



“Pay or Perish”

“Pague ou Pereaça”

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Reading the editorial published earlier this year in the *Revista Brasileira de Atividade Física & Saúde* (Brazilian Journal of Physical Activity & Health), written by my colleague and friend Daniel Umpierre¹, I felt compelled to write this editorial. Although I agree with almost everything contained in the editorial, I would like to express to the readers of the journal and to researchers in the field of physical activity and public health my concerns about the direction that modern science is taking. Below I will list some arguments aimed at creating a healthy environment for discussion and the search for solutions or alternatives.

Today, I can say that I have been “doing” science for over 20 years. I started at the end of my college degree in Physical Education and then continued through my specialization, master’s, doctorate, post-doctorate and during my teaching career. I saw the advent of Google Scholar in 2004. I acquired articles through the “comut” system of the library of the Federal University of Pelotas, at a time when we had to pay to have access to most of the articles that the university did not have. I am from the time when students and professors read printed articles in scientific journals, since the internet era was just beginning to take shape.

Anyway, I have followed the great advances that science has made in the last 20 years. There has been an astonishing growth in the number of publications, citations and new journals. Doing a quick search on Pubmed (<https://pubmed.ncbi.nlm.nih.gov/advanced/>), we see that the number of articles with the term “physical activity” anywhere in the text went from 2,461 in 2005 to 16,601 in 2024 (an increase of 14,140 articles in 20 years or 6.8 times more). If we search for all publications in this database, we see an increase from 671,363 articles in 2005 to 1,730,327 articles in 2024 (an increase of 1,058,964 articles in 20 years or 2.6 times more). We therefore found that research into physical activity grew almost three times more (6.8/2.6) than research in all areas.

If, on the one hand, this growth has brought good things (scientific advances, new discoveries and more knowledge), on the other hand, it has also brought bad things. Among these negative aspects, I mention the high number of publications of low methodological quality and/or without scientific relevance (in the author’s own opinion), leading to what is called “producing more of the same”. In addition, there has been a significant increase in what is known as “paper mills”, which are works produced with false or plagiarized data, and retractions linked to questionable publishing practices (<https://www.science.org/content/article/paper-mills-bribing-editors-scholarly-journals-science-investigation-finds>).

Within this scenario, we are witnessing the growth of a phenomenon called “Open Science”. One of the prerogatives of this “movement” is the publication of data freely (or openly) for the reader with the aim of disseminating and democratizing scientific knowledge. The initiative is very interesting, because who would like to have to pay to read an article? I, for example, published an article in 2012² that I never had access to in full. I remember when I carried out a work mission in 2023 at the University of Cambridge, United Kingdom, where I had free access to all the articles I searched for, because the university has an agreement with several publishers (similarly to *Periódicos CAPES* in Brazil; in English Coordination for the Improvement of Higher Education Personnel; in portuguese *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – CAPES*).

However, there is a “dark” side that permeates and has grown concurrently with the Open Science proposal. And this is my biggest concern about the direction that science has been taking. Along with publications, there has been a huge expansion in the number of new scientific journals. It is estimated that the number of journals in the biomedical sciences area has gone from 15,000 in 2001 to 45,000 in 2020 (an increase of 30,000 or 200% in 20 years)³. Along with this, the “predatory” journals have emerged, which are opportunistic journals that charge to publish articles, regardless of their quality⁴. Most of these new journals have taken advantage of this Open Science movement, as they charge authors to make articles freely accessible to the public. In other words, the perfect formula has been discovered: good for the researcher (since their work can be read for free), good for the journal (potentially increasing its impact factor) and great for publishers (more submissions means more profit at all).

It is worth remembering that what sustained scientific journals until about 20 years ago were library subscriptions. In Brazil, for example, we have the *Periódicos CAPES* (<https://www.periodicos.capes.gov.br/>), which is a federal government initiative to make the content of several journals subscribed to by CAPES freely accessible to the federated community. However, this has an estimated cost of around 100 million dollars per year from public funds. When the internet expanded, articles began to be published mostly online, at a lower publishing cost. What seemed to be the end of scientific publishers at the time, as a result of the loss of profitability due to the end of subscriptions, was the

beginning of a turnaround. The source of profit came from the publication of articles and no longer from access to them.

Thus, the logic of ‘paying to read’ has been reversed to ‘paying to publish’. With this, I would say that currently most journals charge authors fees to publish their articles, at least in an open access format. Journals such as Nature charge what is called the “Article Processing Charge”, or APC, of US\$ 12,690.00 to publish an article in open access (<https://www.nature.com/nature/for-authors/publishing-options>). Interestingly, if authors want to publish an article in this same journal in the traditional format (in which the article can be accessed for a fee), there is no cost for publication. In other words, journals do not necessarily charge to publish articles, but they do charge to “open the lock” (see the symbol that appears next to the title of the articles and you will understand the expression above).

