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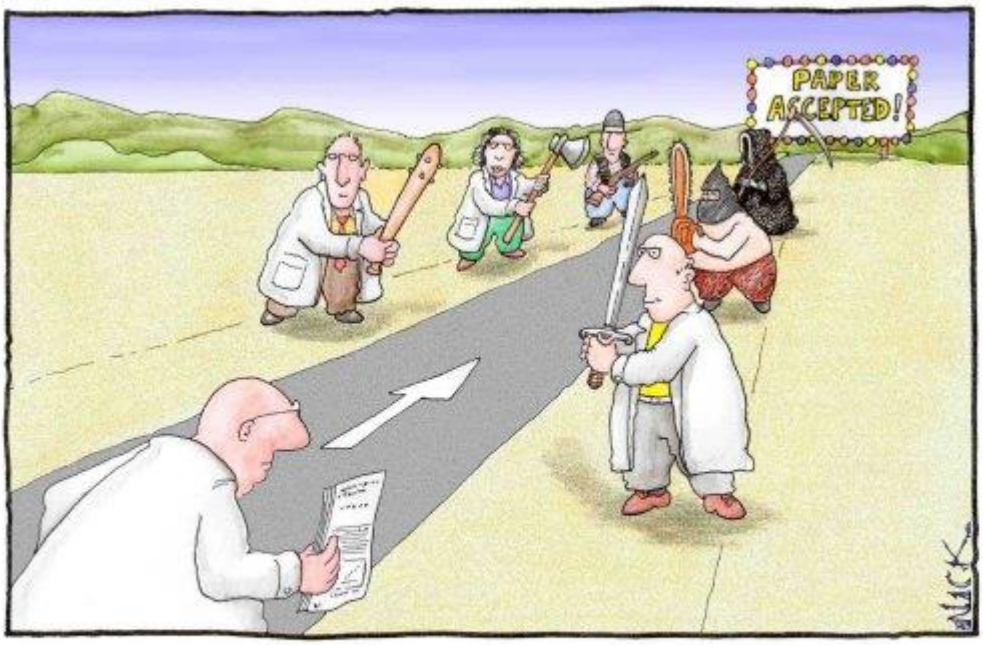
Peer Review



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

Office for the Protection of Research Subjects (OPRS)

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This series of booklets is adapted from the Collaborative Institutional Training Initiative (CITI) Responsible Conduct of Research online course available at www.citiprogram.org

Also available in the RCR Series:

Using Animal Subjects in Research

Collaborative Research

Conflicts of Interest and Commitment

Data Management and Acquisition

Human Subjects Research

Mentoring Student Researchers

Research Misconduct

Responsible Authorship and Publication

About the Source Material

The Collaborative Institutional Training Initiative (CITI) web based education program, developed by the University of Miami and the Fred Hutchinson Cancer Research Center, offers training in Human Subjects Research, the Responsible Conduct of Research, and Good Clinical Practice. CITI is currently used by over 1130 participating institutions and facilities from around the world and offers online course material in more than seven different languages. CITI RCR was developed with public funds and thus allowed access to material used to create these booklets.

Introduction to Peer Review

Peer review is the process by which experts evaluate a research protocol, manuscript, or research product produced by another researcher. Peer review is the essential foundation upon which scientific and scholarly advancement is based. This booklet looks at some of the issues that authors and reviewers face as they attempt to maintain the quality of grant proposals and the published literature.

Being accountable for the content of an article is a minimal responsibility for each author whose name is on a paper. Reviewers are expected to maintaining objectivity and acknowledging potential biases when called upon to review a manuscript or grant proposal. Individuals may view their responsibilities as author or reviewers in different ways.

A case study and reference lists are also included in this booklet.

The Role of Peer Review

Many research funding agencies undertake peer review of grant applications, and the majority of scholarly journals require peer review of submitted manuscripts. Professional advancement is often based on the ability to get articles published in high quality, peer-reviewed journals. In addition, it is an expectation of the IRB (Institutional Review Board) that study protocols undergo review on some level prior to IRB submission.

The philosophy of peer review is that given the technical and specialized nature of academic inquiry, peers with relevant expertise are often the only ones who can fairly judge or evaluate the quality of the work or the chance of success with proposed work. This helps ensure that ideas/conclusions are vetted before they are more broadly shared with other scholars or the public. Thorough reviews often improve the quality of grant applications and written manuscripts.

Peer Review for a Publication or Grant Application

After a manuscript is submitted to a journal, an editor typically sends it for review by members of the journal's advisory board or to a few external reviewers who have expertise in the subject of the article. In many fields, the identities of the manuscript's authors are revealed to reviewers. However, the reviewer's identity is typically not revealed to the author.

