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Abdelghani Maddi, Emmanuel Monneau, Catherine Gaspere, Floriana Gargiulo,  
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# Streetlight Effect in PubPeer comments: Are Open Access Publications More Scrutinized?

Abdelghani Maddi<sup>1</sup>, Emmanuel Monneau<sup>2</sup>, Catherine Guaspere-Cartron<sup>3</sup>, Floriana Gargiulo<sup>4</sup>, Michel Dubois<sup>5</sup>

<sup>1</sup>[abdelghani.maddi@cnrs.fr](mailto:abdelghani.maddi@cnrs.fr)

ORCID : 0000-0001-9268-8022

GEMASS – CNRS – Sorbonne Université, 59/61 rue Pouchet 75017 Paris, France.

<sup>2</sup>[manu\\_monneau@hotmail.com](mailto:manu_monneau@hotmail.com)

GEMASS – CNRS – Sorbonne Université, 59/61 rue Pouchet 75017 Paris, France.

<sup>3</sup>[catherine.guaspere@cnrs.fr](mailto:catherine.guaspere@cnrs.fr)

GEMASS – CNRS – Sorbonne Université, 59/61 rue Pouchet 75017 Paris, France.

<sup>4</sup>[floriana.gargiulo@cnrs.fr](mailto:floriana.gargiulo@cnrs.fr)

GEMASS – CNRS – Sorbonne Université, 59/61 rue Pouchet 75017 Paris, France.

<sup>5</sup>[michel.dubois@cnrs.fr](mailto:michel.dubois@cnrs.fr)

ORCID : 0000-0001-6872-9525

GEMASS – CNRS – Sorbonne Université, 59/61 rue Pouchet 75017 Paris, France.

## Abstract

The *Streetlight Effect* represents an observation bias that occurs when individuals search for something only where it is easiest to look. Despite the significant development of Post-Publication Peer Review (PPPR) in recent years, facilitated in part by platforms such as PubPeer, existing literature has not examined whether PPPR is affected by this type of bias. In other words, if the PPPR mainly concerns publications to which researchers have direct access (eg to analyze image duplications, etc.). In this study, we compare the Open Access (OA) structures of publishers and journals among 51,882 publications commented on PubPeer to those indexed in OpenAlex database (#156,700,177). Our findings indicate that OA journals are 33% more prevalent in PubPeer than in the global total (52% for the most commented journals). This result can be attributed to disciplinary bias in PubPeer, with overrepresentation of medical and biological research (which exhibits higher levels of openness). However, after normalization, the results reveal that PPPR does not exhibit a Streetlight Effect, as OA publications, within the same discipline, are on average 16% less prevalent in PubPeer than in the global total. These results suggest that the process of scientific self-correction operates independently of publication access status.

## Keywords

Post-Publication Peer Review; PPPR; Research integrity; PubPeer; Open Access; Streetlight effect; OpenAlex, Normalized Open Access Index.

## JEL classification

J16; I23; I24; Z13.

## Acknowledgments

Data available from The Center for Scientific Integrity, the parent nonprofit organization of Retraction Watch, subject to a standard data use agreement. The authors would like to thank the Pubpeer Foundation for authorizing the collection and use of data associated with the operation of their platform.

## Competing interests

The authors have no relevant financial or non-financial interests to disclose.

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## Data availability

The code used for data preparation and analysis is available on Github: <https://github.com/abdelghani-maddi/Pubpeer/blob/main/analyse.R>

The aggregated data by discipline for NOAI calculation is available in Zenodo: <https://zenodo.org/records/10797944>

## 1. Introduction

Over the past decade, the rise of PPPR, facilitated by the development of a variety of tools and platforms like PubPeer<sup>1</sup> that allow researchers to openly share their viewpoints on a paper or analyze articles with a critical eye, has led to the “deconfinement” of the process of self-correction in science (Dubois & Guaspere, 2019a). Even if the process of self-correction in science may have a passive form through the disregard of research results, it has also a more active form through the well-known letters to editors, expressions of concern, corrections, and similar channels (Hettinger et al., 2016). The advent of PPPR platforms like PubPeer has significantly contribute to raise the public profile of this self-correction process. Now, anyone has potentially access to the online post-publication review process and may become a contributor, anonymous or not, providing feedback and critical assessments. PPPR allows researchers and the scientific community at large to engage in discussions, identifying potential flaws, and contributing to the refinement of scientific knowledge (Jingshen, 2022; J.-L. Ortega & Delgado-Quirós, 2023).

