



OPINION ARTICLE

# Ten considerations for open peer review [version 1; referees: 2 approved]

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### Abstract

Open peer review (OPR), as with other elements of open science and open research, is on the rise. It aims to bring greater transparency and participation to formal and informal peer review processes. But what is meant by 'open peer review', and what advantages and disadvantages does it have over standard forms of review? How do authors or reviewers approach OPR? And what pitfalls and opportunities should you look out for? Here, we propose ten considerations for OPR, drawing on discussions with authors, reviewers, editors, publishers and librarians, and provide a pragmatic, hands-on introduction to these issues. We cover basic principles and summarise best practices, indicating how to use OPR to achieve best value and mutual benefits for all stakeholders and the wider research community.

### Keywords

open peer review, open science, good practice, research integrity



This article is included in the [Science Policy Research gateway](#).

### Open Peer Review

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**Competing interests:** BS is head of Open Science projects at Göttingen State and University Library. She contributes to several committees, e.g. the EC's Horizon2020 expert group on Future of Scholarly Publishing and scholarly Communication and Knowledge Exchange's Open Access Expert Group. BS and TRH are affiliated with OpenUP, an EC funded project which addresses key aspects and challenges of the currently transforming science landscape and aspires to come up with a cohesive framework for the review-disseminate-assess phases of the research life cycle that is fit to support and promote Open Science. BS is, and TRH was, affiliated with the OpenAIRE2020 project, an EC-funded initiative to implement and monitor Open Access and Open Science policies in Europe and beyond. TRH is Editor-in-Chief of Publications (ISSN 2304-6775), an open access journal on scholarly publishing published quarterly by MDPI and Senior Researcher at Know-Center GmbH, Graz, Austria, a research centre for data-driven business innovative information and communication technologies. XvE is business development manager at Copernicus GmbH, and open-access publisher (Copernicus Publications) and professional congress organizer (Copernicus Meetings). Since September 2015 she has been a member of the board of directors of the Open Access Scholarly Publishers Association (OASPA). ECM supported and initiated the development and implementation of new approaches to peer review and related policy at BMC (part of Springer Nature) until June 2018. She is also an Editorial Board Member for Research Integrity and Peer Review and a member of the Advisory Board for EntIRE (an EU proposal for Mapping the research ethics and research integrity framework).

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## Introduction

Peer review is heralded as the bedrock of quality assurance in scholarly communication, used to scrutinise, select, and improve manuscripts for publication (and further applied in many other contexts, including the review of grant proposals, conference papers, etc). However there are differences in the way various models of peer review are implemented. What is often termed ‘traditional’ or ‘conventional’ peer review is generally (1) partially or completely anonymous, with either the reviewer unknown to the author (single-blind review) or both author and reviewer unknown to each other (double-blind review); (2) selective, with reviewers invited by editors; and (3) opaque, with neither the review, editorial process nor the review reports themselves ever made public. Large-scale surveys continuously show that researchers hold peer review to be beneficial, but that processes are potentially often sub-optimal and open to criticism for being, for example, biased or slow (e.g. 1,2,3). In response to these criticisms, and as the wider agenda towards open research is taking hold, variations of open peer review (OPR) are increasingly being offered by publishers and third-party vendors as a regular or additional feature of the publication process.

So what is OPR? OPR means different things to different people and communities and has been defined as “an umbrella term for a number of overlapping ways that peer review models can be adapted in line with the aims of open science”<sup>4</sup>. Its two main traits are “open identities”, where both authors and reviewers are aware of each other’s identities (i.e., non-blinded), and “open reports”, where review reports are published alongside the relevant article. These traits can be combined, but need not be, and may be complemented by other innovations, such as “open participation”, where the wider community are able to contribute to the review process, “open interaction”, where direct reciprocal discussion between author(s) and reviewers, and/or between reviewers, is allowed and encouraged, and “open pre-review manuscripts”, where manuscripts are made immediately available in advance of any formal peer review procedures (either internally as part of journal workflows or externally via preprint servers).