Peer reviewers are expected to provide the editor with information about different aspects of the manuscript, including whether it adequately discusses the problem of the research, puts the research into perspective, and provides appropriate credit to others in the field. Reviewers should also comment on the originality of the work and describe whether the research design is adequate for the conclusions written.

Peer review of grant applications follows a slightly different path. Researchers submit grant applications to funding agencies, typically the government, and the agencies have committees that assess the quality of the application, often with external reviewers. According to a General Accounting Office report about peer review in the government, federal agencies differ in:

- How they assess research
- How they determine which projects to fund
- How funded projects are monitored
- The pre-publication evaluation and review

National Institutes of Health Peer Review of Grants

The NIH has a double review process for grant applications. The first level of review, called a study section, occurs in committees with members who have expertise in the subject of the application. The agency usually follows the recommendations of the committee in approving grant applications. Then there is a secondary level of review by an Institute advisory council that consists of external scientists, members of the general public, and patient-group advocates that consider issues of relevance and need and the institute's total research portfolio.

National Science Foundation Peer Review of Grants

When examining a grant proposal, the National Science Foundation (NSF) applies two main criteria. It tries to determine the intellectual merits of the proposal and seeks to figure out what broader impact the proposal will have, such as the proposal's potential future influence on research or education.

Reviewers are also likely to consider:

- The qualifications of the proposing researcher
- The extent to which the project is creative and original
- How the work will advance discovery while promoting teaching
- How the work will benefit society
- The likelihood of success of the research
- How researchers fared in prior NSF grants
- The reasonableness of the budget

Proposals received by the NSF are reviewed by an NSF program officer and usually three to ten outside NSF experts in the field of the proposal. The external reviewers help to inform the program officer's recommendations. These recommendations are further reviewed by senior staff at NSF. Approved NSF grants generally run from one to five years and the progress of a NSF funded project is reviewed annually by outside experts.

Peer Reviewer Responsibilities

According to Michael Kalichman ("Seven Key Components of Good Peer Review": Responsible Conduct of Research: An Introductory Guide (2001), Director of the Research and Ethics Program of the University of California at San Diego, the reviewer of a manuscript or a grant application has several responsibilities:

- **Responsiveness:** Reviewers should be able to complete reviews in a timely fashion. Preparing research reports and grant applications takes an enormous amount of time, and should not be undertaken if the reviewer cannot meet deadlines.

- **Competence:** The reviewer should accept an assignment only if he or she has the adequate expertise to prevent the occurrence of accepting a submission that has deficiencies or reject one that is worthy.

- **Impartiality:** If a reviewer has a personal, financial, or other interest that could interfere with an objective review of the material, he or she should either decline to be a reviewer or disclose any possible conflict of interest or commitment to the editor or granting agency.

- **Confidentiality:** Material under review is privileged information and should not be shared with anyone outside the review process. In general, reviewers should seek permission from the editor or funding agency before sharing relevant information about a manuscript or grant proposal. If a reviewer is unsure about confidentiality questions, he or she should contact the appropriate party.

- **Exceptions to Confidentiality:** If a reviewer becomes aware, based upon reading a grant application or a submitted manuscript, that his or her own research may be unprofitable or a waste of resources, it is an ethical expectation to discontinue that line of work. The decision should be communicated to the individual requesting the review. (see Society of Neuroscience guidelines for communications) Every effort should be made to ensure that a reviewer is not taking advantage of information garnered through the review process.

- **Constructive Criticism:** Reviewers should acknowledge positive aspects of the material under review, assess negative aspects constructively, and indicate where improvements are needed.

- **Responsibility to Field of Study:** Members of professional communities are expected to engage in peer review even though they usually do not receive

financial compensation for this work. However, a significant benefit to reviewers is that they may become more aware of the work of their peers, which often can lead to new collaborations.

Peer Reviewer Accused of Bias, Maintaining Status Quo...Among Other Things

Although peer review has been the norm for more than 200 years, it has also been the subject of criticism. For example:

- Reviewers may have biases that they are unaware of or do not manage appropriately when they read a grant application or paper. Such biases can include:
    - Dislike for an author's or applicant's institution
    - Personal dislike of the author or applicant
    - Competition with the author or grant applicant
- Peer review might inhibit controversial or innovative research from entering into the literature or being used as the basis for a grant application.
- Peer reviewers may not be forthcoming about admitting financial or other conflicts of interest that might interfere with the objectivity of their review.
- Reviewers may not admit their lack of expertise in reviewing a paper or grant application.
- The peer-review process is not sufficiently reliable in detecting errors.
- Peer review does not prevent poor quality papers from getting published. For example, a manuscript might be rejected by one journal, but a persistent author might get it published in another.

