



University of St Andrews
SaintScience Journal

PROTOCOL FOR PEER REVIEW

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1. Introduction

This document is intended for **peer reviewers** as a set of guidelines and protocols for conducting peer review for any articles published by SaintScience across the Faculty of Science. Peer review is the keystone of good academic practice, ensuring that submissions conform to a high standard of scientific quality that is free from fallacious reasoning or inaccuracies.

If you are interested in peer reviewing, congratulations! You have chosen a rewarding and meaningful way to engage in your subject and delve into the literature to contribute to science communication. This guide will cover the basic protocols and format that SaintScience uses in its peer review alongside the common features to look out for when reviewing an article. All written media, comprising Comment and Opinion, reviews, primary research and research summaries, are peer reviewed prior to digital and physical publication.

This guide is regularly updated, and we welcome suggestions and comments on changing usage. Contact the Editor-in-Chief (cg281@st-andrews.ac.uk) for any queries on the protocols or suggestions.

2. Roles of a peer reviewer

Imagine the walled city of Carcassonne as the sum of all accepted mainstream scientific publications; as a peer reviewer, you are its sentry at the drawbridge-operated main entrance. By controlling admission into its impenetrable perimeter, you stand between high-quality relevant and valid scientific publications and admitting harbingers of imperfect or worse, fraudulent science.

Peer review is a community-driven, autocatalytic process where members with critical expertise in a particular field evaluate new submissions for their

- (1) Relevance to the journal's overarching themes;
- (2) Logical rigour and technical accuracy; and
- (3) Their originality and interest to a wider readership.

Where peer reviewers are not involved is **proof-reading** and **editorial work** for the simple reason that your role as a peer reviewer is in suggesting *substantive* rather than *expressive* changes to an article. Editorial work is completed only when any technical issues are addressed, which might have entailed major revisions to the original text anyway (please see the editorial house-style for editing queries). Substantive changes therefore require critical analysis of the research article; nothing stated in a given manuscript should be accepted at *prima facie* but questioned if unclear or uncited.

Breaking down substantive analysis – features of an article to check when peer reviewing

When you, the peer reviewer, receive an article for review, the following are major features of the article you should closely examine. Section 4 discusses the protocol for making these changes in comments on the document.

2.1. Theory and factual information

All article formats assume theoretical background knowledge, whether explicitly or implicitly. As a reviewer, it is key to assess the **truth of all premises** made in the article. Premises are statements made that assert something in support of a conclusion in an argument. In order to draw true or defeasible conclusions from valid arguments, its premises must hold true. Consequently, in checking premise truth, one could encounter three scenarios:

1. The premise is factually incorrect and simply false, i.e. *Mars has a larger diameter than the Earth's*. In this instance, the statement would be flagged in comments. The reviewer should closely read the remainder of the argument to check whether the argument is resting upon the false statement. Any large passages that contain multiple serious factual errors should be flagged.

2. The author makes an erroneous assumption. Often when writing and speaking, humans omit underlying premises in an argument because they are assumed to be self-evident or common-sense. However, when reviewing an article, the reviewer must read between the lines and try to discern whether the author is making any assumptions that are factually false. For instance, the argument *I cannot make dinner tonight since I do not have any tomatoes* is invalid as it stands without the hidden assumption, *I can only make dinner if I have tomatoes*. The argument is then valid but unsound, for evidently tomatoes are not essential for making dinner. While the argument given is clearly false, sentences obscured in complex syntax and jargon may be harder to check for false assumptions.

Tackling erroneous assumptions In this instance, we recommend taking a step back from the sentence/paragraph and noting down on paper the salient points the author is attempting to make, including any underlying assumptions needed to support these points. While making sure to consult existing literature to clarify what is factually correct, flag any points in the article that rest on false assumptions

3. The statement is ambiguous or vague. If it is impossible to tweeze apart the meaning of a statement, this should be flagged. This could include

- Use of object pronouns or demonstratives like it/they and this/these without clear reference to the reference subject
- Generalisations and brush-stroke comments. Be aware of the *compounding fallacy*. While a member of a larger class may possess a certain property, it does not entail that all members have

the same property. For instance, if one were to say *mammals give birth to live young*, this is factually ambiguous, (eutherians like primates do but metatherians like platypus do not). Did the author mean 'some mammals', 'most mammals' or 'all mammals'? Therefore **be sceptical of statements lacking modifiers like 'all', 'every', 'most' or 'some'** when the accuracy of the statement depends on having one. This should be flagged.

