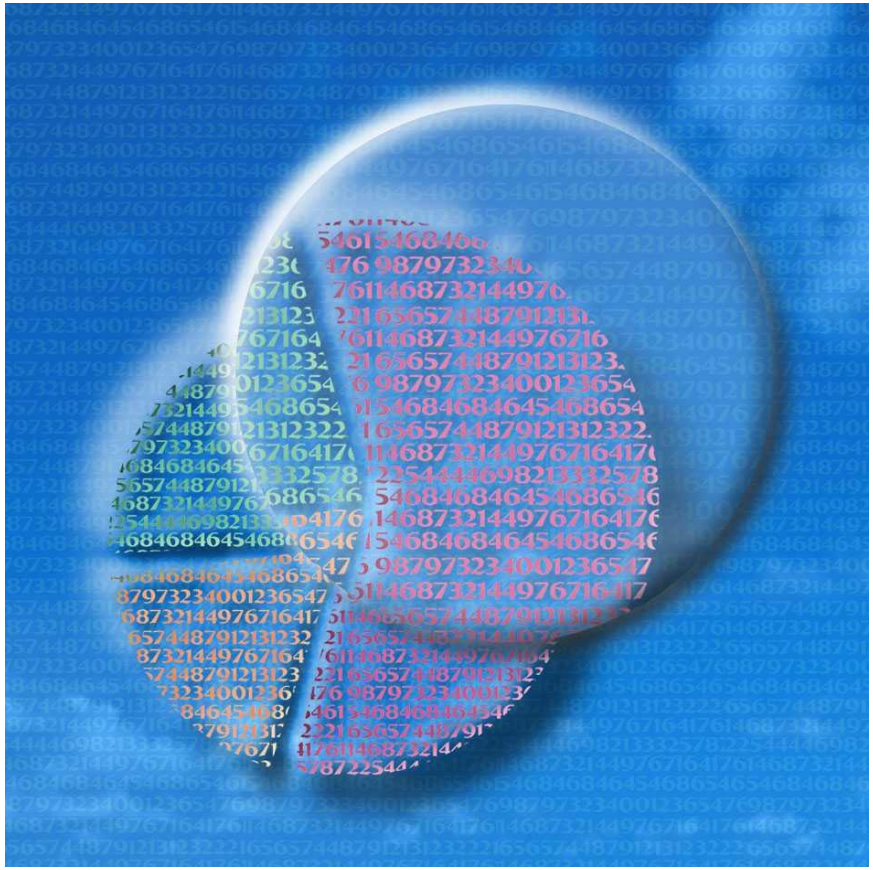

Science for policy at times of crises

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19-20 November 2015

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Policy advice impacted by concurrent crises: crisis of citizens' trust in institutions, crisis of science's own practice and governance (reproducibility);

Concerned institutions discount the severity of the crises and their interconnectedness.

Guimarães Pereira, Â., and Funtowicz, S., Eds., 2015, The end of the Cartesian dream, Routledge's series: Explorations in Sustainability and Governance.

Saltelli, A., and Giampietro, M., 2015, What is wrong with evidence based policy? Draft, Submitted for a special issue
on FUTURES, August 2015.
http://www.andreasaltelli.eu/file/repository/FUTURES_Saltelli_Giampietro_3.pdf

Rommetveit K Strand R Fjelland R & Funtowicz S, 2013 What can history teach us about the prospects of a European Research Area? Study procured by the Joint Research Centre EUR report 2612 (http://wwwuibno/sites/w3uibno/files/attachments/histera_final_report_25_2pdf)

See also: The Rightful Place of Science: Science on the verge, An anthology by Alice Benessia, Mario Giampietro, Silvio Funtowicz, Jerome Ravetz, Angela Pereira, Andrea Saltelli, Roger Strand, Jeroen P. van der Sluijs, with a preface of Dan Sarewitz, Published by the Consortium for Science, Policy and Outcomes at Arizona State University, to appear winter 2015.