All these features aim towards either increased transparency, rigour, or inclusivity in research processes, as well as recognizing reviewers’ contribution to published research literature, driven by a wide range of considerations. In this sense, this article sets out the following 10 items that outline how to apply OPR in a way such that it becomes a valuable exercise for you as an author, reviewer or editor.

The results of this papers have been derived from a review of a broad range of research studies (in some the authors have been involved), as well as practices and experiences at publishing houses that have implemented OPR (including those to which the authors are affiliated, for the literature review we build on<sup>4</sup>).

### Item 1: Understand what kind of peer review you’re dealing with

The term “open peer review” is often used to refer to a number of distinct innovations in peer review, which are combined in

many different ways<sup>4</sup>. As an author, reviewer or editor it is essential that you take the time to understand the choices and obligations you have under each system. Must reviewer identities be revealed or is this optional? Will reviewer reports be published upon acceptance, or even if manuscripts are rejected? Will authors and reviewers be brought into discussion with each other? Familiarising yourself with the particular aspects of an OPR process will help avoid any surprises later on. If in doubt, do not hesitate to contact the journal editor to clarify any questions. Editors play an important role in moderating the review process and are glad to provide additional guidance.

### Item 2: Open peer review relies on, and encourages mutual trust, respect, and openness to criticism

Whatever the degree of openness in a peer review process, as a standard form of academic best practice, it is essential to act with an attitude of charity and in accordance with the highest moral principles<sup>5</sup>. First of all, as a reviewer you should start with acknowledging the authors’ effort in presenting their results — i.e. review on the assumption that the text makes sense, that it is important and interesting, even if it does not seem so at first glance (cf. Davidson’s “principle of charity”<sup>6</sup>). In the review process, authors and reviewers typically collaborate on the improvement of a manuscript, which is in principle submitted as ready for publication. A notable exception here is the **registered report** article format in which the rationale for a study and the proposed methodology — the “study protocol” — are pre-registered with the journal and submitted for peer review before the actual gathering of data and research takes place<sup>7</sup>. During the review process, authors and reviewers may subjectively agree or disagree on how to present the results and/or what needs improvement, amendment or correction. Now imagine all this happens with readers able to see the process ‘live’ or after the article has been published! It is therefore essential that reviewers ensure that they communicate their points in a clear and civil way, to maximise the chances that it will be received as valuable feedback by the author(s). Authors should also be able to respond in kind (i.e., treating peer review as a dialogue, not a monologue), accepting comments and critique as a process of constructive collaboration in ensuring their work is of the highest quality for publication, and refrain from anything which could be interpreted as a vengeful action.

### Item 3: Open peer review enables constructive and efficient quality assurance

In situations where manuscripts are made available as a preprint and review reports are disclosed, all steps of the scientific quality assurance process can be traced and examined. Experiences gained since the early 2000s have shown that submissions that are posted publicly for interactive public peer review start off with a higher quality compared to those submitted in closed peer review processes<sup>8</sup>. Although some early studies found no overall change in quality between single-blind versus identities revealed to the authors (i.e. “open identities”)<sup>9</sup>, other studies have indicated that there may be an improvement of the overall quality of review reports under OPR, particularly that comments are more constructive<sup>10,11</sup>.

Some OPR approaches rely on a consensus-building process between the reviewers (e.g., [eLife](#) takes this approach), which is an efficient way of providing feedback to the authors. Consistent feedback saves the authors' time and is far easier to take into account than contradictory reports. Signed reviews enable direct communication between authors and reviewers and thus may also enhance constructive quality assurance, although there is a risk that non-anonymous reviews will be less critical.

OPR can also address aspects of the replication crisis making it easier for experts and non-experts to evaluate the reliability of findings.

#### **Item 4: Open peer review increases transparency and accountability**

Transparency in peer review — i.e. with review reports and/or reviewer identities disclosed — can be beneficial for all parties — authors, reviewers, editors, and readers. Transparency of the peer review process enables readers to see how any (dis)agreements (and potential biases) were addressed and how the final version emerged (who argued for what, what arguments were adopted, how controversial points were addressed, etc.). This is especially the case when the authors' responses to the reviewers' comments are also published. An OPR process also makes the reviewers accountable for their comments, and indeed the editor accountable for their choice of reviewers and the final acceptance decision. On this basis, the research community and wider public can assess all comments made by authors, reviewers and editors, and may even participate in the discussion. By fostering such transparency, OPR reports can help dispel persistent concerns about the rigour of peer review processes<sup>12</sup>, or even highlight places where these concerns might be perfectly legitimate.

