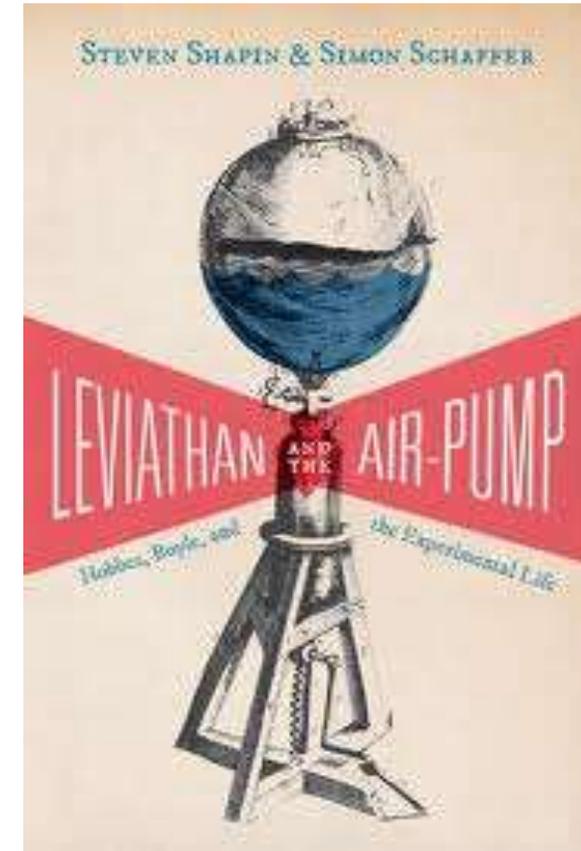


Jean-François
Lyotard

Lyotard, J.-F. 1979. La Condition postmoderne. Rapport sur le savoir, Paris : Minuit.

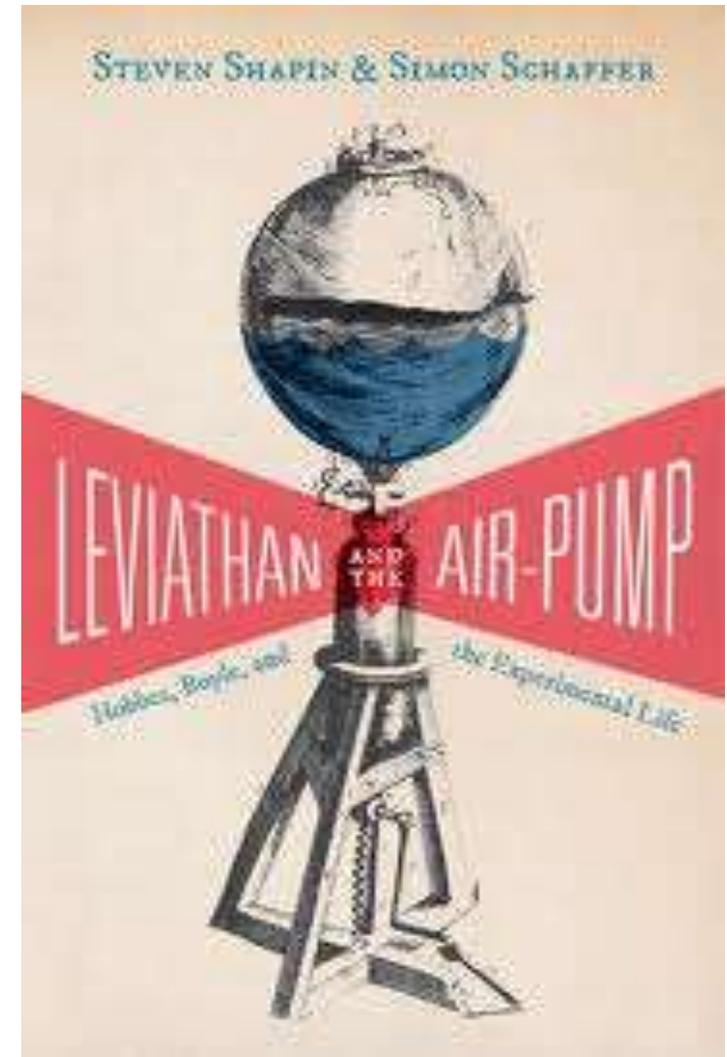
“Solutions to the problem of knowledge are solutions to the problem of social order.

[...] Trust in Science and trust in the prevailing social order are linked.”



Shapin, S., Schaffer, S., 1985, Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life, Princeton, 2011 Edition

Establishing ‘matter of facts’
under controlled ‘laboratory’
experiments before witnesses
as a way to subtract the
discourse about knowledge
from religious squabbles ...