Ravetz, J. R. and Saltelli, A., 2015b. "Policy: The future of public trust in science", Nature, 524: p. 161.

Trust

“the great ideas which once inspired Europe seem to have lost their attraction, only to be replaced by the bureaucratic technicalities of its institutions.”

“As the European Union has expanded, there has been growing mistrust on the part of citizens towards institutions considered to be aloof, engaged in laying down rules perceived as insensitive to individual peoples, if not downright harmful” (Strasbourg, November 25, 2014)

http://en.radiovaticana.va/news/2014/11/25/pope_francis_address_to_european_parliament/1112318

For Helga Nowotny, former head of the ERC, scientists are losing public trust by 'overselling' research.

… not due to deliberate deception, but because scientists have "internalised" the demands for certainty from research councils, who are in turn responding to the expectations of government and the public.

Helga Nowotny

Matthews, D., 2015, Helga Nowotny: scientists are losing public trust by 'overselling' research, Times Higher Education, https://www.timeshighereducation.com/news/helga-nowotny-scientists-are-losing-public-trust-overselling-research

“Is industry funding undermining trust in science? How valid are fears that financial conflicts of interest are damaging confidence in academic research? […] In economics, medicine, energy and a host of other subjects, there are fears that financial conflicts of interest give the impression that academic findings are up for sale.”

Matthews, D., 2015, Is industry funding undermining trust in science?, Times Higher Education,

https://www.timeshighereducation.com/features/is-industry-funding-undermining-trust-in-science

Film Inside Job. Interview with Frederic Mishkin, a banking professor at Columbia University, praising Iceland's "strong" banking regulation system two year before it went bust, 'uninfluenced' by the $124,000 received by the Icelandic Chamber of Commerce.

Frederic Mishkin at Columbia

After the bust he changed in his CV the title of his report from 'Financial Stability in Iceland' to 'Financial Instability in Iceland'.

Campaign for Accountability's ("CfA") new report, **Academic Deception**, reveals how a payday lending industry trade association paid for and edited a controversial academic paper claiming that payday loans do not leave consumers trapped in cycles of debt.

"Internal Arkansas Tech University documents reveal a close working relationship between the payday lending industry and the author of a key academic paper. The Consumer Credit Research Foundation (CCRF), an industry trade group, paid a professor at the Arkansas Tech University College of Business, nearly $40,000 to produce the study, and CCRF's chairman edited the study and directed the professor to remove negative information. Unsurprisingly, the paper concluded payday loans are not responsible for a "cycle of debt," an important industry talking point."

https://www.scribd.com/doc/288230891/Academic-Deception

“medical paradigms found, then lost, then regained, then placed in a kind of scientific limbo occur in the field of nutrition”

- dietary cholesterol and
- trans-fats
- caffeine
- wine
- sugar-
- gluten.

Barash, D.P., 2015, Paradigm Lost, AEON, http://aeon.co/magazine/science/why-scientific-paradigms-keep-changing/

Ancel Keys ‘seven nations’ study showed a correlation between a diet with animal fats and heart disease. Soon flaws emerged, but it was already entrenched with the major charities and the medical profession.

“About a half-century elapsed before the situation was corrected, […] there is little doubt that the focus on fat combined with the ignoring of sugar had indeed claimed thousands of victims. Nutrition, always a controversial science, was further damaged.” (Ravetz, 2015, work in progress)

A commentator notes recently: “Mistrust of medical science is not merely the product of ignorance” (Evans, 2015).

Evans, R.J., 2015, Mistrust of medical science is not merely the product of ignorance, www.opendemocracy.net /, October 23.

Haiti cholera outbreak

How about forensic science?

