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Should we be wary of the role of scientific publishers in Open Science?

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Abstract

We wish to express our concern for the role of for-profit scientific publishers in understanding and appropriating what “Open Science” means. This role can be characterised as opportunistic, and has led to an interpretation that can cause considerable confusion when we identify Open Science with Open Access and Open Access with "paying for publishing”. This simplistic approach to what Open Science entails has led to poor quality publications, hindering the improvement of researchers' practices and culture. We discuss and clarify issues, identifying “false friends”, misunderstandings and misleading interpretations of Open Science. A superficial interpretation, sometimes driven by vested interests or simply due to the proliferation of bad practices, leads to unethical behaviour or simply opportunism, in the ‘publish and perish’ context where Open Science has developed. We then provide guidance on challenges and potential solutions for all stakeholders to increase rigour and credibility in science, through a genuine researcher perspective of Open Science.

Keywords

Open-Science, Open Access, Publishers, APC, rigour



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Introduction: The state of the scientific publication market in the Open Science era

Open Science is a global term referring to "an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible, and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation, and communication to societal actors beyond the traditional scientific community" (UNESCO, 2021). Scientific publishers are increasingly promoting the term "Open Science" (*e.g.*, Edmunds *et al.*, 2022). As an example, Frontiers' Director of Public Affairs, recently published a blog post titled *"Who's Afraid of Open Science?"* (Ciavarella, 2023). There's an evident paradox when we look at this emphasis on transparency on the part of the publishers and their accompanying practices.

It is the case that the traditional model of publishing had important problems. The process of continual revisions often changed the meaning of what authors wanted to convey and consumed a great amount of resources (Frey, 2003). In addition, the subjectivity in the process led to many articles that did not seem as very "significant" to be left outside the corpus of mainstream published research. Moreover, the ability to read most of the scientific literature was largely inaccessible without institutional access. Accordingly, calls were made to simplify the publication process of endless revisions and subjectivity, remove the barriers to accessing articles and embrace a new model. Our main point is that many attempts to promote such a model have resulted in an even more problematic regime and that having publishers promote Open Science distorts the principles of the Open Science movement.

In the evolving landscape of scientific inquiry, the transition from traditional publication models to the principles of Open Science represents a crucial issue. Open Science is more than a movement, an attitude and a brand (Méndez, 2021) aimed at enhancing transparency, accessibility, and reproducibility in research, fundamentally altering the scientific publication market. Open Science, characterised by its commitment to making research outputs publicly available without restriction, challenges existing publication practices and economic models. It necessitates a redefinition of the roles of publishers, researchers, and funding agencies in the dissemination of scientific knowledge. The imperative for accessible and open research outputs, including publications and data, is reshaping the metrics of scientific impact and the mechanisms of scholarly communication.

The conversation surrounding the role of for-profit scientific publishers within the context of Open Science is multifaceted, blending ethical considerations with the practicalities of disseminating scientific knowledge. For-profit publishers have been critiqued for their business models, which can seem at odds with the ideals of scientific research accessible to all. A Guardian article from June 2017[1] underscored this tension, by highlighting how scientific publishers achieve huge profits by managing to avoid many of the actual costs associated with publishing. This business model raises questions about the allocation of resources within the scientific community and the accessibility of research findings. The contrast between the ethos of Open Science and the practices of profit-driven publishers highlights a critical issue: balancing business sustainability with the broad availability of scientific publications.

The discussion about scientific profit-driven publishers and how they use Open Science for their own benefit is not just about profit, but also about how the scientific community can best disseminate knowledge in ways that are ethical, equitable, and conducive to advancing research and innovation.