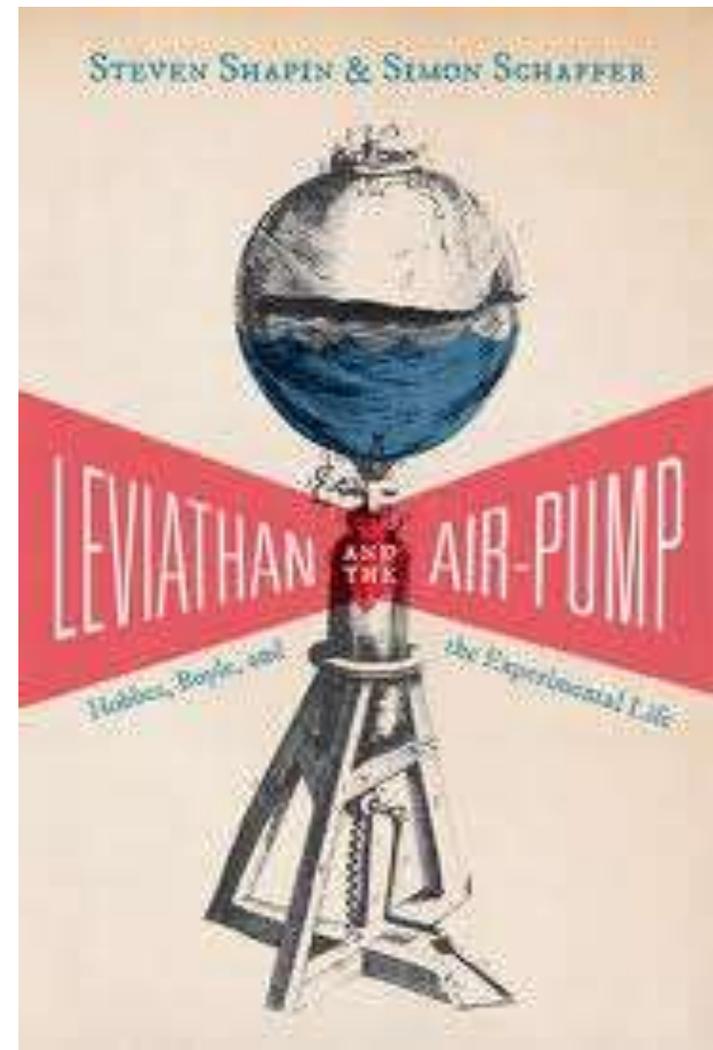


Shapin, S., Schaffer, S., 1985, Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life, Princeton, 2011 Edition

Shapin and Schaffer's book inspired Bruno Latour's 'Nous n'avons jamais été modernes', 1991, and was 'hot' during the 'science wars'.



Bruno Latour



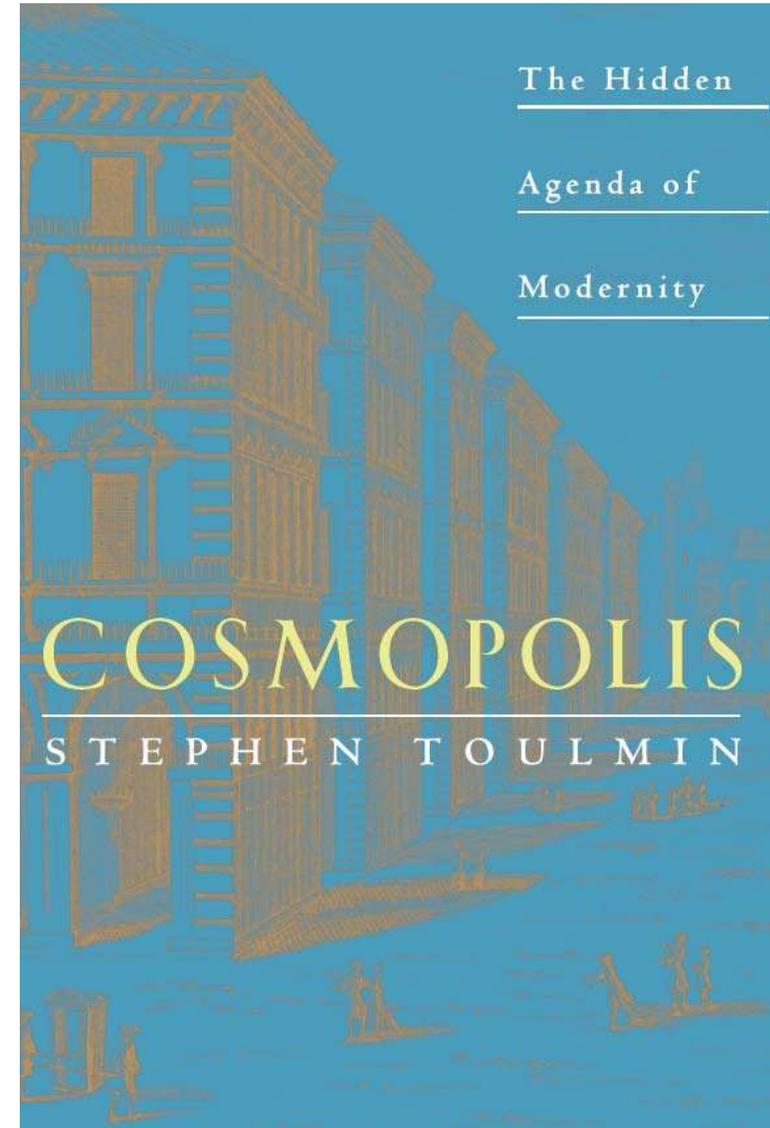
Latour, B., 1991, *Nous n'avons jamais été modernes*, Editions La découverte, 1993; *We Have Never Been Modern*. Cambridge, Harvard UP.

