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How to review a manuscript

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1. Introduction

The decision to reject or accept a manuscript is for an important part based on peer review. The process of peer review, as we know it, was introduced only in the 20th century. Journals such as *Science* and *Journal of the American Medical Association* (*JAMA*) did not use external reviewers until after 1940. Before that time, there was more journal space than articles to print, and the primary task of the assistant editors was to elicit articles to fill the journals. With increasing scientific specialization, and a larger number of scientists, outside assistance in selecting manuscripts for publication became necessary. The invention of the typewriter and the photocopier facilitated this process because it allowed the replication of submitted manuscripts [1,2].

Good reviews not only aid in the selection of manuscripts for publication but also improve the clarity, transparency, accuracy, and utility of the selected submissions. Reviewers who write poor quality reviews are often not invited again, and some journals even score the quality of each review [3]. The assumption underlying all this is that the peer review process improves the quality of published articles. There have been surprisingly few studies examining the effectiveness of peer review, partly because of the fact that it is such an integral part of the complex scientific process. However, the limited evidence available indeed suggests that peer review may lead to higher methodological and reporting quality of published articles as is shown by a systematic review of Jefferson et al. [4]. This review showed that peer-reviewed articles were of higher methodological and reporting quality than nonpeer-reviewed articles in a cohort study comparing 394 articles published in high-ranking peer-reviewed journals compared with high-circulation throwaway journals. Peer review and editing also made articles more readable and improved the general quality of reporting, as shown by two studies comparing the quality of manuscripts before and after reviewing. Furthermore, adding a statistical/methodological reviewer improved the quality of final manuscripts in a small, double-blind, randomized, controlled trial.

Once researchers develop expertise in a certain research area, they will be asked to review manuscripts. Being able to give clever and constructive comments is illustrative for the capacity of researchers, and funding organizations and editors will ask the opinions that are worth asking. The quality of the review is also an important aspect in the selection of new members for editorial boards. But what is a high-quality review? Is research a matter of ‘‘see one, do one, judge one?’’ How much time should a reviewer spend on a review? Are there any specific elements that a review should include? Often, there is not enough time to discuss reviews among colleagues. Furthermore, journals usually do not give feedback; they just do not invite the reviewer again if the review is poor.

Most journals have instructions for reviewers. These instructions, also mentioned in the guideline for editors of the World Association of Medical Editors, usually mention the topics that the review should cover, such as originality of the research, the design of the study, presentation of the results, and so forth. These checklists give the reviewer an idea of the topics, and these topics obviously should be in the review. However, these guidelines do not make the distinction between a good and a bad review. Writing a good review also involves understanding and appreciating the editorial process, structuring the review in a comprehensive way, and being aware of some general but often unwritten rules.

In this tutorial, we will present a guideline that reviewers can use when reviewing a manuscript. This guideline was developed with the use of existing literature on this topic [5−7]. In addition, the authors of this article give lectures and a course on ‘‘how to review a manuscript.’’ During these sessions, the dynamic discussions were used to improve the list of ‘‘dos and don’ts.’’ We suggest using the scheme as shown in Table 1 when reviewing a manuscript. We will follow the outline of this scheme in this article.

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Table 1
Basic scheme for reviewing a manuscript

Before you start
- Decide whether or not you have time to do the review
- Be critical about whether or not to accept the review; ask more information if you have doubts regarding your expertise
- Be honest about your expertise and possible conflicts of interest (see example 1)
- Scan the manuscript on overall quality and decide how you will proceed; if the manuscript is good, give detailed comments, if not then just give global/major comments
- When it is a poor manuscript, indicate that your comments are on major issues and that you may give more detailed comments later

The structure of your review
- Start with a short summary of the study (see example 2)
- Structure your comments into major and minor comments
- Number your comments

General rules of good reviews
- Give specific and constructive comments (see example 3)
- Don't just give your opinion, but prove your point; you can also leave it to the authors to prove their point (see example 3)
- Do not try to change the manuscript too much
- The editor decides whether or not to accept the manuscript, so do not include your advice in the comments to the author
- Don't offend the authors
- Don't allow the best to be the enemy of the good

The final check
- Check whether you have addressed the following items:
  - Relevance of the research question (why? For who?)
  - Originality of the research question (do your own literature search)
  - Do the methods match with the research question?
  - Strengths and weaknesses of the methods (use checklists)
  - Are the results presented well (what is redundant and what do you miss)?
  - Are the conclusions supported by the data?
  - Do you miss important discussion points?
  - Do you miss good suggestions for future research?
  - Date your review
  - Save your review

2. Before you start

2.1. Decide whether or not you have time to do the review

Larger journals such as *JAMA*, *BMJ*, *New England Journal of Medicine*, and *The Lancet* have a full-time professional editor and staff. Much of the review process is handled by this editorial team. They often review all submissions and reject 30−50% without external review [5]. Furthermore, they have professional staff to track reviewers, once the article has been sent out for external review. Another advantage of being a high-impact journal is that reviewers usually do not decline to do a review.

