Why Peer Review Matters

Although poorly understood by the public, the practice is crucial to establishing the soundness of scientific knowledge

Scientific peer review involves the careful scrutiny of research findings by qualified experts—those who have sound knowledge and relevant understanding of important aspects of the research area within which results are reported. It is a tool whose use is crucial to assessing the merits and credibility of reported scientific work.

Although not a foolproof method for establishing with absolute certainty the veracity, at any given moment, of what has been learned, peer review has the twin virtues of being both self-corrective and of offering a plausible basis for having confidence in reported results. Without scientific peer review these outcomes are not possible. But does the quality control function of peer review matter to the public?

A recent public poll has found that at least seven in ten adults (and probably more) have no understanding whatsoever of scientific peer review, or its relevance to establishing the soundness of science in instances where it underlies important societal decisions. Simply put, peer review is not a basis for the way in which most people form their opinions. This finding suggests that when assessing information pertaining to science-driven policy issues, the public is either largely indifferent about whether scientific information has been peer-reviewed or does not recognize the importance of the process. Regardless, the consequences are serious.

Science in a Vacuum

Without a sound framework for evaluating research, credible scientific information is devalued and is instead gauged on equal footing with information that is (or should be) far more suspect. Thus, Raelian “scientist’s” claims to have successfully cloned human infants were accepted by many individuals as believable. Moreover, despite the absence of substantiating information, the claims were given a semblance of credence by some news media outlets.

How then, absent the use of scientific peer review, is the public to determine the reliability of current knowledge when far more complex issues arise—such as whether reducing mercury emissions will lower the amount of toxic forms of mercury found in ocean fish, or the possible effects of alar on apples, or vaccines on autism, and the effects of current levels of particulate matter on human health?

A Way Forward?

The public needs to be continuously reminded that when it comes to evaluating scientific information, it should ask important questions. Authors of the report produced by Sense About Science recommend that:

Everyone should be encouraged to ask questions about peer review when listening to claims made about a scientific advance in an interview, press release, or news report. Has the work been evaluated by experts in the field, or is the report based on opinion or unsubstantiated extrapolation? If published, what is the standing of the journal? Has the work been acknowledged by other scientists as a contribution to the field, or dismissed because it is flawed? Has it been replicated? Is it being reported by science correspondents, who know the importance of peer review, or by those who do not distinguish science from opinion? If scientists regularly draw attention to whether work has been scrutinized by peers, and to whether results have been replicated, it will become easier for everyone to be more demanding about the quality of information that informs social discussions about science.

While peer review needs to be made more transparent so that the process can be better understood and appreciated, it also needs to be made more efficient. The process is fundamentally sound, as it is self-correcting, but improvements in

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1 Other researchers subsequently use reported peer-reviewed science findings as a benchmark against which they test both their own research findings and that which has been reported. Where differences are uncovered, they are examined and reconciled, the result over time of this effort being further improvement in knowledge as information that cannot be substantiated is rejected and replaced with more credible knowledge.


3 Ibid.
To add further confusion to this societal dilemma, when sound peer review is not relied upon to establish the reliability of key science issues, discussions of what is known are often driven by ad hominem attacks: Who funded what research findings rather than the credibility of the reported research becomes the central focus of attention.

Especially in the discussion of environmental issues, the credibility of researchers and their scientific findings, when funded in whole or in part by business and industry, is invariably attacked and debased by environmental organizations, who justify doing this based on their claims to have the best interests of the public in mind. Yet very frequently, what environmental groups assert as their version of scientifically sound information has not been subjected to rigorous scientific peer review—thus, the advantageousness to them of resorting to such ad hominem attacks. This tactic is particularly viable when the general public is indifferent to rigorous scrutiny of scientific information through credible peer review; and it is because of this indifference that many environmental organizations are able to offer up their own versions of scientific information without ever publicly revealing that such purportedly sound findings have not been subjected to rigorous scientific peer review.

The news media, too, make it harder for people to determine how much credence they should give to scientific findings reported in the press. Several factors warrant a mention. For starters, bad news (true or not) sells better than good news. Additionally, it is easier to scare people than to make them feel comfortable about a circumstance they formerly feared. And then, of course, there’s the undeniable bias of many news reporters in their coverage of public policy issues. All of these, and other factors, complicate the public’s ability to ascertain the credibility of scientific information when news media outlets present debate about the science.

News reporters are often indifferent to whether the information they highlight has been scientifically peer reviewed. Instead, they develop their stories modeled on an opinion framework that aims to contrast opposing points of view (often the extremes of such opposing views), without ever including for the public a reasonable inspection of the veracity of the views presented or providing information that would enable news readers to discern what is reasonable and what is not.

Rarely if ever do news reporters inform the reading public whether the opinions presented in a news story are based on peer reviewed scientific information. “Fact checking” in news media reporting largely consists of verifying with sources that the reporter has faithfully reproduced word-for-word what the source said. This is not at all the same as verifying the inherent scientific truthfulness of the statement made by the sources.

Fortunately, there are ongoing discussions of how to promote greater transparency of science in the public policymaking arena, inclusive of how to accomplish any agreed upon objectives and over what timeframe. What is emerging in some quarters offers the prospect of a way forward that better serves societal needs.