“FBI admits flaws in hair analysis over decades” [1]

“some crime labs are paid not by the case but by the conviction, creating a strong incentive to produce incriminating evidence” [2]

[1] HSU, S.S., 2015, FBI admits flaws in hair analysis over decades, Washington Post, April 18.
[2] Nathan J. R., 2015, Forensic Pseudoscience. The Unheralded Crisis of Criminal Justice, The Boston Review, November 16, 2015, quoting inter alia a major report in 2009 by the National Academy of Sciences (NAS)

Controversy

More controversy – wicked issues

More and more issues become ‘wicked’ , meaning by this deeply entangled in a web of hardly separable facts, interests and values… (GMO, climate, the use of statistics in Education (PISA), bees and pesticides, children born to gay couples, culling of badgers, …)

Crises

“Science still commands enormous—if sometimes bemused—respect. But its privileged status is founded on the capacity to be right most of the time and to correct its mistakes when it gets things wrong. […] The false trails laid down by shoddy research are an unforgivable barrier to understanding”

Issues with trust / quality in the scientific enterprise

Laboratory experiments cannot be trusted without independent verification (Sanderson 2013), rules are proposed to spot "suspected work […in] the majority of preclinical cancer papers in top tier journals" (Begley 2013).

Begley CG 2013 Reproducibility: Six red flags for suspect work Nature 497 433–434.

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

Sanderson K 2013 Bloggers put chemical reactions through the replication mill Nature 21 January 2013.

Issues with trust / quality in the scientific enterprise

In a landmark study of results in cancer science Begley and Ellis were able to reproduce only 11 per cent of the original findings (2012).

Begley, C. G., and Lee M. E., 2012, Drug Development: Raise Standards for Preclinical Cancer Research, Nature, 483, 531–533.

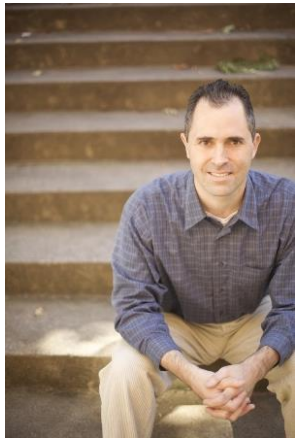
“Shoddy science” is not confined to natural sciences: social sciences are also affected; “I see a train wreck looming” warns Daniel Kahneman; Joseph Stiglitz condemns perverse incentives in the modelling of financial products at the hearth of the present crisis.

Daniel Kahneman

Joseph Stiglitz

Yong, E., Nobel laureate challenges psychologists to clean up their act, Nature, News, 03 October 2012.
Stiglitz, J. (2010) Freefall, Free Markets and the Sinking of the Global Economy, Penguin, London.

Another landmark effort to reproduce the findings of 100 recent papers in psychology failed in more than half the cases – and the effects were smaller (Brian Nosek's work).



Brian Nosek
Professor,
Department of
Psychology
University of Virginia

Baker, M., 2015, Over half of psychology studies fail reproducibility test. Largest replication study to date casts doubt on many published positive results, Nature, 27 August 2015.

OSC, Open Science Collaboration, 2015, Estimating the reproducibility of psychological science, SCIENCE, 349(6251) aac4716. DOI: 10.1126/science.aac4716

Issues with trust / quality in the scientific enterprise

Initiatives:
http://retractionwatch.wordpress.com
http://www.reproducibilityinitiative.org

Fixing the mess is not easy:
'Sluggish data sharing hampers reproducibility effort',
(Van Noorden, 2015).

Nature biotechnology. Further Confirmation Needed, Editorial, Nature Biotechnology 30, 2012, 806.

Van Noorden, R., Sluggish data sharing hampers reproducibility effort, Nature, News, June 3rd 2015.

Begley, C.G., Buchan A.M., and Dirnagl, U., 2015, Institutions must do their part for reproducibility, Nature, 525, p. 25-27.

The New York Times

‘Scientists Who Cheat’

nature

Misplaced faith.

The public trusts scientists much more than scientists think. But should it?’

New York Times, 2015, Scientists Who Cheat, Editorial, June 1.
Nature, 2015, Misplaced faith, Editorial, June 2. The public trusts scientists much more than scientists think. But should it?

.

“Currently, many published research findings are false or exaggerated, and an estimated 85% of research resources are wasted”

For Lancet (2015) an estimated US$200 billion were wasted in the US in 2010.