In fact, were OPR the standard, it could help distinguish journals, authors, editors, and reviewers who follow good practices from those that do not. Furthermore, the growing body of openly available publications together with review reports also enables the mining of content and perceptions as well as directions of research, including the assessment of “quality and quantity of contributions to the peer-review process alongside publication record as an additional measure of a researcher's impact in his or her field”<sup>13</sup>. However, how to best archive and preserve published review reports and related comments has yet to be addressed comprehensively.

#### **Item 5: Open peer review facilitates wider, and more inclusive discussion**

Research findings emerge in a complex network of scholarly communication, but only a small part of this process is currently recorded and made publicly available to authors, reviewers, and readers. Publicly available peer review reports, comments and discussions broaden the perspective on the research presented. They document how reviewers and authors, as representatives of the research community, evaluated the work's achievements, merits and shortcomings in its early stages of being ‘made ready’ for publication. Depending on the topic, papers may receive from just a few to up to a hundred comments<sup>8</sup>

(for a paper which received many comments see e.g. [14](#)). Again, journal editors can play an important role in encouraging and moderating comments from the research community and the wider public.

If the process is opened up to the wider community, additional constructive input (in addition to the reviewer reports) can help to further enhance the quality of a manuscript. Examples for journals with such discussions are the [Journal Economics](#), the interactive journals of [Copernicus Publications](#), and [SciPost](#). This type of open commenting facilitates discussion and (in some approaches) consensus building between reviewers and authors. Finally, as an author, you may cite reviews and comments in your revised version, and thus acknowledge these contributions.

#### **Item 6: Open peer review gives reviewers recognition and makes reviews citable**

Peer review, done well, is hard work — usually taking between 5 hours (median) and 8.5 hours (mean) per person per review<sup>15</sup>. Yet, traditionally there have been few obvious incentives for reviewers, beyond a quid pro quo status of mutualism. A recent survey of almost 3,000 reviewers found that 4 in 5 agreed peer review is currently insufficiently recognised, and that reviewers would invest extra effort if review activities were formally acknowledged in research assessments, promotion processes and funding applications<sup>16</sup>. OPR can facilitate this by making review activities visible, open to inspection, and formally citable (e.g. by assigned DOIs to review reports). Traditionally, as a reviewer, it was only possible to indicate the journals that one had reviewed for — now with open reports linked to reviewer identities, reviews become creditable research outputs in their own right. Crossref has recently adopted a metadata schema that allows DOIs to be assigned to reviews, enabling peer review reports to be persistent research outputs, which can be listed on CVs and ORCID profiles<sup>17,18</sup>.

#### **Item 7: Open peer review is gaining popularity**

While OPR is not without its challenges (e.g. [19,20,21](#)), support is growing across various fields. It has long been recognized to be feasible in practice<sup>13</sup> and in recent optional trials, the majority of authors are willing to publish the full peer review history if given the opportunity (e.g. [22,23](#)). However, there are still strong concerns against disclosing reviewer identities, with more than half believing it would make peer review worse<sup>24</sup>. Anecdotal evidence from editors suggests it can be harder to find reviewers who are willing to agree to OPR, however this is not insurmountable in practice<sup>25</sup> and can be outweighed by the advantages discussed above. OPR is certainly happening across many research fields and looks set to rise in the future<sup>26</sup>.

#### **Thing 8: Open peer review offers learning opportunities and facilitates training**

With every review process, both early career and established reviewers can learn something, typically about a new finding in their field of research but also through providing feedback and advice to other researchers. Where reports of fellow reviewers are made available, it is worthwhile to read them carefully and learn from them in writing your next review<sup>5</sup>. OPR opens up this

opportunity to a wider audience, and adds further learning points. Consider using open review reports as instructive material in training sessions with early career researchers on how to write a good review. Open review comments offer further opportunities: they can serve as a testing ground for brief feedback or more comprehensive additional reviews.