Most journals, however, do not have such large editorial teams. Therefore, they heavily rely on external peer review. Usually, the editor scans all submissions, and apart from manuscripts that are clearly unsuitable for the journal, all submissions are sent out to external reviewers. Smaller journals have much difficulty getting people interested to do the review, and they have only a few resources to stimulate delayed reviewers. The *Journal of Clinical Epidemiology*, for example, has to invite between 6 and 10 reviewers to get 2 reviewers.

Every journal wants to keep the time between submission and publishing as short as possible. This is where the journal and the author share an interest. Therefore, whether it is a big journal or not, researchers should at least respond promptly when they are invited to do a review. It is not always necessary to agree to do the review. It is very legitimate to decline, if, for example, your agenda does not allow any additional work for the coming 2 weeks. A good review costs approximately 3 hours, but inexperienced reviewers may need a bit longer. If there is not enough time to do the review before the deadline, the researcher should decline as soon as possible, so that the editor can look for alternative reviewers.

When reviewers agree to do the review, often they will receive a reminder from the editorial office just before the deadline. Most journals use databases to keep track of the manuscripts. This makes it very easy to track the performance of reviewers and exclude for future invitations those reviewers who consistently miss deadlines. If reviewers cannot do the review themselves, it is very much appreciated if they could find somebody else in the department to write the review. If the latter is the case, it is appreciated when they mention this to the editor.

2.2. Be critical about whether or not to accept the review

Reviewers are invited through several ways. The editor might know the reviewer, the authors may have suggested him/her, reviewers may have entered their expertise in the journal's database when they submitted an article, or the editor may have selected the reviewer after a short search on PubMed. Often editors will also look in the archives of their own journal to look for authors who have previously published on the topic.

The expertise that researchers develop is usually very specific. Based on key words defining the expertise, it may be difficult to judge whether the author really has sufficient knowledge. Therefore, it is not unlikely that authors sometimes receive an invitation to review a manuscript that does not fit to their expertise. If that is the case, they should not hesitate to decline because it will be difficult to deliver a good review. A review from someone who does not have the proper expertise will not be useful to the editor to decide whether or not he should accept the article, and the comments will be of little value for the authors.

2.3. Be honest about your expertise and possible conflicts of interest

It is also possible that the reviewer does not have the expertise to comment on all aspects of the manuscript. For example, the authors may have used rather sophisticated statistical techniques that the reviewer is not familiar with. The reviewer should be honest about this and not just skip the part that is too difficult. The reviewer should try to understand what the authors have done, and if the reviewer thinks that the matter is too difficult, this should be mentioned to the editor and in the review (see Example 1). Nobody will benefit if reviewers pretend to have the required expertise, whereas in fact they have not.

Besides having the expertise to judge the manuscript, the reviewer should also have a broad understanding of the scope of the journal. The *Journal of Clinical Epidemiology*, for example, focuses on methodological articles. Some articles may be technically correct but inappropriate for the *Journal of Clinical Epidemiology* because it concerns specific content rather than methodology. Therefore, to be able to wisely advise the editor of the journal, the reviewer should be familiar with the journal, or at least read the mission/scope statement of the journal and the instructions to reviewers.

2.3.1. Example 1

> I have expertise on the methodology that the authors used, but I am not familiar with the specific subject that the authors are investigating. My comments and suggestions are therefore mainly on methodology.

Another frequently occurring matter where honesty is preferable is when the reviewer has a possible conflict of interest. There could be a conflict of interest concerning the content of the manuscript, for example, when the reviewer investigates more or less the same topic or works for a company that has an interest in the results of the manuscript. The reviewer may also know the authors personally. The chance of this is higher when journals ask the authors to suggest reviewers. The *Journal of Clinical Epidemiology* now states that any suggested peer reviewers should not have published with any of the authors of the manuscript within the past 5 years and should not be members of the same research institution, after several cases where authors suggested reviewers whom they clearly knew very well (based on a PubMed search for articles that showed that they regularly coauthored with the suggested reviewer). A reviewer should decline to do the review when an unbiased review of the manuscript is not possible. A lot of journals always ask the reviewers to disclose any conflicts of interest, but if they do not the reviewer should do this. In some cases, there may be some doubt whether or not an unbiased review is possible, for example, when the reviewer knows the authors but not in such a way that an objective review of their work is impossible. Then the reviewer could do the review and disclose the specific conflict of interest to the editor. The editor can decide how he will deal with the review.