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

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

Brave efforts from within:

Jeffrey Beall, librarian, University of Colorado, Denver. Monitors predatory open access publishers.

http://scholarlyoa.com/2015/01/02/bealls-list-of-predatory-publishers-2015/#more-4719.

"**Misleading metrics** list includes companies that "calculate" and publish counterfeit impact factors [...] The **Hijacked journals** list includes journals for which someone has created a counterfeit website, stealing the journal's identity and soliciting articles submissions using the author-pays model (gold open-access)"

Brave efforts from within:

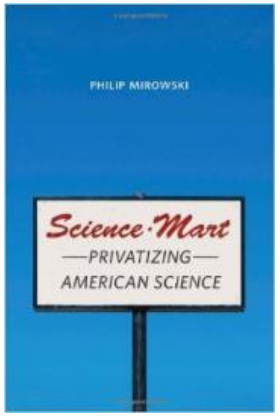
Timothy Gowers, mathematician, Fields medalist, boycott of Elsevier, slogans: ‘Academic Spring’, ‘Occupy Elsevier’.

Whitfield, J., 2012, Elsevier boycott gathers pace: Rebel academics ponder how to break free of commercial publishers, Nature, doi:10.1038/nature.2012.10010

Larivière V, Haustein S, Mongeon P (2015) The Oligopoly of Academic Publishers in the Digital Era. PLoS ONE 10(6): e0127502, http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0127502

After the eighties neoliberal ideologies succeeded in decreasing state intervention in the funding of science, which became increasingly privatized... …Knowledge as a monetized commodity replaces knowledge as public good...

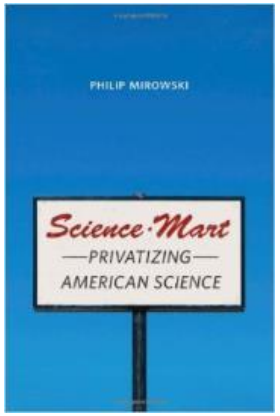
Mirowski, P. 2011. Science-Mart: Privatizing American Science, Harvard University Press.



Philip Mirowski

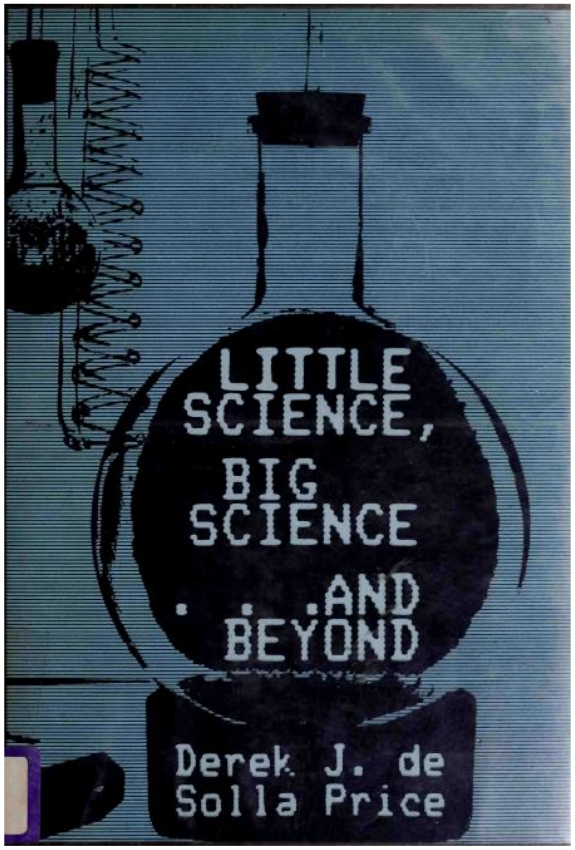
In house science labs of major corporation were closed and research outsourced to universities which … became more and more looking as profit seeking organization (technology transfer offices in every campus) … then research ended up outsourced again to contract-based research organizations (CRO's)…