However, as an early career researcher you may not feel comfortable to step into a fully open review process, in particular if you have strong opinions about the paper under review. Perhaps, a potential compromise is to start with a journal that allows you to become gradually open. For example, [Royal Society Open Science](#) and [PeerJ](#) encourage but do not require reviewers to sign their reports, and authors are allowed to decide whether reviewer reports and author responses are published alongside articles. In addition, turning to a trusted mentor for advice whilst undertaking a first-time OPR may be helpful.

#### **Item 9: There is room to practice open peer review even if it has not been formally introduced yet**

Even where journals do not formally operate an OPR process, as an author or reviewer you will still have room to practice openness. For example, you can often choose to sign your review, although this can depend on the individual editor or peer review workflow whether this information will be passed to the author. When signing reviews you may consider doing so with reference to the [Open Science Peer Review Oath](#)<sup>27</sup>. A more radical step is for a reviewer to publish the review report, however, this would require express agreement in advance with the authors and journal.

The most radical approach from a reviewer perspective was recently featured in [WIRED](#) magazine: neuroscientist Niko Kriegeskorte advocates only reviewing manuscripts that have already been made available online on a preprint server. When he receives a review request, he first emails the author to identify himself and advise of his review policy, requesting the author upload a preprint online. He then reviews the paper, posts the review on his blog and in conclusion sends the review to the editor<sup>28</sup>. In a similar spirit, the [PRO initiative](#) encourages reviewers to make openness of underlying research data and related materials a pre-condition of comprehensively reviewing a paper.

As an author there is less room for direct interaction in the traditional journal setting but with the emergence of preprint servers in many fields you have new opportunities to collect feedback and comments from the scientific community and wider public, both in public and private. If you want to crowd-source additional comments and reviews for your manuscript via open participation, this is still possible even if the venue you submit to does not practice such peer review — simply post your pre-review manuscript to a preprint-server simultaneously with submission and invite feedback through commenting features, e.g. services for collaborative review of preprints<sup>29</sup>, or just ask people to email or contact you via social media (again, do acknowledge these contributions in your revised version). However, as some journals consider posting on a preprint server as pre-publication you need to check beforehand if your preferred journal permits

posting on preprint servers (cf. the [SHERPA RoMEO](#) database and [Wikipedia's Academic journals by posting policy](#)).

#### **Item 10: We need more analysis of and research on open peer review**

It is well recognized that the diverse practice of peer review is not without its flaws (for a summary see e.g. [30](#)). Although OPR may help address some of them, it will not solve them all or suit every community. OPR can provide incentives for robust open research practices but will not be able to completely prevent undesirable behavior or even misconduct. However, it provides a means to make such cases much more transparent, even in cases of retractions (for an example discussed on [Retraction Watch](#) see [31](#)).

There is still need for further research into OPR, especially in terms of both desirable and unintended outcomes as well as efficacy compared to conventional processes. We need additional evidence from authors, reviewers and editors on how effective OPR actually is in various fields. We also need further research into which issues and biases in peer review still need to be addressed<sup>4,24,32</sup>, and how the publication environment can be further improved in order to better support diversity and inclusivity in peer review. OPR is not a panacea and other models, experiments and initiatives with peer review may help to address some of the concerns with traditional peer review.

#### **Discussion**

In this section we would like to briefly outline where further investigation is needed especially with regard to unintended effects, possible biases, how to mitigate those effects and what role “opt-out” may play in the above good-practice recommendations.

Are there any rules missing? Possible “Opt out if there is a sound reason to do so” could be considered. For example, in pilots with OPR experiments<sup>10</sup>, about 1 in 10 reviewers declined to review due to a potential conflict of interest and 1 in 4 for personal reasons. However, time was the most important factor (over 2/3). In the context of this paper, we have refrained from introducing an “opt out” related to any of the traits of OPR as the option to decline to review seems sufficient.

One further open question is who benefits most from OPR, e.g. is it the case that there are more positive reviews for well-established researchers or for papers which tackle more trendy topics? Which biases play out in OPR? Are language skills a factor? Are there country, subject or gender biases? How can such effects be controlled/mitigated? For the latter there certainly is a role for e.g. editors, who can amend policies and provide additional instruction and education. Is “open reports” the best we can have given the strong competition in academia?