The other form of conflict of interest, when the reviewer suspects that the authors have a possible conflict of interest with the topic they investigated, is also something to mention to the editor. Usually, the authors have to declare possible conflicts of interest when they submit their manuscript and often this statement is also available for reviewers. If the reviewer suspects a possible conflict of interest but cannot find anything mentioned about this in the submission, more information should be requested. When there is a possible conflict of interest, it is up to the editor to decide how to manage this (check the statements by the authors, ask for more information, reject the article, or take more rigorous measures). Therefore, it is best that the reviewer finishes the review and mentions the suspiciousness to the editor only.

2.4. Scan the manuscript on overall quality

Sometimes, the manuscript to be reviewed is poor. A poor manuscript often suffers from both major and minor faults. Reviewing a manuscript that suffers from so many mistakes is very frustrating. Of course, it would be helpful for the authors if reviewers always provide all the comments that they can think of, but this will take the reviewer probably more than the average 3 hours. In addition, the frustration costs a lot of energy, and we should be careful with that. A way to handle poor articles is to decide, after a first scan, whether or not this article deserves both major and detailed comments. If the major flaws are too big—for example, the research question is unclear or does not fit to the used methods—the reviewer could limit the review to

the major comments only. However, the editor may still decide that the authors should get the chance to revise and resubmit the article. In that case, it may surprise the editor and the authors when the reviewer gives detailed comments in the second round. Therefore, it should be indicated in the first review that comments are on major issues and that more detailed comments could be given later.

3. The structure of your review

3.1. Start with a short summary

Starting with a short summary (see Example 2) is helpful for several reasons. First, it forces the reviewer to capture the essence of the manuscript. Second, it helps the editor to understand the comments. The editor does not have to go back to the original manuscript to remember what the study was about. Finally, authors often (should) appreciate such a short summary. They can see whether the reviewer captured the essence of their work. If the reviewer missed the key points, others may as well.

3.1.1. Example 2

> This paper represents a major effort to test the efficacy of duct tape in the treatment of warts. The methodology of the study consists of a randomised trial. The study was carried out in primary school children. The major finding was that duct tape was not better than placebo. Only one study has been previously published on this topic which was methodologically flawed.

3.2. Structure your comments into major and minor comments

Often, there are several (i.e., three or four) major comments. These could, for example, be comments on the clarity of the research question, the originality of the research question, or the suitability of the research methods that have been used. The editor will probably judge his decision to accept or reject the article on these major comments, so these comments should be easy to identify in the review. Major comments also have a different loading. If the authors fail to address these comments, it is clear to everybody that this may lead to rejection.

However, a reviewer should preferably not only give major comments. Giving detailed comments is a matter of endurance. Because you usually start at the beginning of the manuscript, and because formulating the major comments requires quite some effort, the reviewer may be inclined to give less detailed comments at the end of the manuscript (i.e., the discussion and tables and figures). However, detailed comments are often very helpful because they give the authors specific clues to improve their article. Numbering the comments makes responding by the authors easier because there can be no doubt which comment is addressed.

3.3. Give specific and constructive comments

The aim of a review is not to teach the authors a lesson. Preferably, the comments should be helpful, so that the authors are able to improve their article. Everybody who has ever received comments will agree that general negative statements are the most frustrating to receive. Nevertheless, it frequently happens that reviewers give such comments (see Example 3).

3.3.1. Example 3

Examples:

1. *"As I see it, the authors are a bit too pretentious as to what they can do with the data at hand."*
2. *"An impressive reference list. Congrats for reading all that. It looks a bit like overkill, however, since few real data from the studies reported are specifically referred to in the text."*
3. *"At present the introduction describes much that is not strictly relevant and could be shortened considerably."*
4. *I also suggest that a paragraph comprising methodological considerations is added to the discussion section.*
5. *It is important to keep in mind that a "retrospective look" always has the limitations that causal relationships could not be determined…*

The problem with statements, such as those shown in example 3, is that the authors will probably not have a clue how to improve the manuscript. As regards the first statement, it is not clear why the reviewer finds the authors pretentious. Is it because they dredge the data too much? Is it that the research design does not allow conclusions on causal relationships? It is also not necessary to be unclear because pretentiousness can often be traced back to specific wording. For example, the authors may have used ''are a risk factor for developing diabetes'' instead of ''are associated with having diabetes.'' Furthermore, in the second statement of example 3, the reviewer is being unnecessarily vague (and unnecessarily cynical). Probably, the reviewer has checked some references and could not trace them back to the text. Then why not mention which references it concerns?