2.2. Technical vocabulary usage

Use of precise vocabulary that is context-specific and relevant to the audience the article is addressing is key. As a peer reviewer, one must ensure that (1) technical vocabulary is used accurately and (2) level of jargon is appropriate to the audience background.

2.2.1. Comment and Opinion pieces and Research abstracts

Jargon should be explained in sufficient detail for an individual with broad scientific training to understand when first used. If the theory behind the vocabulary usage is too extensive to summarise, a clear mention to external resources should be made in the article with relevant reference(s). Check for accessibility and flag any unnecessary jargon for broad understanding or demand clearer explanation

2.2.2. Minireviews, Reviews and Primary Research

The article is aimed at a more specialised audience. Consequently, more extensive use of assumed jargon is acceptable. If you, a member with similar knowledge to the article, struggle to read the article due to dense verbiage, this should also be flagged as a recommendation for the author to clarify their thought process.

2.3. Figures and results

Figures are intended to draw attention to relevant points in an article, present results or illustrate a concept more clearly. Reviewers should

- Ensure that all figures are accurate. As described above, checking for any technical errors/inaccuracies is key.
- Ensure figures are properly cited and can be relocated if adapted from another source
- Figure clarity. Is the figure clear? How crowded or text-heavy is it?
- Accuracy of the figure legend. Often, legends fail to describe key features of the figure panels themselves or omit important information to understand them. The figure legend should be read to ensure its contents match the figure with sufficient detail **that it can be read independently of the main text and still be understood.**

Likewise, if the reviewer feels that a figure should be inserted to explain a particular concept, this should also be mentioned.

2.4. Argument validity and conclusions drawn

As discussed in subsection 2.1 Theory and factual information, a peer reviewer should check not only the accuracy and truth of the statements made in an article, but its logical structure. Peer reviewers should check that

- Conclusions follow logically from the statements made in the article. Does the conclusion, i.e., in the discussion section reach beyond its premises? If the conclusion makes a generalisation from results or data that appears unfounded, this should be flagged. Reviewers should check existing literature and citations made to assess the feasibility of conclusions made
- The author has not committed any fallacies or clear errors in reasoning. This resource, <https://www.logical-fallacy.com/articles/list-of-formal-fallacies/> can help identify the most common errors in reasoning you might encounter. These should again be flagged.

2.5. Methods and results

While more applicable to primary research papers and meta-analyses, peer reviewers must assess the quality of the methodology of a paper, namely, if the methods described are used, are they necessary and jointly sufficient to answering the questions laid out in the introduction? If the methodology is fundamentally flawed and cannot answer these questions or shows irrelevance, this must be flagged immediately and sent back to the school managing editor. The protocol is given below in Section 5. Some things to check:

- Experimental design – have authors/experimentalists tried to control confounding variables? Are suitable controls in place?
- Sample size – risk of sampling error, pseudoreplication or lack of technical repeats?
- Output variable(s) – is the measuring apparatus or system of measurement appropriate and suitable for answering the question(s) laid out in the introduction? Read the method closely for technical specifications, statistical analyses completed, animal/cell systems if relevant **using your background in the subject** and **existing literature**.
- Sufficient detail in methodology. Given the information presented, could another experimenter reproduce the experiment perfectly? For meta-analyses, this would include details on search parameters, indexing platforms (Web of Science, PubMed, etc.)
- Result presentation. Using the methods given, can the results given be attained? All results and figures presented should have been generated using the methods given.