To get an idea of this new and profitable capitalist market that science is becoming, it is estimated that the main North American and European publishers had a turnover of around 28 billion dollars in 2019. Elsevier, the largest publisher of scientific articles in the world, alone made a profit of more than 1 billion pounds in 2022, with a profit margin of close to 40% (<https://piaui.folha.uol.com.br/materia/ciencia-recalcula-sua-rota/>). By way of analogy, Elsevier’s profit was greater than that of Nubank, which had a turnover of 1 billion dollars in 2023 (<https://blog.nubank.com.br/resultados-nubank-4o-trimestre-2023/>). However, Nubank had around 70 million customers in 2022, while Elsevier publishes around 700 thousand articles per year (<https://www.elsevier.com/pt-br/about>). This leads us to believe that a researcher “applies” 100 times more in his/her article than a bank customer – or, in other words, that the bank would need 100 customers to earn what a publisher earns with a single researcher!

Personally, I am not opposed to paying to publish an article, as long as it is a fair rate, because there is indeed a cost to this. It is estimated that the cost to publish an article is around US\$ 200 for journals with volunteer editors⁵. However, these amounts are far below what most journals charge. And I do not see any solid movement against these mercenary practices. Instead, we have seen researchers paying their own salaries to publish their articles – often in low-impact journals. Others have used resources from research funding agencies to cover these huge publication costs (an increasingly common practice).

Research funding agencies themselves have been encouraging researchers to publish their articles in open access format. Recently, CAPES published an ordinance in the Official Gazette of the Union (DOU – section 1, no. 83, April 30, 2024) providing for the payment of APCs. In other words, the government itself is proposing to use part of the public budget to further enrich private publishers. And in a doubly way, since it has the subscription of journals to *Periódicos* CAPES and will now have federal funding to pay the APCs. And who pays this bill? I think everyone knows the answer...

I recently read with appreciation the commentary written by the president of CNPq: "Open Science: a dispassionate view" (<https://www.gov.br/cnpq/pt-br/assuntos/noticias/atualidades/ciencia-aberta-uma-visao-desapaixonada>), which was promptly rejected by a group of authors from the Brazilian Reproducibility Network (<https://osf.io/h2unb>). I am not, in any way, against Open Science. But we, researchers endowed with intelligence and common sense, cannot be naive, nor can we be complicit in and maintain this oligopoly of scientific publishers. Although it is a lawful practice, I do not feel at all comfortable using public money "for show", that is, to publish articles in journals that charge exorbitant fees, instead of allocating public resources, already scarce, to carry out new researches.

When there are no more good options for free journals, I imagine that the solution will be to publish in "pre-print" format, as some authors already do. What still prevents us from doing this, at least in Brazil, is that "pre-print" articles do not count towards the evaluation of graduate programs and are included in the curriculum as "other bibliographic productions". However, when the Bill & Melinda Gates Foundation itself has advocated "pre-print" publication, to the detriment of bearing the high APCs of journals (<https://blog.scielo.org/blog/2024/04/24/seria-a-nova-politica-de-acesso-aberto-da-fundacao-bill-e-melinda-gates-o-inicio-de-uma-mudanca-em-direcao-aos-preprints-publicado-originalmente-no-lse-impact-blog-em-abril-2024/>) it means that the scientific community also needs to mobilize.

I see, with caution, that science is taking the same path that soccer took. If before doing science was an "art", today it has become a (very) lucrative market. If

before the dilemma of researchers was "publish or perish", today the dilemma we face is "pay or perish". And what about artificial intelligence? Well, let's leave that for another editorial...

Conflict of interest

The author declares no conflict of interest. All opinions expressed are the sole responsibility of the author of the article.

Availability of research data and other materials

The contents underlying the research text are contained in the manuscript.

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Reviewers' assessment

The reviews of this article were originally conducted in Portuguese. This version has been translated using ChatGPT and subsequently reviewed by the Chief Editors.

Reviewer A

Carlos Herold Junior 

Universidade Estadual de Maringá

- Was any indication of plagiarism observed in the manuscript?
No
- Did the authors provide clarifications regarding the ethical procedures adopted for the research?
Not applicable

Comments to the author

- I congratulate the author for their willingness to engage in dialogue with the journal's editorial stance, as expressed in one of its editorials. Such an attitude values the efforts of editors not only in receiving, reviewing, and publishing articles, but also in assuming their role as key actors in fostering ideas, practices, and attitudes related to knowledge and its dissemination.
- These congratulations gain even more relevance when considering the content of both the editorial and the letter sent to the editorial board. The former defends open science in scientific practice, not only aligning the journal with the open science movement, but also arguing for the importance of its community of authors, reviewers, and readers to do the same. The latter, which is the subject of this review, presents interesting reflections on the “profitable capitalist market” driven by commercial publishers responsible for many major scientific journals worldwide. Beyond the always necessary reminder that scientific dissemination is tied to large publishing companies, the letter portrays this aspect as a “dark side,” “leveraged by open science.”
- This point raises two questions, prompted by reading the proposal: Commercial publishers and their revenues were already significant even before not only the open science movement but also one of its key dimensions—open access. While it is clear that this openness has led to changes in these companies' business models, with APCs being one such manifestation, I wonder—and invite others involved in this evaluation process to also consider—whether