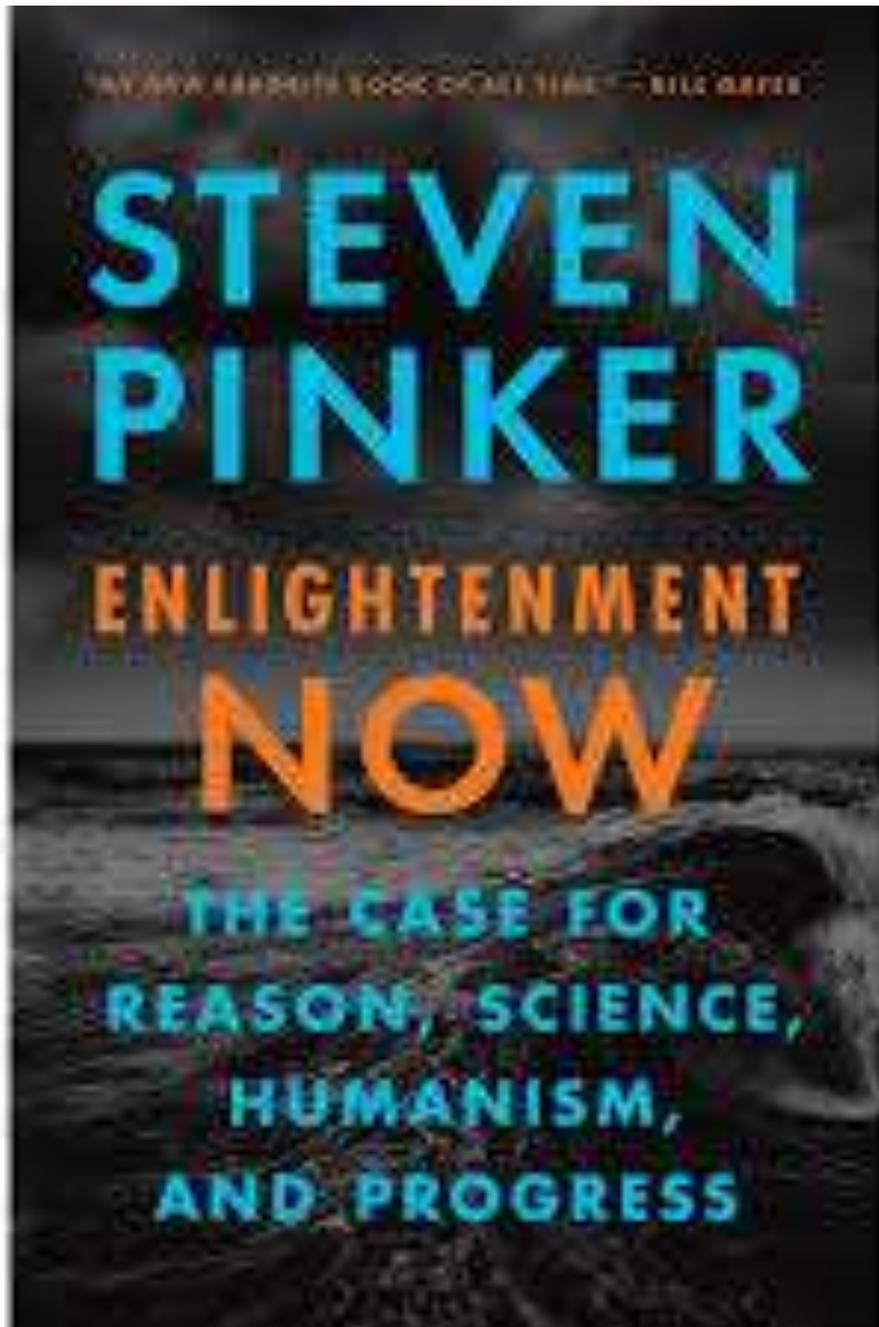
Stephen Toulmin: Modernity as a counter-Renaissance; Descartes versus Montaigne; the delusion of a Newtonian view of society



Stephen Toulmin

Stephen Toulmin, 1990, *Cosmopolis: The Hidden Agenda of Modernity*, The University of Chicago Press





“a monumental apologia for a currently fashionable version of Enlightenment thinking”
(John Gray, New Statesman)

<https://www.newstatesman.com/culture/books/2018/02/unenlightened-thinking-steven-pinker-s-embarrassing-new-book-feeble-sermon>

See also Gunnar Skirbekk’s idea of half-modern

More reading



THE RIGHTFUL
PLACE OF SCIENCE:
**SCIENCE ON THE
VERGE**

CONTRIBUTORS

Alice Benessia	Jerome R. Ravetz
Silvio Funtowicz	Andrea Saltelli
Mario Giampietro	Roger Strand
Ângela Guimarães Pereira	Jeroen P. van der Sluijs



See a review by
Deepanwita Dasgupta
(2017) in *International
Studies in the Philosophy
of Science*, 31:1, 108–110.