2.6. Citations

Citations are what enable researchers to see further than others by “standing on the shoulders of giants” (Sir Isaac Newton in conversation with Robert Hooke). Citations are allusions made to literature supporting an assertion made in the article. As a peer reviewer, one must ensure that

(1) The citation style is correct and free from errors. SaintScience uses IEEE format (please see the handbook on our editorial house-style or visit saintscience.wp.st-andrews.ac.uk/submissions/editorial-house-style). Therefore, the first evident feature to check for is consistency in the referencing style in terms of in-line citations and the bibliography. In the bibliography, peer reviewers should confirm that the format is consistent.

(2) Citations are made almost exclusively to primary and secondary literature, to a lesser extent depending on the article format. Unlike media reports, our articles should synthesise the findings from the source rather than using filtered and reported articles. Primary sources include original research papers and meta-analyses, whereas secondary sources comprise reviews and comment articles. Tertiary pieces like news reports or bulletin updates should not be used as principal evidence for an assertion made in the article.

(3) All assertions made in the article that go beyond common-sense or background knowledge should have citations. While reading the article, peer reviewers should check whether any citations appear to be lacking in the article. If the peer reviewer discovers a statement made that does not rest on common sense or background knowledge **appropriate to the readership**, this should be flagged. The reviewer should also search for relevant literature to recommend a supporting citation to the author.

3. Peer Review pipeline

The review pipeline details what happens from the point of article submission to publication.

1 – Presubmission enquiry made via saintscience.wp.st-andrews.ac.uk/submissions/forms/ followed by article submission (~1 week)

SaintScience writers directly submit their articles using the article submission form whereas prospective authors submit article proposals or fully written article summaries via the presubmissions enquiry form. Following this, the relevant school head moves the article to their school folder on our Journal management system for subsequent processing.

2 – Initial screening by School Managing Editors (SMEs) to ensure the article is eligible and relevant to the school being submitted to (1-2 days)

SMEs will peruse the article to ensure it falls within the scope of the school and meets the eligibility criteria of the article format chosen by the author. If eligible, the article progresses to stage 3. If ineligible, the author is contacted and requested to make the article compatible. Alternatively, if the SME feels that the article should be reviewed by a different school, the SME will contact the SME of that school.

3 – Selection of peer reviewers by the SMEs (1-2 days)

If you are reading this, you are already likely a member of SaintScience as part of our fantastic group of peer reviewers, or perhaps you have been contacted outside the journal. SaintScience uses a **double-blind peer review system** which means that only SMEs and the editor-in-chief know the names of the

author and peer reviewers during article processing. SMEs have access to all the peer reviewers in their school by name and matriculation number and will elect a number of peer reviewers to review the article submission.

How many peer reviewers?

Comment and Opinion pieces

The SME chooses **two peer reviewers**

Review and Minireview pieces

The SME chooses **between three and four peer reviewers**

Primary research

The SME chooses **between three and five peer reviewers.**

Research abstract

The SME chooses **two peer reviewers**

Contacting peer reviewers

SMEs will contact all peer reviewers for requests to review articles by St Andrews email. They will give a brief summary of the article, its format and the expected time commitment.

4 – Accepting or declining the offer to review

Once peer reviewers receive the email from the relevant SME or editor-in-chief asking whether they be available and able to review the article submission, reviewers will have **two days** to accept or decline the offer to review. While reviewers are encouraged to take this chance as an opportunity for academic growth, peer reviewers **do not need to provide grounds for declining review** but should respond promptly. SMEs will then contact a different peer reviewer

If the reviewer accepts the offer, the SME will give access to the article and will ask the reviewer not to share or show the document to anyone else. When making comments on Microsoft Word or LibreOffice Writer, one's name should not be visible, only the matriculation number.

5 – Independent review process (<2 weeks)

Now, peer reviewers have time to shine. During independent review, the peer reviewer will conduct the substantive analysis described in Section 2 and make comments as appropriate on their version of the document. Each reviewer will do this independently of the others. Once the article has been fully reviewed, the peer reviewer will write a short report (<150 words) that is uploaded with the finally published article.

They will then upload the modified documents to the OneDrive repository shared in the offer email where the SME can then access all the reviewed documents.