Transparency in publisher's activities

"Predatory publishers are corrupting open access". This is the title of a paper published in 2012 by Jeffrey Beall, in which the author stated that publishers promote access at the expense of quality (Beall, 2012). We argue that the situation is now worse. Some researchers adopted a radical view we don't disagree with, by stating that all publishers are predatory, but some are more so than others (Amaral, 2018). Since 2016, Frontiers and MDPI have seen a reduction in the response time and rejection rates of their journals, and a significant increase in the number of articles published (+1080% for MDPI, +675% for Frontiers, Hanson *et al.*, 2023). Both publishers have also seen an increase in the number of citations between articles published in the same journal and the total number of articles per journal. This led some of their journals to be *delisted* from the Web of Science in March 2023 (Brainard, 2023; Quaderi, 2023). The reputation of some Open Access scientific journals (and their editors) has been questioned when *paper mills* (companies that churn out fake scientific manuscripts to order, Else & Van Noorden, 2021) were used to publish papers in the journals of these editors. Moreover, there is an inordinately low rejection rate of papers in the case of MDPI and a high rate of special issues in Frontiers' current publishing strategy. Hindawi, a former publisher bought by Wiley, said that they are "taking an open science approach to publishing" (Hindawi, 2022). Nonetheless, they had more than 9600 retractions in 2023 (Mallapaty, 2024) because of "concerns that the peer review process has been compromised" and "systematic manipulation of the publication and peer-review process" (Van Noorden, 2023a). Fake papers and retractions are increasing exponentially across all fields, and at the same time, publishers continue adopting and communicating about open-science publishing.

[1] Is the staggeringly profitable business of scientific publishing bad for science? by Stephen Buranyi, 27 June 2017. Is the staggeringly profitable business of scientific publishing bad for science? | Science | The Guardian

Examples include the *International Journal of Environmental Research and Public Health* which released six special issues per day, before being delisted from Web of Science. Another example is the journal *Sustainability*, where critiques encompass both special and regular issues. These critical assessments involve scrutinising authors' affiliations and potential roles as editors or colleagues from the same university. Intriguingly, a substantial proportion of articles published in *Sustainability* (42.3%) exhibit minimal to no correlation with sustainability themes (Repiso *et al.,* 2021). The significant percentage of articles seemingly disconnected from *Sustainability* addressed topics underscores potential diversions in the journal's content focus. Finally, there are cases in which some researchers paid to be listed as authors in publications (Perron *et al.*, 2021). All of this while MDPI, Hindawi, and Frontiers (but also many others) emphasize the need for Open Science to increase quality in science (Brainard, 2023).

Even Elsevier, the most important publisher in the research ecosystem, and proponent of open science, has faced criticism. Elsevier published research outputs from paper mills (*e.g.*, Marcus, 2022) and had "sponsored scientific papers" by the pharmaceutical industry (Elsevier, 2009). It was recently discussed that Rafael Luque, a virology researcher at Universidad de Córdoba, has been publishing one article every 37 hours, mainly in Elsevier-owned journals (Ansede, 2023). RELX, the parent company of Elsevier, employs at least two full-time lobbyists in the European Parliament (LobbyFacts.eu, 2023).

While all these for-profit companies emphasise the need for more transparency in science, researchers call for more transparency regarding these research publishers' processes. The European University Association (2018) stated that it was "*very concerned about possible irregularities concerning pricing and market conditions in the research publishing sector. We find that the current lack of transparency and competition is harmful to knowledge dissemination and the progress towards a European science system based on Open Science.*"

Open Access and Article Processing Charges

An important issue is the benefit of academic publishers from Article Processing Charges (APCs) accompanying the shift to Open Science, and more particularly Open Access. Only recently, a study revealed an "oligopoly" based on APCs. Using Open datasets and historical fees, Butler & colleagues (2023) estimated that authors paid around USD 1.06 billion in publication fees to Elsevier, Sage, Springer-Nature, Taylor & Francis and Wiley between 2015 and 2018. The exponential increase in the total number of articles published since 2020 should further increase revenues from APCs (Hanson *et al.,* 2023).

As highlighted by our literature review, many authors try to raise awareness of these issues but are not alone. Editors are also inclined to rebel against APCs and publisher malpractice by resigning en-masse (Sanderson, 2024). In 2015, the 37 editors of Lingua resigned to protest Elsevier's policies on pricing (Jaschik, 2015). In April 2023, 42 editors from NeuroImage (another Elsevier set of journals) resigned because, as they stated, the fees for the APCs were unethical (Sanderson, 2023). More recently, co-editors of Syntax (a Wiley journal) resigned and in the letter sent to the community, they stated "We are resigning to protest charges imposed unilaterally by the journal's publisher." (Abels, 2024). All over the world, and in journals belonging to various publishers, editors try to raise concerns about APCs, with moderate success.