Peer Review Benefits

Scholars acknowledge problems with the peer review system, but generally believe that the merits of the system outweigh the drawbacks. Peer review often improves the quality of the research presented in a manuscript or grant application. It is not always clear, however, who is primarily responsible for the improvement: the editors, the reviewers, or the authors.

Those who perform reviews with competence and integrity are fulfilling their obligations to the scholarly community. Ideally, reviewers are upholding accepted

standards when they reject work and improve the field by giving constructive criticism.

If an author believes that a manuscript has been rejected undeservedly, he or she can write to the editor and explain his or her concerns. The reviewer does not usually have the final say. There are also appeals built into the grant-application process. For example, if someone believes that work has been improperly taken during the peer review process and used for the reviewers gain, the author or grant applicant can seek legal representation and petition the institution where the reviewer works to initiate an investigation of plagiarism. Directly contacting the granting agency or the journal with the concerns might also be appropriate.

Opening Up the Process of Peer Review

Instead of the traditional peer review system, modifications which have been introduced are:

Blinded Review
"Blind review" means to conceal identities of the author and the institution from the reviewer. Blinded peer review can remove bias that might result from this knowledge. In
principle, blinded reviews might be of higher quality, because it allows reviewers to focus on the importance of the research question, key issues in the work, including a rigorous critique of the methods.

Open Review
Some critics, such as Fiona Godlee, in her article "*Making Reviewers Visible: Openness, Accountability, and Credit (2002)* in the *Journal of the American Medical Association*, suggest that open reviews, in which the author knows the reviewer and the reviewer knows the author, would improve the peer-review process. Godlee argues that if authors and reviewers know each other's identities, this would increase the accountability of the reviewer by providing less opportunity for unjustified arguments or misappropriation of data under the guise of anonymity. However, a problem with an open review system, Godlee says, is that more reviewers might refuse to participate.

Other Approaches

- On the *BioMedCentral (BMC)* publishing website, the precise form of peer review is left to those responsible for editorial control of the journals that participate. In some cases, including all the medical *BMC journals*, reviewers are asked to sign their reviews. The pre-publication history of each paper (submitted versions, reviewers' reports, authors' responses) is also posted on the Web, with the published article. *PubMed Central* is another Web-based repository, housed at the National Center for Biotechnology Information of the National Library of Medicine. This Center archives, organizes, and distributes

peer-reviewed reports from journals in the life sciences as well as reports that have been screened but not formally peer-reviewed.

- **Publish First, Review Second:** The Internet has made it feasible to make draft publications available to the public prior to full review. These may be posted by the individual authors on their own websites, or sometimes journals will themselves make drafts available. Peers and other reviewers may then comment on these drafts, with the comments becoming part of the public record. In addition, some authors make their work publically available in “wiki” format, in which others can modify and improve the draft work. These formats have potential to speed the progress of research, and to promote research collaboration.

Intellectual Bias

An academic conflict of interest could occur if an individual interferes with the peer-review process for personal gain. Bias can cause a reviewer to respond positively to a manuscript because it presents results favoring a method or production in which the reviewer has a personal interest. Alternatively, a biased reviewer may act to delay the publication of a competitor's manuscript in order to strengthen his or her own chances for publication or funding. Further, it is incumbent on the reviewer to not only provide timely reviews, but, to disclose to the editor or granting agency any real or potential conflicts of interest and commitment that might be perceived by someone to negatively impact the integrity of the review process.

Conclusion

Writing papers and reviewing the manuscripts and grant applications of colleagues are vital activities for individual researchers and scholarly communities. It is the reviewer's responsibility to be fair and objective during the review and maintain confidentiality of the materials entrusted to him.

Case Studies

I. What is Responsible Peer Review?

Dr. John Leonard is one of a few psychologists working in a particular field of Clinical Psychology. Dr. Leonard receives a paper to review about an area of schizophrenia, which he and a graduate student in his laboratory are researching. The schizophrenia studies have to do with new powerful drugs, but also with the analysis of several serum proteins that seem to predict the onset of a paranoid schizophrenic episode.