The strength of PPPR stems from its apparent simplicity: it replicates the principles of a journal club in an online setting (J. L. Ortega, 2022; Torny, 2018). An initiator puts forth a reading by launching a discussion thread and providing comments, setting the stage for interactions between participants and sometimes between participants and authors. Such discussions often pave the way for meticulous assessments of publications, diving deep into data, imagery, and other content (Barbour & Stell, 2020; Dubois & Guaspere, 2019b). Consequently, ensuring access to these publications is of paramount importance. Since PPPR requires access to the full text and the data of publications, it is essential for articles to be fully available. Consequently, publications in journals accessible only through subscriptions might receive comparatively less scrutiny than those in Open Access, potentially eluding the grasp of PPPR. This hypothesis aligns with the well-known “Streetlight Effect” (Freedman, 2010), wherein reviewers are naturally drawn towards easily accessible publications, creating the possibility that articles

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<sup>1</sup> PubPeer is a dedicated website platform and a central venue for PPPR. But PPPR can take place through various channels, including social media or through the comment sections of academic or scientific websites like Retraction Watch, as well as through commenting features offered by certain journals (PLoS One, Frontiers, Peer J or the New England of Medicine among others). See for example: (O’Sullivan et al., 2021)

published in subscription-based journals might not undergo the same level of scrutiny and oversight.

The streetlight effect, a well-studied concept across various disciplines, illuminates a fundamental cognitive bias where attention is disproportionately directed towards easily accessible information, often at the expense of more complex or less visible/accessible phenomena. This analogy, stemming from the allegory of the drunkard searching for his keys under the streetlight, underscores a tendency to focus on what is readily observable rather than what might be more relevant or critical. (Molas-Gallart & Rafols, 2018) further expanded on the ramifications of this phenomenon, drawing parallels between the drunkard's search and policy decisions guided by incomplete or biased data, particularly in the realm of science, technology, and innovation. Beyond the realms of research evaluation, this effect has garnered attention in diverse fields, shedding light on systemic biases and methodological limitations (Fitoussi, 2014).

Looking at bibliometric indicators, (Davies et al., 2021) highlighted the need for a broader definition of success in scientific endeavors than valuing measures such as citations which tend to perpetuate gender and racial biases. (Rafols et al., 2024) highlighted the perils of such selective open science monitoring, stressing that policy frameworks often prioritize activities amenable to quantification (scientific outputs), neglecting disciplines, practices, and territories that engage in open science but may remain invisible to traditional indicators.

In the context of post-publication peer review (PPPR), open access (OA) platforms represent the proverbial streetlight, providing visibility and accessibility to scholarly outputs. Consequently, certain issues or flaws in research articles within subscription-based journals might not receive the same level of scrutiny, potentially hindering the improvement of the process of self-correction within science. As a result, there could be limitations in identifying and rectifying potential shortcomings in scholarly publications comprehensively. Thus, it's important to acknowledge the potential influence of the well-known Streetlight Effect on post-publication peer review (PPPR) (Brookes, 2014; Guaspere & Didier, 2020).

In this study, we propose to test the Streetlight Effect hypothesis in PPPR and its potential impact on the scrutiny of scholarly publications according to their open access status. Consequently, we seek to address the following question: Does the open access status of publications influence the level of scrutiny they received in the context of Post-Publication Peer Review (PPPR)? Surprisingly, to date, the existing literature has not delved into this specific question. Therefore, this article aims to fill this research gap by investigating the potential impact of the Streetlight Effect on PPPR and examining whether Open Access publications

undergo a more rigorous review process<sup>2</sup> compared to articles accessible through subscription-based journals. Through this investigation, we seek to contribute to the understanding of how publication accessibility may affect the thoroughness and fairness the process of self-correction of science.