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



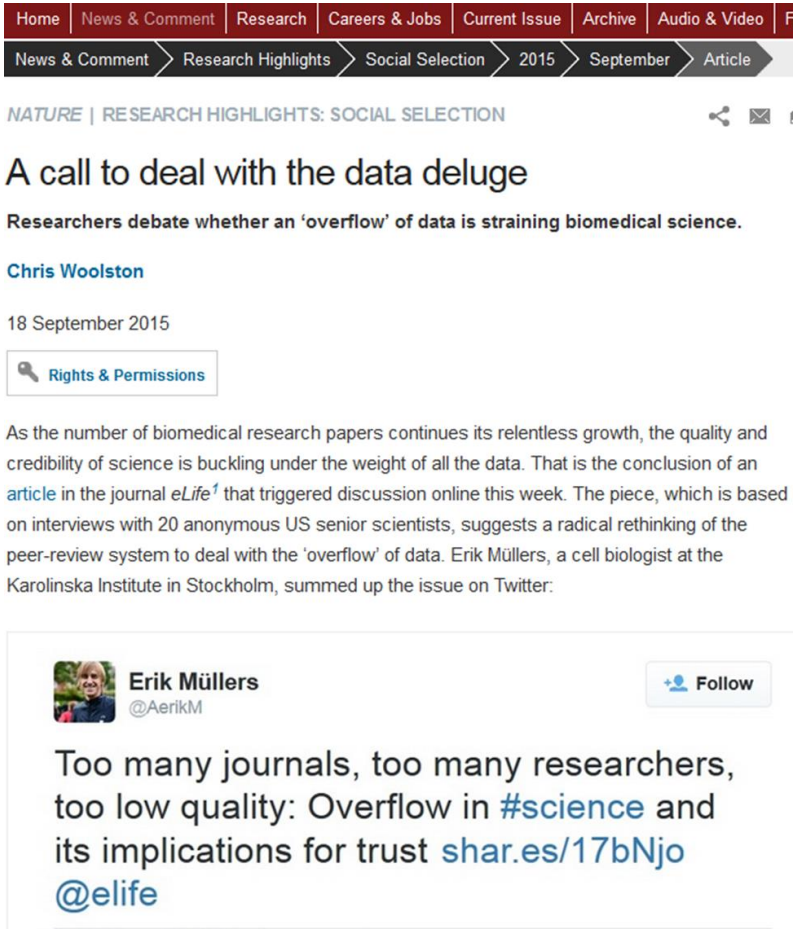
Philip Mirowski

There were rare anticipations of this crisis. 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.



Derek J. de Solla Price's prophecy ...

Siebert, S., Machesky, L. M., and Insall, R. H. (2015) Overflow in science and its implications for trust. eLife, 4, e10825. (doi:10.7554/eLife.10825)

Abstract

To explore increasing concerns about scientific misconduct and data irreproducibility in some areas of science, we interviewed a number of senior biomedical researchers. These interviews revealed a perceived decline in trust in the scientific enterprise, in large part because the quantity of new data exceeds the field's ability to process it appropriately. This phenomenon—which is termed 'overflow' in social science—has important implications for the integrity of modern biomedical science.

Siebert, S., Machesky, L. M., and Insall, R. H. (2015) Overflow in science and its implications for trust. eLife, 4, e10825. (doi:10.7554/eLife.10825)

“Springer and Université Joseph Fourier release SciDetect to discover fake scientific papers”

“The open source software discovers text that has been generated with the SCIgen computer program and other fake-paper generators like Mathgen and Physgen […]

SciDetect […] is a valuable building block for the future of academic publishing”

https://www.springer.com/gp/about-springer/media/press-releases/corporate/springer-and-universit%C3%A9-joseph-fourier-release-scidetect-to-discover-fake-scientific-papers--/54166

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So far a about science's own governance crisis;

how about science for policy and science's advice?

Do institutions chose to ignore the connection between science's crisis and science advice?