Thibault and colleagues stated in their 2023 paper (p. 16): *"Organised discussions about open access go back as far as 1995, followed by the Budapest Open Access Initiative in 2001, and mandates for open access from several government funders over the past 20 years. Yet, high-end estimates place the percentage of open access publications around 50%, and the high cost of publishing was not addressed but instead transitioned in part from subscriptions to article processing charges. Moreover, because this transition was not accompanied by widespread changes in how researchers are assessed—where research volume remains a priority—other problems such as predatory journals and paper mills emerged. This story highlights the level of persistence and coordination needed to drive change and address unintended consequences. To achieve a research ecosystem that is substantially more open, rigorous, and collaborative will require much larger efforts, supported by sustained funding from governments and institutions."*

Under the publication conditions presented above, we claim that the current publication system can distort Open Science, by presenting a vision of Open Science that fails to consider the need for quality inherent in scientific production. We especially argue that scientific publishers, but also institutions, tend to confound Open Science and Open Access, underfunding the quality control of data while overfunding Open Access, without sufficiently consulting the researcher community on global scientific objectives. We call for greater cautiousness when dealing with the promotion of Open Science, and a stronger reliance on Open Science practices by and for researchers instead of by institutions and publishers and for publishers.

Open Science, isn't it?

Open Science for Open Societies EU describes the European Union Research and Innovation Programme, Horizon 2020, as "almost reduced to open access" (os4os team, 2022). Similarly, for the European Commission, Open Science is limited to Open Access and Citizen Science.[2] The issue of data quality (*i.e.* cases of fraud, low level of reproducibility, high prevalence of researchers malpractice, increase in publications by papers mills and tortured sentences by artificial intelligence

[2] One can have a look at the main page Open science (europa.eu). 'Open science' and 'Open Access' are mentioned several times, including in titles, while the words 'verification' or 'analysis check', that should accompany open access, (Thibault *et al.,* 2023; Vazire & Holcombe, 2022) are never mentioned. Consultation date:18/12/2023

in the current literature), but also other fundamental aspects of Open Science (*e.g.*, diversity of opinion, inclusivity) are not mentioned. However, quality control is fundamental to understanding the challenges of Open Science (Hrynaszkiewicz, 2019).

The number of retractions for scientific fraud is increasing exponentially (Oransky, 2022). The idea that one can believe that an article is legit based on the openness of its data or results, without trying to replicate and peer-review its results, is no longer tenable. Quality control, and thus self-correction mechanisms, is a core aspect of science that has been neglected while being intimately connected to transparency. The following sections will detail aspects of Open Science that could be improved to benefit researchers, and more generally, advance the quality of scientific publications. In Table 1 we summarise our approach about what Open Science is and what it is not, along with normative statements concerning how to ensure that Open Science benefits the society as a whole.

Ensuring quality control: Vital to the integrity of scholarly data

Transparency, applied to scholarly data, to methods and procedures, to the analysis, and to Open Access to manuscripts, allows everyone to verify others' work. Simply opening up the data does not guarantee reliability. Transparency of scientific output is not enough, there needs to be a clear and defined process for this verification, a kind of quality control. As Vazire and Holcombe (2022) pointed out, several observable indicators can be used to determine how well a research area uses transparency and how well the research area uses critical appraisal. A transparent research area has open data, code, materials and methods, an individual contribution indicator, an open peer review, pre-registration and planning or a registered report format, and low barriers to entry. A field of research using critical appraisal has automated error detection systems, computational reproducibility checks, empirical replicability checks, pre- and post-publication peer review systems, detection of errors and biases in the literature, strong theories and predictions, and a diversity of methods and results. A quality field of research must possess both dimensions, transparency and quality control, and not overlook any of them.