To do so, we conduct a comparative analysis of publishers and journals between a dataset of 51,882 reviewed publications on PubPeer and a vast collection of 156,700,177 publications indexed in OpenAlex. Additionally, we investigate the prevalence of Open Access (OA) publishers and journals in PubPeer to explore whether the accessibility status of publications might influence their likelihood of being subjected to PPPR (measured by number of comments in PubPeer).

## **2. Data and Methods**

### **2.1. PPPR data**

In this study, we used PubPeer's database to analyze PPPR. PubPeer is a prominent and widely-used online platform that serves as a dynamic database for Post-Publication Peer Review (PPPR). Established in 2012, PubPeer provides a space for researchers and the scientific community to engage in open discussions, critique, and evaluation of published research articles across various disciplines (Barbour & Stell, 2020). It offers an accessible and transparent forum for individuals to post anonymous or signed comments on specific publications, addressing concerns, identifying potential flaws, and offering constructive feedback. This interactive platform allows for continuous and collaborative assessment of scholarly works, contributing to the enhancement of scientific integrity and the self-correcting nature of academic research. PubPeer's database houses a diverse range of publications, enabling researchers to actively participate in the critical appraisal and evaluation of the scientific literature.

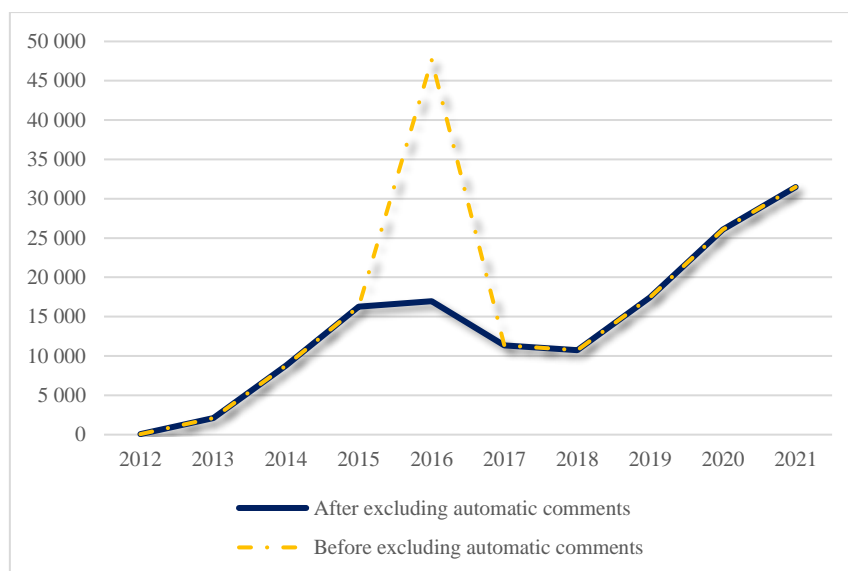
Our initial analyses have uncovered a notable spike in comments in the year 2016, as depicted in Figure 1. These comments were observed to be generated en masse through the use of dedicated software (for further details, refer to (Baker, 2016)).

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<sup>2</sup> It should be noted that in some cases, PPPR discussions can be neutral or even positive, and that even in the context of critical reviews, the articles in question may gain increased attention and receive more citations, albeit negative ones, from other works. However, it is crucial to consider the broader implications of this post-publication peer review (PPPR) process. While PPPR may potentially enhance the impact of the concerned articles, it can also tarnish the reputation of the authors of the criticized publications. Furthermore, it may trigger investigations by editors and potentially lead to mass retractions. Thus, while PPPR may initially appear beneficial in terms of increased visibility, it is important to carefully weigh the potential consequences on authors' reputations and the integrity of scientific research (see: (McCook, 2018)).

In order to ensure the integrity and impartiality of our analysis, we have excluded the publications that were affected by these automated comments, amounting to a total of 47,633 publications (publications with only a single comment from commentator No. 3845).