The OECD report on Science Advice 2015; not a single mention of science's crisis. Only 'crisis situations' ignoring that science itself is into one.

http://www.oecd-ilibrary.org/docserver/download/5js33l1jcpwb.pdf?expires=1442656356&id=id&accname=guest&checksum=AF1467AD25FF8BE6516083077CCEE31A

OECD publishing

Please cite this paper as:

OECD (2015), "Scientific Advice for Policy Making: The Role and Responsibility of Expert Bodies and Individual Scientists", *OECD Science, Technology and Industry Policy Papers*, No. 21, OECD Publishing, Paris.
http://dx.doi.org/10.1787/5js33l1jcpwb-en

OECD Science, Technology and Industry Policy Papers No. 21

Scientific Advice for Policy Making

THE ROLE AND RESPONSIBILITY OF EXPERT BODIES AND INDIVIDUAL SCIENTISTS

OECD

Those aspect of science most used in policy (mathematical and statistical modelling) are also those more problematic.

Sarewitz, D., 2015, Reproducibility will not cure what ails science, Nature, 525, p. 159.

Saltelli, A. and Funtowicz, S., 2014, When all models are wrong: More stringent quality criteria are needed for models used at the science-policy interface, Issues in Science and Technology, vol. winter, pp. 79-85.

Leek J.T., and Peng, R.D., 2015, P values are just the tip of the iceberg, Nature, 520, p. 612.

“The notion that science can be used to reconcile political disputes is fundamentally flawed.”

The example of contested 2000 presidential election between George W. Bush and Al Gore.

“How science makes environmental controversies worse”

Daniel Sarewitz, Arizona State University

Sarewitz, D., 2004, How science makes environmental controversies worse, Environmental Science & Policy 7 (2004) 385–403.

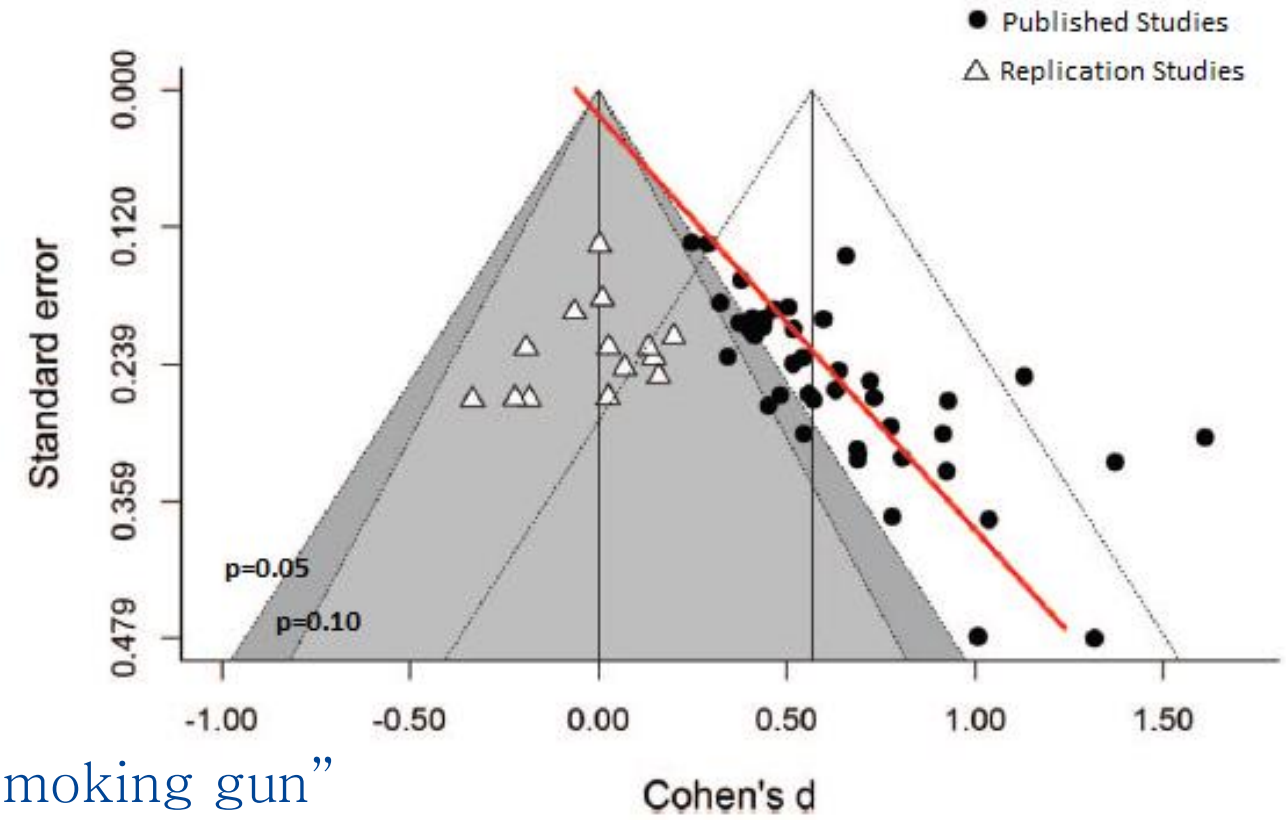
Sarewitz, D., 2006, Liberating Science from Politics, American Scientist, 94(2) 104–107.