Changing the research culture

If it is not possible to change the scientific process towards greater transparency quickly, it is just as difficult, if not more, to change the research culture. Merton (1973) stated that researchers use four standards of research: universalism, communalism, disinterest, and organised scepticism. We now know that the four standards have not been reached (Vazire, 2018). Recently, Vazire proposed to transform Merton's norms, (thought of as descriptive norms) into prescriptive norms: It is necessary to modify the norms to create a culture of organised scepticism that allows us to doubt each other to collectively improve the results of our research.

A definitional issue

As of 2020, Elsevier no longer calls itself a scientific publisher, but rather an information analytics company (Elsevier, 2023). The reorganisation of the main publisher as an information analysis company leads us to collectively rethink the researchers' work. Are we solely producers of information that can be freely shared, then analysed and sold by big companies? How much of this money can be reinvested in quality control of the information published? What does a researcher do, and how can their know-how be assessed? Instead of advancing the specialisation of tasks, researchers are mostly seen as and are asked to be, a Jack of all trades. We are asked to do both research and teaching, generate hypotheses, test them, collect data, transform them, analyse them, draw conclusions, draw generalisations, and write an article, all of that in addition to the various administrative tasks. Most of these tasks are not valued in the assessment for the advancement of researchers' careers. The predominant measure of a researcher's productivity is the metrics related to the articles written and the journal in which they publish (Moher *et al.*, 2018; Rice *et al.*, 2020). This has led to an untenable situation in which more and more "extremely productive" authors compete by producing fake papers (Conroy, 2024). Open Science is a way of valuing other tasks that are essential to scientific

Table 1. Open Science challenges and potential solutions.

Statements	Scope	Beneficiaries
➢ Open science is not a set of skills, but a research culture ➢ Open Science should not be reduced to open access. (Thibault *et al.*, 2023) ➢ Open Science is not only about transparency but also quality control. (Vazire & Holcombe, 2022) ➢ Open Science should be normal Science.	➢ The objective is the improvement in the quality of the scientific process. ➢ Open Science is not an aim in itself. ➢ If Open Science becomes the norm, the need for improvement of quality may still exist.	➢ Researchers are the main beneficiaries of Open Science. ➢ Therefore, Open Science needs to include the needs, costs, and benefits of the research community. ➢ Editors, institutions, and non-scientific businesses should not be the main beneficiaries of Open Science. ➢ Citizens cannot be the main beneficiaries of Open Science.

production (Stracke, 2020). It is necessary to put more emphasis on scientific work over the long term, by funding servers, giving salaries to employ people who keep the open databases updated, and researchers who check the quality of the data, as well as the reproducibility of other researchers' results, a work that is traditionally referred to as "red teams" (Korbmacher *et al.*, 2023). Redefining Open Science must make it possible to redefine science as such, enhancing the researcher's know-how and the research culture.

Thus, we emphasise the need to have a strong definition of Open Science, which includes the verification of the quality of what is opened, to increase the overall quality of the research output. The idea of moving away from an outdated and reduced definition of Open Science as just Open Access is not new (Allen & Mehler, 2019; Persic *et al.*, 2021; Purić *et al.*, 2019). As stated by Méndez and Sánchez-Núñez (2023, p. 204). "Institutions, researchers, and founders are hostages to an anachronistic, absurd and ineffective scientific communication model based exclusively on 'the scientific paper' as an end in itself. This 'paper-centric' model often leads to a simplistic conception of Open Science as 'Open Access to scientific publications'". Overcoming this simplification can only be done with a clear vision and definition of Open Science, encompassing both the aspects of transparency and quality control equally, without neglecting any of these aspects.

The pursuit of scientific quality

Open science is not an objective in itself. It serves a more important goal, as it allows for a better quality of scientific findings. Transparency (and even more so, Open Access) is only a means, or more precisely, a part of a means, for better science. The second and perhaps the most critical part is the quality control. It is necessary for researchers not to forget that Open Science is a new vision of the research process that has only one objective, to improve the quality of knowledge production. Once Open Science is the norm, the process of improvement will continue. The goal is and will remain, to ask researchers what is not working well enough in the scientific process to fix and improve it.

Open Science: by whom and for whom?