The article was submitted by Dr. Mark Morris to ***Excellent Clinical Psychology***, a medium-impact journal, and the editor asked Dr. Leonard and two other experts in the field to review the paper. The article suggests a new relationship between plasma markers and the onset of the clinically significant disease. The data suggests that a simple blood test for "Protein X" might be possible along the lines now in use by diabetics to monitor blood glucose levels.

What types of conflict of interest might arise when someone is asked to review a paper or grant application?

The reviewer may benefit financially from the findings in the paper or grant application; may be too close to the author or applicant; may not like the author or applicant; may disagree with the methodology or science of the author or applicant; may be in very clear and direct competition with the author or applicant; or may have religious or philosophical views that are in conflict with
the research of the author or applicant.

But the paper is fraught with problems: poor controls, inconsistent data in figures, and alternative explanations are not considered and claims are overstated. Dr. Leonard gives the paper to his graduate student Melvin Zane, who gives it a detailed critique and recommends significant revisions. Mr. Zane has never reviewed an article before, and Dr. Leonard thinks that doing so would be a good educational experience for him. Mr. Zane notes that the methodology used by Dr. Morris and the drugs used in the patients provide an explanation for some of the problems he is having interpreting some of the data he has been getting in his studies with saliva samples from schizophrenic subjects. He discusses it with Dr. Leonard. Both agree that they should make some changes to their procedures including the analysis of Protein X described in Morris's paper.

Is it ever appropriate for a peer reviewer to give a paper to a graduate student for review? If so, how should the reviewer do so?

Peer review should be a confidential process in which the reviewer considers the material in the paper or grant application to be privileged information. If a reviewer would like to ask the assistance of other parties in the review of a paper, he or she should get approval from the editor to do so.

Dr. Leonard submits Mel's and his own comments about the research to the editor, suggesting that the paper be accepted only after a few more experiments are performed to validate some of the conclusions. One of the other reviewers has comments similar to Dr. Leonard's, and the editor asks Dr. Morris, the author, to make the revisions before he will accept the paper.

But in the next few weeks the relationship between the "Protein X" levels and the timing of schizophrenia relapse that is discussed in the paper remains in Dr. Leonard's mind. Dr. Leonard until now had no major interest in the "Protein X". They were focused on another protein, "Protein Y" found only in saliva. Dr. Leonard suggests to Mel that he test the saliva samples for the Morris "Protein X" using a slightly modified methodology, similar to that described in the Morris paper. Dr. Leonard knows this is risky as his experiments were stimulated by the review of the confidential data. However, the modified method allows Mel to get data that is consistent with his working hypothesis about "Protein Y" and with the results described by Dr. Morris. They are very excited now as the development of a saliva test kit to monitor schizophrenia will be much easier and less invasive than a blood based test. Further, they now have two unique proteins to target.

Is it ever appropriate for a reviewer to use ideas from a paper under review, even if the reviewer's method to achieve a result is different from that used in the paper under review? If so, how should the reviewer proceed?

If a peer reviewer feels that he or she must use the information contained in an article or grant application, the reviewer may be able to contact the author or applicant and try to establish a relationship in order to form a collaboration. Otherwise, it is misconduct to plagiarize the ideas described in a paper or grant application under review.

Mr. Zane and Dr. Leonard draft a paper based on the results, which includes appropriate controls. *Science*, a prestigious journal, accepts the paper. Several months later, *Excellent Clinical Psychology* publishes a revised paper from the Morris laboratory. But after Dr. Morris sees the article in *Science* he suspects that

Dr. Leonard, who was an anonymous peer reviewer on the paper, might have taken some of the ideas for the *Science* article from his paper under review.

What are some of the challenges in the current peer-review process, in which the peer reviewer is anonymous but the author is known to the reviewer?

Some say that anonymous peer reviewers can abuse their position by holding up the review process to finish their own work, by appropriating information, or by giving bad reviews to disliked colleagues-actions that the author might be able to detect if he or she knew who the reviewer was.

One new approach to peer review makes the author anonymous to the reviewer. Another approach has both the author and reviewer aware of each other's identity.

Resources

Office of Research Integrity (ORI) Peer Review
http://ori.dhhs.gov/education/products/rcr_peer_review.shtml

Ethics of Peer Review: A Guide for Manuscript Reviewers
http://ori.dhhs.gov/education/products/yale/prethics.pdf

CITI program
www.citiprogram.org

Ethical Issues in Peer Review Overview (PPT)
http://ori.dhhs.gov/education/products/yale/prethics.ppt

NIH Peer Review Process
http://grants.nih.gov/Grants/peer_review_process.htm

NSF Peer Review Process
http://www.nsf.gov/bfa/dias/policy/meritreview

USC Contacts

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