[there is] a profound misunderstanding of the relation between science and politics. The idea that a set of scientific facts can reconcile political differences and point the way toward a rational solution is fundamentally flawed. The reality is that when political controversy exists, the scientific enterprise is ideally suited to exacerbating disagreement, rather than resolving it.'

Sarewitz, D., 2006, Liberating Science from Politics, American Scientist, 94(2) 104-107.

“Growing concerns about the quality of published scientific results have often singled out bad statistical practices and modelling assumptions, and have typically focused on the very types of science that often underlie regulations […]”.

Sarewitz, D., 2015, Reproducibility will not cure what ails science, Nature, 525, p. 159.



"P-hacking's smoking gun"

Shanks et al. (2015) JEP:General

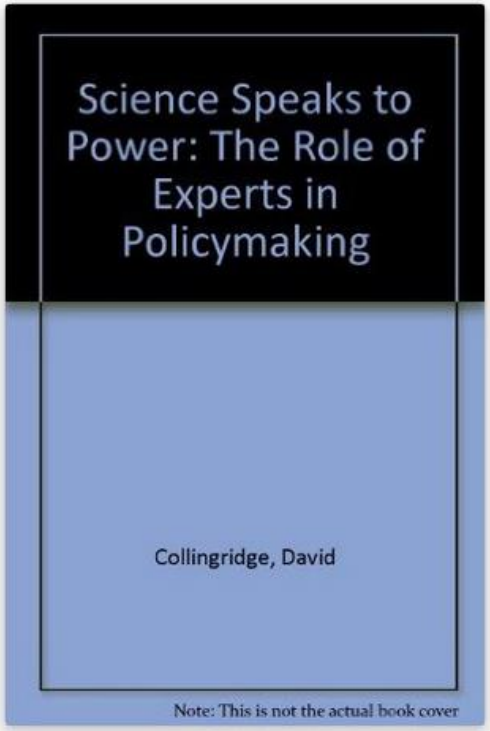
Shanks DR, Vadillo MA, Riedel B, Clymo A, Govind S, Hickin N, Tamman AJ, Puhlmann LM., 2015. "Romance, Risk, and Replication: Can Consumer Choices and Risk-Taking Be Primed by Mating Motives?", Journal of Experimental Psychology: General, [Epub ahead of print] 2015 Oct 26, http://www.ncbi.nlm.nih.gov/pubmed/26501730

We must accept the persistence in our modernity of what Collingridge and Reeve (1986) call the twin myths of rationality (policy action is predicated on the accumulation of facts and the taming of uncertainty) and the power of science (whereby science is there to provide dispassionate facts to adjudicate controversies).

Collingridge, D. and Reeve, C., 1986, Science Speaks to Power: The Role of Experts in Policy Making. London: Frances Pinter.

Collingridge and Reeve advocate as model for policy decision one of least dependence on science.