portraying the open science movement as the cause of this “dark side” (which is, in fact, well known) does not warrant further attention? The editorial that inspired the writing of the letter presents the principles of open science and how they can impact not only the dissemination but also the production of science itself. Throughout the editorial, we also see that the open science movement criticizes the commercialization (privatization) of science, although this is not the central message addressed to the RBAFS audience. In this sense, I ask: how could the fact that the “letter to the editor” presents a different analytical focus than that proposed by the editor support its publication as a stimulant to a fruitful dialogue with the editorial stance presented by the journal? To consider this question, it is important to note that the author of the letter states at the beginning that they “agree with almost all of the content presented in the editorial.” In other words, the proposal, besides not presenting a point of disagreement, analytically questionably links the high APC fees with the open science movement.

Reviewer B

Luiz Guilherme Grossi Porto 

Universidade de Brasília, Brasília, Distrito Federal, Brasil.

Dear Prof. Dr. Samuel C. Dumith,

- In order to expedite the evaluation of your Letter to the Editor, we have decided to count on one external reviewer, while the other review is being carried out by myself, as Section Editor of RBAFS.
 - First of all, we thank you for your interest in promoting this very important discussion within RBAFS. As highlighted in your letter, the field of Physical Activity and Health has grown rapidly, and it is essential that all involved remain attentive to issues related to Open Science.
 - Congratulations on the quality of the manuscript, both in terms of clarity and care in the writing, as well as the relevance of its content.
 - Below, in comments, are some reflections and/or suggestions to be considered.
- Sincerely,

Luiz Guilherme Grossi Porto
Section Editor and reviewer of the manuscript

Comments to the author

- 3rd paragraph:
- Although the 3.6-fold relationship is mathematically correct, it is important to consider that when starting from a smaller base (2,461 articles in 2005 containing the term "physical activity"), the potential for percentage growth is greater than when the comparison base is much larger (671,363 general articles in 2005). For example, 100 new articles would represent about a 4% increase in the physical activity field, but only about 0.015% in general articles. Therefore, the growth potential of the physical activity field was approximately 267 times higher in 2005 ($4/0.015$) compared to the total base. I understand that your point clearly indicates the significant growth in the PA field, which seems to be the key message to emphasize. However, presenting only the percentage comparison may suggest an overestimated relative growth. I suggest either limiting the information to the PA field or including a caveat about its greater growth potential. As mentioned, the statement is mathematically correct—so this is only a suggestion, and the author may choose to keep the original as is and leave further reflections to the readers.
- 4th paragraph, 3rd line: It would be important to include at least one solid reference to support this statement or somehow make it clear that it represents the author's personal view. Although I agree with the statement, and the Science reference at the end of the paragraph mentions the issue of low-quality articles, this particular claim lacks more specific referencing or a wording that clearly indicates it as the author's perspective.
- 5th paragraph: I suggest specifying how the articles were made open access. As written, it may suggest to less experienced readers that foreign universities offer completely free access, when in fact access is likely funded (as with CAPES journals, for example).
- 6th paragraph, 1st line: I suggest a reflection: could the wording imply complicity between publishers' interests—especially predatory journals—and the philosophy of Open Science? The wording used later seems more appropriate: "Most of these new journals took advantage of this Open Science movement..." Perhaps, if the author agrees, something like: "However, there is a darker side that emerged and grew in parallel with the Open Science proposal."
- 7th paragraph, 7th line: For clarity, consider: "What then seemed to be the end of scientific publishers, as a consequence of lost profitability due to subscription cancellations, was..."
- 9th paragraph, 6th line: As with the example regarding Elsevier's profits, I suggest including a link to the source of the information regarding Nubank.
- 12th paragraph, 5th line: Again, I wonder: is the APC charging effect an exclusive result of open science? It might be worth acknowledging that the open science movement is genuine and not inherently linked to APCs. On the other hand, publishers saw an opportunity for profit in what the movement proposes regarding APCs. It would also be important to emphasize that open science goes beyond open access publishing, and that there are still opportunities to publish open access at no cost or at reasonable costs—especially in traditional journals tied to scientific societies.
- 12th paragraph, 7th line: While I do not disagree with the core of this point, I wonder whether it would be appropriate to question whether public resources should instead be allocated to conducting new research rather than using part of the limited available funding to pay for open access publication.
- 13th paragraph, 2nd line: I believe it is important to include a reflection on how evaluation agencies—such as CAPES in our case—will assign "scores" to preprints. This could be a major limiting factor for researchers within the country's graduate evaluation system who seek alternatives to APCs.