

From: Holland , Earle
Sent: Friday, February 10, 2012 3:35 PM
To: 'Tony Shin'
Subject: re: your "Bad Science" infographic

Tony:

Thanks for forwarding your infographic to me for my review. After reporting on academic science for nearly 40 years, I have an obvious interest in the question of scientific misconduct. And as a journalist, I do recognize the immense power that "infographics" provide to the public. And yours, both this one and others I've seen on the web, are most attractive. By sharing it this way, unsolicited, I'm assuming it is available for fair use. Here's my feedback . . .

My initial reaction from examining the graphic:

Your opening . . .

"But several new studies have revealed that an enormous number of researchers cut corners, cook data and lie about results when conducting experiments."

Those studies can only report the proportion of bad deeds included in the individual studies' sample size.

You say, "Shady scientific research is rampant."

That statement is an extrapolation that far exceeds the data you reference.

You say, "1 in 50 scientists admits to falsifying or fabricating data outright."

Therefore, assuming the validity of the data, that means that only 2 percent of the scientists surveyed made such an admission.

You cite "3 categories of scientific misconduct" and include "questionable research practices: cooking data, mining data, concealing conflicts of interest."

According to the federal Office of Research Integrity, research (or "scientific") misconduct is defined as . . .

Definition of Research Misconduct

Submitted by admin on Mon, 2011-04-25 11:05.

Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

(a) Fabrication is making up data or results and recording or reporting them.

(b) Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

(c) Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

(d) Research misconduct does not include honest error or differences of opinion.

If you want to report on Research Misconduct, you should use the definitions and restrictions observed and enforced by both the scientific community and the agencies charged with policing that community.

Also, "data mining" is not considered misconduct, and concealing conflicts of interest are violations of best practices separate from research misconduct and involving their own separate policies.

You state that "71% of scientists report that colleagues have used questionable methods."

Cases of reported "questionable methods" are routinely handled by checks-and-balances in the process of doing research. Those instances where actual wrong-doing, as defined by the definition above, is shown to occur lead to investigations and, if necessary, sanctions. Accusations by colleagues, by themselves, prove nothing!

You state that "14% claim that colleagues have falsified data."

Again, accusations by colleagues, by themselves, prove nothing! Proven instances of falsified data usually lead to research misconduct investigations and sanctions. The inference that 14% of scientists falsify data is a wildly misleading allegation.

You say "It's likely that misconduct is much more rampant than researchers will admit."

There is no way to substantiate that claim, no way to show if a supposed increase is actually occurring or whether the increased visibility is the result of better monitoring and more broadbased communications about the topic. In the first seminal book treatment of the question of scientific misconduct -- "Betrayers of the Truth," by Broad and Wade -- the authors could not determine whether misconduct was increasing or if we just heard more about it due to the growth and activity of the news media.

You cite figures supposing result modification and fabrication as an indication of widespread misconduct.

You draw these figures from "biomedical research trainees at the University of California San Diego." Research trainees are individuals learning how to become scientists, not working scientists, therefore blowing your premise. Also citing data from a single institution hardly serves to represent the whole community of science.

You cite that "1 in 2" papers, from a sample of 281 psychology papers, "was found to contain a statistical error." You also say that "15% of papers have an error that would change the conclusion of a paper."

The federal guidelines on scientific/research misconduct specifically state that an "honest error or differences of opinion" does not constitute misconduct.

Under your heading "3 ways to make research more honest," you suggest "make all raw data available to other scientists."

The fact that 44% of high-profile journals require data sharing does not mean, as you infer, that data is not being shared among scientists. It only means that such sharing is a prerequisite for publication in those journals. The majority of scientists share their data -- the major exceptions being when that data is considered "intellectual property" or "proprietary information." Both exceptions are widely recognized as supporting and promoting more research.

You also include the alleged behavior of "journalists simply repackage(ing) press releases . . ." You also chide them for not "seeking out opposing views."

Modern science "press releases" from major science institutions routinely follow good science journalism standards and in some cases, surpass the reporting of journalists when it comes to defining and explaining science. In the past decade as much as a third of the staff science journalists in the country have lost their jobs and research institution public information officers have filled that void, providing balanced science reporting

Secondly, one of the greatest weaknesses in journalism in general -- and science journalism in particular -- is the inclusion of "false balance" into a story where the need for "opposing views" does not exist. Science is not an argument of opposing opinions, it is data-driven. An opposing view from a different scientist not involved in specific research actually weakens science reporting by lending weight to arguments which may not apply.

Lastly, you propose "introduce anonymous publication," the concept of allowing research to be published anonymously.

Doing so would remove all accountability from the process and remove from the researcher the responsibility to stand behind their research claims. This is the most surprising element of the entire package you present.

Then I checked your references included at the end of the graphic:

<http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.0020124> This is a well-known study but only relates only to correlations, not causation. It might be wise to read the comments to the paper, the best being, "In sum, I agree with Dr Ioannidis' methods, but not his conclusions."

<http://www.nytimes.com/2011/11/03/health/research/noted-dutch-psychologist-stapel-accused-of-research-fraud.html> You are seriously using a news report of a single (but significant) fraud case to support your hypothesis? Really?

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005738> First off, this is based on anonymous self-reporting surveys which have an equal probability of being right or wrong; then those surveys are brought together in a meta-analysis which, by virtue of its construct, is grossly general in nature and seldom reliable as truth.

<http://techyum.com/2011/03/omg-aliens1-or-is-it-just-more-fake-science-news/> A blog as a source? Really?

<http://www.badscience.net/2011/04/i-foresee-that-nobody-will-do-anything-about-this-problem/#more-2024> Now this blog is highly respectable in general. But Ben is posing the problem of getting replication studies published in the literature, thereby validating the original work. The way this actually occurs in real life is that the original experiments are incorporated into other future experiments that take the original findings forward, therefore providing new discoveries and qualifying for publication consideration.

<http://www.citypages.com/2011-03-23/news/women-s-funding-network-sex-trafficking-study-is-junk-science/> You offer as reference a news story from an alternative weekly in Minnesota that reports on a “study” by an advocacy group, hardly equivalent to an academic peer-reviewed study.

<http://www.psychologytoday.com/blog/naturally-selected/201109/what-do-about-scientific-fraud-in-psychology> Again, your reference is an opinion column from Psychology Today?

<http://www.scientificamerican.com/article.cfm?id=researchers-failing-to-make-data-public> This merely reflects a commentary piece in Scientific American covering the Ioannidis’ paper in PLOS.

<http://www.guardian.co.uk/science/blog/2011/aug/22/riot-control-newspapers-distorting-science> Again, a commentary column from the mass media as a reference? The irony is that the British press are notorious for sensationalizing research findings way beyond any semblance of an accurate reflection of the work at hand. And in fairness, British researchers and their institutions are often weak in their ability to accurately report research findings to the press and to the public.

<http://www.bmartin.cc/pubs/92prom.html> You offer as a reference a journal piece from The Newsletter of the Libertarian Futurist Society? That’s hardly an academic, scholarly source.

Tony, as attractive as the graphic is, it is also tragically misleading in its content and commits a fairly common error of most infographics – that in trying to simplify the complex information involved it misrepresents any careful research at its core. The clarity and direct statements included lead the reader/viewer to assume its accuracy at a much more general scale, thereby misleading in an overt way. I’m still considering using it but more as an example of the minefields existing in oversimplified graphics. I know that probably isn’t what you planned but I do think it will be instructive to readers.

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