While Open Science can benefit the public good and citizens as an endpoint, we argue that Open Science should directly benefit the research ecosystem because they are the ones changing their own culture of research. They should be the main beneficiaries of the changes induced by Open Science. Accordingly, researchers should have a strong say in the developments that concern the Open Science movement. In fact, some Open Science groups included scientists in the policymaking process. For example, the Coalition for Advancing Research Assessment (CoARA, 2023)[3] created working groups organised by researchers. However, the inclusion of researchers in the global scheme of things is not systematic yet. Some important work tools for researchers are neglected by funders, such as the important online repository PsyArxiv which recently asked researchers for financial support (Bottesini, 2023). Data Colada (2023) financed their defence regarding the accusation of defamation for having indicated data tampering through fundraising by the research community. In the long run, it is not sustainable to protect self-correction systems from lawsuits with community fundraising. Open science should find a means to protect from lawsuits from these researchers who conduct corrections. The group of funding agencies cOAlition S pressured journals to allow for Open Access publishing, but as stated by Liverpool (2023): "One criticism of Plan S was that it was launched with little input from the research community, a mistake that the leaders don't want to repeat." In any case, Open Science plans that are not designed by and for researchers are not desirable and should be viewed with scepticism.

Conclusion

Openness to more transparency in science has been a major challenge since the beginning of modern science. If, as Merton (1973) claimed, researchers aspire to more universalism, communalism, and disinterest, Open Science would be a default achievement. However, the place of science in society is more complex, and the financial stakes are high. It is therefore necessary to protect the scientific process and the research community from external influences that can harm the common good. We have discussed three issues regarding Open Science to ensure that it brings a clear benefit to the community.

The first issue is the different understanding of Open Science for researchers, publishers and the public at large. Open Science is an improvement of science beneficial to the common good. The release of data or articles alone cannot provide this benefit; it requires a second step of quality control of the released data. This requires resources and time, which are never taken into account in national and international Open Science plans. Misled Open Science may prove to be more dangerous than closed science. It is necessary to always return to the systematic inclusion of quality control, as well as the change of culture towards organised scepticism within the research community.

Secondly, Open Science is not an end in itself. Opening access to an article is not desirable in itself, but because it should allow anyone to read and comment on it. The same applies to the availability of data, software, scripts, and other research outputs. Thus, we also need to incentivise, modify the research structure, and protect researchers who conduct research to improve the quality of science.

Finally, if Open Science is meant to benefit society at large, its end user is the one who can take advantage of open data

[3] The working groups can be found here: https://coara.eu/coalition/working-groups/

and manuscripts: to read them, work with them, and improve our understanding of the world. It is therefore a change made by and above all for researchers (but also, to a lesser extent, science journalists, popularizers and anyone with a scientific background). Too often, researchers are not consulted on what changes need to be made, what their specific needs are, and what benefits they could derive from these principles. Open Science, and more specifically, Open Access, is imposed on them. This position can neither benefit the research community nor citizens, but only the companies, which can be paid to publish open-access manuscripts and that want to monetize the commendable goal of sharing knowledge.

Ethics and consent

Ethical approval and consent were not required.

Data availability

No data are associated with this article.

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Marc-André Simard
Université de Montréal, Québec,, Canada

I really enjoyed reading this paper that covers a timely and relevant topic. The authors made several highly interesting points such as how publishers are creating ambiguity around the community's understanding of Open Science (OS), and using this as a business opportunity to make more profits.

However, I believe that the current format of the manuscript does not really suit the arguments it is trying to make. Sitting at around 3000 words, it lacks the focus of a letter to the editor (which I believe it should have been) or the level of details and empirical investigation of a full paper. It generally attempts to cover a lot of ground and brings up (too) many ideas. Furthermore, the link between some of these ideas and the purpose of the paper is not always clear (e.g., Elsevier having lobbyists are the EC) or relevant (the need for having a commonly shared definition of OS; we already have one in the UNESCO Recommendation).

I appreciated the table of challenges and potential solutions; however, I really wish the authors would have spent more time expanding upon these ideas and going through each of them instead of quickly moving on to another problematic aspect of poor publishing practices (quality control).