When it comes to mentioning specific references, the habit of referring to own articles is often criticized. The criticism is correct if the reviewer clearly only tries to increase his citation score. However, it can also be very legitimate to suggest referring to specific articles. The reviewer may have been invited to do the review because he has previously published on the topic. In that case, the editor would expect the reviewer to suggest referring to his own articles.

Being constructive in your comments also means that it is wise to add explicit praise for sections or analyses that are particularly innovative and/or well constructed.

However, reviewers should not force themselves to mention some positive aspects, but mentioning strong aspects of the manuscript will help to make the review being seen as constructive.

3.4. Do not just give your opinion, but prove your point

The anonymity of reviewers has been a topic of debate for several years. Some journals reveal the identity of the reviewers; others do not. A potential weakness of an open review system is that reviewers may feel inhibited about expressing their true feelings, making them less critical, especially when the reviewer is young, knows the author, or fears negative repercussions. When investigated, it shows that open review tends to have a positive effect on the quality of reviews (i.e., higher objective quality and more constructive and courteous comments) [8].

Whether or not it concerns open or blinded review, it is always good to be specific and objective in your comments. Of course, the reviewer should give his opinion on the manuscript. However, it is often possible to provide evidence for the statement. When evidence is provided for the comment, it will be unlikely that it will provoke emotional reactions, making it less uncomfortable for the reviewer to be unblinded to the authors. A reviewer may find, for example, that the study is not very original. In that case, the point can be proven when the reviewer presents some studies that investigated more or less the same. This does not only prove the point, but it also helps the authors in their response. A trick to save some time—after all we are doing this only for the sake of science—is to let the authors prove their own point (see Example 4).

3.4.1. Example 4

> The authors state in their introduction that tension type headache is a highly prevalent problem. However, this review is about prophylactic medication for tension type headache. Therefore, the prevalence of prophylactic medication for tension type headache prescriptions rather then tension type headache itself is crucial. In my opinion the authors should provide studies on this in the introduction.

3.5. Do not try to change the manuscript too much

Sometimes, the authors have a substantially different point of view or ideological background. This can affect the basic assumptions of the article, the way they frame issues or how they interpret the data. In that case, there is a thin line between giving a requested opinion and trying to change the manuscript too much. As a rule of thumb, reviewers should be aware that their job as a reviewer is to judge the work as it is and give objective and specific comments. Reviewers should remember that the work is not theirs; they are not responsible for the presented work and they are not a coauthor. Therefore, reviewers should not try to change the work too much and they should not insert too much of their own ideas and ideology into the work of the authors. The reviewer should leave it to the authors to decide whether or not they use the comments to change the manuscript.

3.6. The editor decides whether or not to accept the manuscript

The reviewer should not include any advice on acceptation in the comments to the authors. It is better to give such advice only to the editor. The point is that the editor ultimately decides whether or not to accept the article. The editor may disagree with the reviewer, often also based on the comments of other reviewers. If, for example, one reviewer advises to accept the article as it is, whereas the other reviewer has very strong arguments against acceptation, the editor may choose to reject. To decrease the chance of appeals from the authors, the editor will probably remove the advice from the comments.

3.7. Do not offend the authors

Reviewers should be polite and modest in the way they phrase their comments; they may be wrong. Authors are probably very familiar with reviewers who seem to know it all and want to teach them a lesson. Therefore, the reviewer should stick to the facts, admit that he may see it wrong, and not give emotional comments.

3.8. Do not allow the best to be the enemy of the good

In science, there are many different ‘‘gold standards.’’ However, in many cases what you can do with the available data does not always allow gold standard research. Nevertheless, it can be the best possible research at that moment. The same goes for all the different choices that a researcher has to make during a study.

Reviewers should of course comment on the limitations of the study. However, they should remember that something could be worthwhile publishing, although it does not meet the gold standard. The authors can also address these limitations in their discussion.

4. The final check

The checklist at the end of Table 1 is a checklist that can be found in many ‘‘instructions to reviewers.’’ Most of these issues are obvious, and you would probably have addressed the issues during the writing of your review. However, it is good to check this list before the review is finalized. Often, reviewers are inclined to narrow down their review to specific major points, forgetting, maybe less significant but nevertheless, important topics. The checklist may help to think of other potential comments than those

that initially came up. One of the items on the checklist is to use checklists when commenting on the methods. Several checklists are available, such as the guidelines for observational studies (Strengthening the Reporting of Observational studies in Epidemiology) or randomized controlled trials (Consolidated Standards of Reporting Trials). Reviewers should use these available checklists because they may help in providing comments on all relevant aspects of the study.

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