Collingridge, D. and Reeve, C., 1986, Science Speaks to Power: The Role of Experts in Policy Making. London: Frances Pinter.



Science Speaks to Power: The Role of Experts in Policymaking Hardcover – 31 Dec 1986

by David Collingridge (Author), Colin Reeve (Author)

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The myth of scientific quantification via risk or cost benefit analyses, including of the impact of new technologies, has been at the hearth of the critique of the ecological moment (e.g. Winner, 1986; Funtowicz and Ravetz, 1994a)

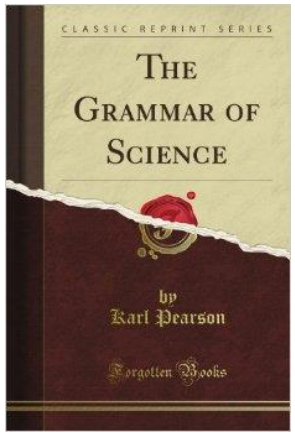
Winner, L., 1986. The Whale and the Reactor: a Search for Limits in an Age of High Technology. The University of Chicago Press, 1989 edition.

Funtowicz, S.O. and Ravetz, J.R. (1994a). The worth of a songbird: Ecological economics as a post-normal science. Ecological Economics 10(3), 197-207.

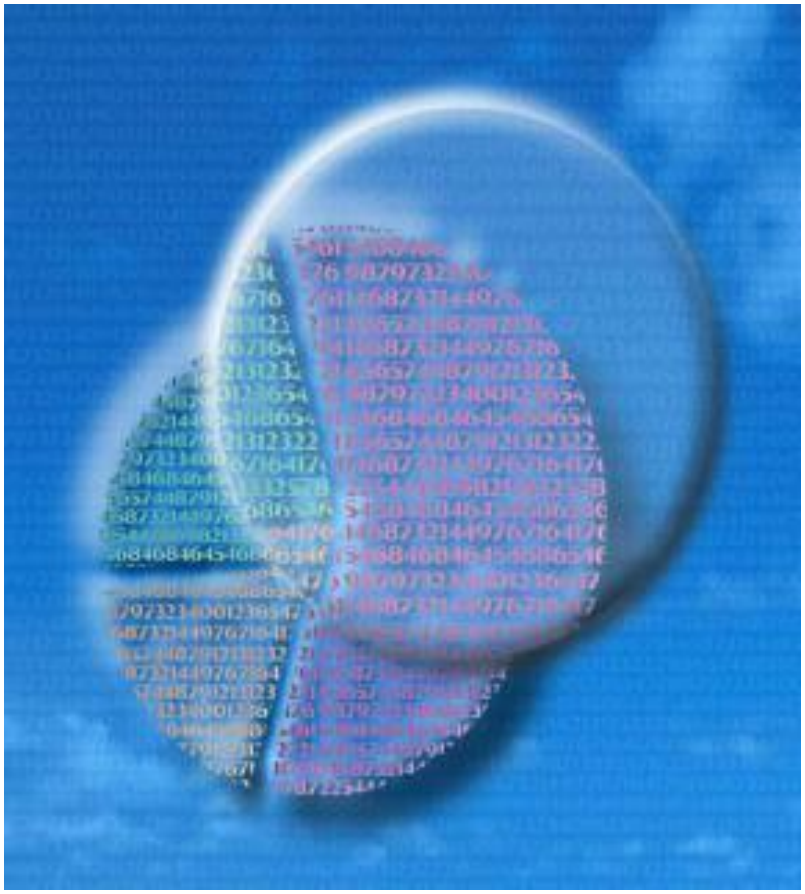
Science as a solution? Karl Pearson (a social Darwinist) suggests not wasting resources on social programs as:

"No degenerate and feeble stock will ever be converted into healthy and sound stock by the accumulated effects of education, good laws, and sanitary surroundings"

Karl Pearson



Pearson, K., 1892, The Grammar of Science, Walter Scott Publisher, London, p.32.



END

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