Despite some faults, I do think that the authors of this paper have assembled a highly interesting set of arguments and references that would either make a great starting point for a review of literature that is a part of an empirical investigation (whether quantitative or qualitative) of some of the aspects it covers such as how researchers and publishers understand OS, publishers transparency, or a deeper inquiry into predatory publishing trends such as special issues.

Another possibility would be to cut down on at least 60% of the content and focus or a more straightforward approach (e.g., letter to the editor) where they clearly explain their point of view. The current conclusion of the article would be a good place to start and build on by adding other pieces from the article.

If the authors of the article would like a more detailed breakdown of each sections or comments

on specific parts of their article, I would gladly comply.

Is the topic of the essay discussed accurately in the context of the current literature?
Partly

Is the work clearly and cogently presented?
Partly

Is the argument persuasive and supported by appropriate evidence?
Yes

Does the essay contribute to the cultural, historical, social understanding of the field?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Scholarly communication, open access, bibliometrics

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 06 August 2024

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John Willinsky
Stanford University, Stanford, California, USA

The authors have assembled the basis of an opinion piece that answers the question posed in their title. Their “call for greater cautiousness when dealing with the promotion of Open Science” is clearly warranted. If they were to exercise greater precision in delimiting the extent and scope of the issues they address, they would be able to offer an effective editorial or a blog post call for wariness.

An example of what’s needed is indicated at the outset when the authors refer to the “traditional model of publishing” which involved a “process of continual revisions,” which leave what leaves the reader wondering what tradition and process is being addressed. Or at another point, the authors quote Mallapaty on how Hindawi “had more than 9600 retractions in 2023” followed by the authors’ claim that “fake papers and retractions are increasing exponentially across all fields.” What would make this a fine research paper is to, in fact, establish the rate of growth over time, relative to the total number of publications, in as many fields as possible. (Otherwise, their

sweeping claim misleadingly suggests that it is only a matter of time before corrupted research overtakes all of science.)

Now, the authors are also in a good position, having assembled a wide range of studies, to decide upon and execute a research design that would advance our understanding of this topic. Such a study could, for example, (a) align the findings of a number of the assembled studies to produce an original and accurate profile of the extent and scope of an aspect of the issue; (b) gather new data whether through counts, interviews, or surveys, that further substantiate a claim that they or others have made; or (c) construct an argument out of a close reading of the assembled studies on causes, connections, gaps around such concerns. When the authors write, for example “all over the world, and in journals belonging to various publishers, editors try to raise concerns about APCs, with moderate success,” each phrase in this sentence calls for substantiation through research bringing greater precision to our understanding of what is taking place in both discouraging and, in this case, encouraging instances.

In pursuit of this greater precision, the authors would also do well to ensure the extent to which each claim is tied directly to open access and open science, as this goes missing, for example, in this non sequitur pair of sentences: “It was recently discussed that Rafael Luque, a virology researcher at Universidad de Córdoba, has been publishing one article every 37 hours, mainly in Elsevier-owned journals (Ansede, 2023). RELX, the parent company of Elsevier, employs at least two full-time lobbyists in the European Parliament (LobbyFacts.eu, 2023).”

I hope that this helps point the way for the authors to contribute, through an editorial, blogpost or, most preferably, research study, to our understanding of the reasons for such wariness over publishers' roles in Open Science.

Is the topic of the essay discussed accurately in the context of the current literature?
No

Is the work clearly and cogently presented?
No

Is the argument persuasive and supported by appropriate evidence?
Yes

Does the essay contribute to the cultural, historical, social understanding of the field?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Scholarly communication

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Comments on this article

Version 1

Author Response 30 Jun 2026

Adrien Fillon

Both reviewers explained why this manuscript, while having interesting ideas, is not focused enough or not exhaustive enough to be published. We agree with their suggestions. We decided to follow reviewer's 1 advice "I hope that this helps point the way for the authors to contribute, through an editorial, blogpost or, most preferably, research study, to our understanding of the reasons for such wariness over publishers' roles in Open Science." and we will submit a new manuscript as a research study that will compare the cost of paying APCs for journal owned by academic associations and private publishers. In doing so, we do not plan to submit a new version of the present manuscript."

Competing Interests: No competing interests were disclosed.