Some of these questions are currently being explored, e.g. in the context of the EU-funded [OpenUp](#) project. In addition to exploring workflows and the behavior of all actors involved, OpenUp proposes to collect and aggregate data across publishers in order to evaluate the efficacy of OPR processes<sup>33</sup>.

However, the good news is that in OPR settings biases can be monitored and inform interventions. E.g. a recent study revealed that all-female economics papers remain six months longer in peer review than all-male papers, and the author expressed that hope that open peer review may prevent such behavior<sup>34</sup>. An investigation based on Wellcome Open Research from the first year of operation (based on 142 papers, gender of first author) showed that reviewers took only a few days longer to review papers of female first authors (19.5 vs. 14 days for female vs. male first authors)<sup>35</sup>. Further investigation would be desirable, in order to monitor undesirable behavior and identify opportunities for editor intervention.

## Conclusion

OPR is an innovation in scholarly communication that deserves further attention. As we have outlined in the 10 items above, it places a research work in the context of a discussion, and gives authors, readers and others a chance to better understand the process from the initial manuscript submission to final published version. As such it provides excellent learning opportunities and the potential to improve scholarly communication and research towards a more transparent, collaborative and participative undertaking.

## Data availability

No data are associated with this article.

## Competing interests

BS is head of Open Science projects at Göttingen State and University Library. She contributes to several committees, e.g. the EC's Horizon2020 expert group on Future of Scholarly Publishing and scholarly Communication and Knowledge Exchange's Open Access Expert Group.

BS and TRH are affiliated with OpenUP, an EC funded project which addresses key aspects and challenges of the currently transforming science landscape and aspires to come up with a cohesive framework for the review-disseminate-assess phases of the research life cycle that is fit to support and promote Open Science.

BS is, and TRH was, affiliated with the OpenAIRE2020 project, an EC-funded initiative to implement and monitor Open Access and Open Science policies in Europe and beyond.

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ECM supported and initiated the development and implementation of new approaches to peer review and related policy at BMC (part of Springer Nature) until June 2018. She is also an Editorial Board Member for Research Integrity and Peer Review and a member of the Advisory Board for EnTIRE (an EU proposal for Mapping the research ethics and research integrity framework).

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This is a nice introductory article to a reader who wishes to learn about open peer review. Authors introduce the main concepts and lay down ten items to be considered when dealing with open peer review. It will be useful to early stage researchers and general readership new to the issue.

This is not a research article, but a non-systematic review of existing literature with recommendations from experienced researchers and professionals in the field.

In my opinion, the article can be indexed without revisions.

Minor point:

- pp 4 bottom right says "Thing 8" - should be "Item 8" (?)

**Is the topic of the opinion article discussed accurately in the context of the current literature?**

Yes

**Are all factual statements correct and adequately supported by citations?**

Yes

**Are arguments sufficiently supported by evidence from the published literature?**

Yes

**Are the conclusions drawn balanced and justified on the basis of the presented arguments?**

Yes

**Competing Interests:** No competing interests were disclosed.

**I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

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**Richard Smith** 

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I'm glad that this article is already available to be read by those who want to know more about open peer review, particularly young researchers. The article is a useful guide.

Ironically, I think that little value will be added by me peer reviewing it openly or otherwise. If the article had been submitted to a more traditional journal, including many that review openly, then it would not be available for people to read. It might have languished for months while it progressed slowly through the bureaucracy of science journals. Indeed, it would probably be rejected because there is little or nothing that is new in the article. The article would then work its way down the food chain of journals before appearing in an obscure journal where few people would read it, especially if it appeared in a journal behind a paywall.

Why have the authors submitted the paper to a journal? Why haven't they simply posted it as a blog and used social media to promote the article? They might easily achieve a higher readership, and presumably it is readers that they want. Or is it? I think that these authors are primarily interested in readers, but sadly the main motivation for many authors is simply to add to their CVs and increase their chances of raising more grants and getting promoted.