6 – SMEs screen reviewer reports and comments. (1-2 days)

If (1) the article is free of any requirements for substantive change, the SME chooses one/two editors to edit and proof-read the manuscript. However, if (2) the article has correctable substantive suggestions, the manuscript is sent back to the author by the SME alongside the reviewers' reports. Once the author has made the corrections required, it is sent back to SaintScience for a follow-up round of review. This process is therefore a cycle between author and peer reviewer until the standard of the article is acceptable. (3) if the article possesses fundamental or

incorrigible errors, the article is rejected at this instance and the author informed. If major revisions by the author can rescue the article, the author would be contacted by the SME and manuscript is sent to editor

7 – The article is published on the website, advertised on our social media and made eligible for feature in our physical issue

Once the article has been reviewed, edited and formatted, it can then be published on our website and other platforms. However, we will always contact the author before doing this.

4. Peer Review Style

As described in Section 3, SaintScience uses a double-blind style with open review comments. We do this to eliminate the possibility of unconscious bias (towards friends or peers) of reviewers towards authors and vice versa.

As a committed open-access journal, we believe that peer review feedback should be available to anyone to provide advice in subsequent improvement of article quality. Therefore, when an article is published, the summary reports (<150 words) made by reviewers respectively are made available with the article for download.

Anonymity – reviewers' names are stored on our secure spreadsheet tracker alongside matriculation numbers. Only SMEs know the names of reviewers in their schools for the purposes of contacting and liaising with them.

Principle of open-access review – Once articles have been published, reviewers' reports are made available for download alongside the article. This ensures that others can benefit from the suggestions made by reviewers. Reviewers will remain anonymous throughout however.

Security – only relevant parties, namely, reviewers, SMEs, editor-in-chief and editors receive a copy of the article for review, eliminating the possibility of leaking

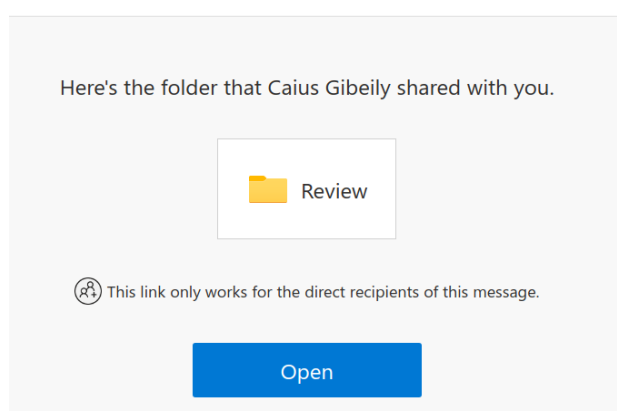
5. Protocol

This Section details the protocol that peer reviewers use following acceptance of an offer to review. It should be relatively straightforward but please do not hesitate to contact the SME with questions about the process.

5.1. Accessing the document

On accepting the offer, you will receive an email saying that 'x shared a folder with you'.

Caius Gibeily shared a folder with you



On opening the folder, you will find the article manuscript. Please download this document and save it as 'article-name-matric_no.docx'. For example, 'reactive oxygen species.docx' would be saved as 'reactive oxygen species-100000000.docx'

You will conduct all your comments in this one document. It is key that the original article is not edited but downloaded and saved separately.

5.2. Commenting

1. When commenting, please ensure that your name is not visible in the comments, since the author will receive a copy of your review. To do this, enable track changes in the review menu on Word. Then, click on the dialogue box launcher in the bottom right corner of the 'Tracking' box. You will have the option to 'Change User Name...'. This will direct you to 'Personalize your copy of Microsoft Office. Here, the username can be changed to your matriculation number and the initials left blank. You can uncheck the 'always use these values' to ensure that it does not interfere with your other documents.

5.2.1. Commenting style

- Please always be constructive in your comments. When a point is made well, or you are impressed with the findings, figures or work, please mention this. This will make authors more

receptive to criticism. Further, we should always praise good science in tandem with pointing out sources of improvement.