I am letting my cynicism about the whole process of science publishing shine through, and I would have liked this article more if it had been less accepting of the status quo and more questioning. But that is probably not the role of a simple guide.

I don't have any major criticisms of the article, and it will be fine if it published and indexed as it is. But here are some comments in descending order of importance.

1. I think that the authors could have done a better job of discerning the quality of the evidence they quote. As I've argued elsewhere peer review is more faith than evidence based, <https://breast-cancer-research.biomedcentral.com/articles/10.1186/bcr2742> and scientists who would not advance strong views on their own subject without evidence are quite happy to make statements on peer review without evidence. For example, in Item 3 the authors write: "Although some early studies found no overall change in quality between single-blind versus identities revealed to the authors (i.e. "open identities"), other studies have indicated that there may be an improvement of the overall quality of review reports under OPR, particularly that comments are more constructive." They do not make clear that the first study was a randomised trial, a much more reliable method than the later studies, one of which was simply a survey and the other a retrospective study.

2. This is not a scientific study, but the authors do outline what might be described as their methods in the fourth paragraph. They might usefully expand this, providing more information and explaining how this paper builds on their systematic review.

3. This is my bias, but I'd have liked to see a short section pointing out that there is little empirical as opposed to anecdotal evidence to support peer review but lots demonstrating its problems. At the end they cite my article in the JRSM, but they would do better to cite my article in Breast Cancer Research<sup>1</sup>, which is more up to date and contains more data. They might also have discussed more the objectives of peer review.

4. The authors suggest that tyro reviewers might start with journals, like *Royal Society Open Science* that allows reviewers to choose whether or not to be named. This is a tangential point, but I think that offering this option is probably a bad idea. I've experienced a case where a journal rejected a paper on the basis of an unsigned review while also sending the authors a glowing signed review. You can imagine that this

seemed unfair to authors. The other strategy the authors suggest--of consulting a mentor--is a much better idea.

5. Perhaps the authors might say more about the ethics of open peer review. We introduced open peer review at the BMJ when I was the editor largely on ethical grounds as our studies did not show that open peer review was superior to closed peer review<sup>2</sup>. All publishing should be about credit and accountability, and closed review is weak on both.

6. I, like most readers, find it annoying when authors introduce things I've never heard of without saying more. I'd like them not just to give a reference to Open Science Peer Review Oath but tell me a bit more in this paper. Similarly they refer to "the PRO initiative." Is PRO a reference to the Peer Review Oath? I guess that it probably is, but I don't want to have to guess.

7. I wish the authors had not succumbed to the academy disease of acronyms. I'd like them to spell out OPR, and there is something particularly silly about referring, as they do, to "the process of OPR."

8. I hadn't heard of the process the authors mention adopted by Niko Kreigeskorte, but I think it a great idea. Like him I will post these comments on my blog as well as on *F1000Research*.

#### Conclusion

As I said at the beginning, I'm sure that some researchers and others will find this guide useful, and I'm glad that it's already published. The authors might want to revise the paper in the light of my comments, but I don't think that it's essential. I support the paper being indexed whether or not they revise the paper.

#### References

1. Smith R: Classical peer review: an empty gun. *Breast Cancer Res.* 2010; **12 Suppl 4**: S13 [PubMed Abstract](#) | [Publisher Full Text](#)
2. Smith R: Opening up BMJ peer review. *BMJ.* 1999; **318** (7175): 4-5 [Publisher Full Text](#)

**Is the topic of the opinion article discussed accurately in the context of the current literature?**

Partly

**Are all factual statements correct and adequately supported by citations?**

Partly

**Are arguments sufficiently supported by evidence from the published literature?**

Yes

**Are the conclusions drawn balanced and justified on the basis of the presented arguments?**

Partly

**Competing Interests:** I am a critic of peer review, but if there has to be peer review I much prefer it to be as open as possible. Articles by me, including a research study, are cited in the article. I am involved with Open Pharma, which is encouraging pharma companies to adopt open science. I am paid for that work, and so I suppose that gives me a financial interest in open peer review; but as I don't need the money I think that my intellectual bias is much stronger than any financial bias.

**I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

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