- Please be brief when making a comment. Comments should be concise and pithy. The comment should flag the problem, explain briefly why it is problematic and propose a change. Any citations in the comment should be made at the end of the comment
- While being brief, please make sure the comments fully explain the problem such that it is clear from the author’s perspective what must be modified.

5.2.2. Flagging

Discussed in Section 2 were various substantive problems you might encounter when reviewing an article. Clearly, while all substantive problems are flagged, some are more flagged than others. When making a comment, you should also highlight the degree of severity of the problem following the recommendations in Table 1. All comments should begin with the severity code (1-4), followed by the rest of the comment. This is your opportunity to exercise academic and scientific judgement, so please do not feel wary of assigning codes 3-4 if you deem it necessary. We trust your judgement! Please contact your SME if you’re unsure about assigning codes.

Code	Steps the reviewer should take	Features
1 – Minor problem, minimal revision needed	The errors are minor and do not constitute immediate concern. The rest of the article can be reviewed	<ul style="list-style-type: none"> • Rare or occasional factual errors and ambiguous language • Imprecise or unnecessary use of technical language or jargon • Citation format and occasional lack of citations which can be found easily following a search of literature
2 – More serious problem, more thorough revision needed	The errors are more significant but not sufficient to constitute immediate concern or termination of review. The rest of the article can still be reviewed	<ul style="list-style-type: none"> • Errors in argument structure or flaws in reasoning that persist throughout a greater part of the article • If a review article, omissions of relevant literature that you feel should be added to the article • Reporting errors – errors are made when reporting the findings of past literature or discoveries • Flaws in the figure or legend. However, unclear figure legends should be considered code 1

3 – Serious or immediate revision required, recommend sending back immediately to author

A fundamental problem in the structure, methods or results is found, or gross inaccuracies in knowledge. The reviewer should finish reviewing the article but contact their SME to notify them of their concern

4 – Unacceptable level of revision required, recommend rejection

If the article is found to have any plagiarism, major and irreversible errors in methods, results or knowledge, the peer reviewer should stop reviewing the article and contact the SME immediately. Their current document should also be uploaded. This event should be rare.

- Presence of irrelevant material
- Results do not fully follow from methods or contain major deviations from the methods
- Conclusions are irrelevant and do not link to the aims made in the introduction, or fail to follow from the results.
- In comment/opinion pieces, voice is too opinionated and consistency lacks substantive citation to support views
- Document fails to follow the University of St Andrew’s Good Academic Policy (GAP). Hence, code 4 is given to articles with plagiarised material and derogatory or discriminatory language
- Irretrievable problems with methods and results. For example, the methods are insufficient for answering the question, or the article contains extensive irrelevant material
- Major argument flaws and poor-quality material

Once all comments have been made, the final task is to write the Reviewer’s Report

5.3. Writing the Reviewer’s Report

The Reviewer’s Report (RP) is a summary (<150 words) made by the reviewer, recapitulating the main points they have made in the comments. They underline the strengths of the article in addition to sources of improvement. The RP should be written in the same document, before the first page of the manuscript. If necessary, a bibliography (in IEEE format) can be added to the end of the report. On Word, you can use ‘Page Break’ to add a page before Page 1. The report ends with a recommendation. Here, you could recommend four outcomes based on your perception of the article quality:

- The article only requires minor revisions (mainly code 1 but a few code 2s) but is otherwise nearly publication worthy
- While more serious revisions are needed by the author, the article is overall quite strong and publication-worthy once all changes have been made (more code 2s than 1)

- The article carries a few major problems that require immediate addressing by the author before proceeding (a few code 3s). Recommend sending the article back immediately to the author for correction
- The article is unacceptable. Recommend rejection of the article.

5.4. Uploading

When complete, the document should be uploaded to the same folder where the manuscript was initially downloaded. Please also contact the SME notifying them that you have now submitted your review. They will thank you and inform you of whether further review will be required after liaising with the author. If you have assigned code 4, then please upload the document to the same folder and contact the SME.

6. Thank you

Thanks again for choosing to peer review! We hope you gain a lot from the experience and welcome your suggestions. In SaintScience, we hope to provide access to all levels of journal involvement, from editing, management and review to writing and reading.