**Figure 1: Number of publications per year before and after excluding automatically generated comments**



Consequently, our final sample of publications subject to comments in PubPeer consists of 51,882 articles, enabling us to conduct a robust and unbiased examination of the peer-reviewed literature in the context of Post-Publication Peer Review.

## 2.2. OpenAlex data

OpenAlex is a comprehensive and extensive database that offers broad coverage of academic publications across various disciplines (Priem et al., 2022; Singh Chawla, 2022). With a vast collection of indexed materials, OpenAlex includes research articles, conference papers, preprints, and other scholarly outputs from a diverse range of sources. This database is designed to encompass a wide spectrum of publication types and supports, facilitating access to a rich array of academic content for researchers and scholars. By curating and aggregating data from numerous publishers and repositories, OpenAlex provides a valuable resource for researchers seeking a comprehensive view of scholarly literature and enables in-depth investigations across different fields of study.

In this study, we utilized the "openalexR" package (<https://docs.ropensci.org/openalexR/>) to extract information regarding journals and publishers from the OpenAlex database. The extracted dataset comprises essential details, including the journal's name, the name of its publisher, the Open Access (OA) status of the journal, and its inclusion in the Directory of Open

Access Journals (DOAJ). Additionally, the dataset includes the number of publications and citations associated with each journal.

In total, the extracted dataset encompasses information from 253,222 diverse supports of publication, including directories, open archives, and more. Out of these, 186,347 entries correspond to journals, which constituted the focus of our analysis in this paper. The dataset's breadth and depth provided us with a comprehensive overview of the publishing landscape, enabling us to conduct a thorough investigation into the relationship between Open Access publications and the Post-Publication Peer Review process.

### 2.3. Normalized Open Access Index

The Normalized Open Access Index (NOAI) is a metric utilized to quantify the extent of Open Access adoption within a specific entity, such as an institution, region, or country, following the conventional method of normalization in bibliometrics (for further details, refer to (Maddi, 2020)). See section 3.4 for the formula and calculation steps. This metric employs a normalized scale, with a value of 1 serving as the neutral reference point, representing the global average. This normalization technique facilitates equitable comparisons of Open Access integration across diverse disciplines, accounting for disciplinary disparities in the prevalence and availability of Open Access publishing. We calculated the NOAI using data at the level of Journal Categories from the Web of Science (WOS) database, which provide more reliable data on disciplinary classification.

To compute the Normalized Open Access Index (NOAI), our methodology unfolds through a two-step process. In the initial phase, we ascertain the share of open access (OA) publications within PubPeer ( $OA_{Pubpeer_{category}} / n_{Pubpeer_{category}}$ ), categorized according to the WoS Subject Categories. This share is subsequently normalized by relating it to the proportion of each WoS Subject Category within the comprehensive Web of Science (WoS) database ( $OA_{WoS_{category}} / N_{WoS_{category}}$ ). This initial normalization procedure brings to light the distribution of open access ( $OA_{Pubpeer_{category}}$ ) engagement across distinct disciplinary domains within the PubPeer platform.

$$OA_{Pubpeer_{category}} = \frac{OA_{Pubpeer_{category}} / n_{Pubpeer_{category}}}{OA_{WoS_{category}} / N_{WoS_{category}}}$$

Subsequently, in the second phase, obtain a comprehensive indicator of openness within PubPeer by calculating a weighted average. This entails a meticulous computation that involves

the weighted aggregation of the dual ratios derived in the preceding step. These dual ratios offer a revealing perspective, showcasing the relative prevalence of OA publications within PubPeer against their representation within the global WoS framework. By conducting this intricate aggregation, we derive a robust measure—the NOAI—that encapsulates the multifaceted openness dynamics operative within the post-publication peer review ecosystem. Through this methodical approach, we aspire to unravel the intricate relationships between open access practices, peer review engagement, and disciplinary orientations within the scholarly landscape.

$$NOAI_i = \frac{\sum(OA_{Pubpeer_{category}} \times n_{Pubpeer_{category}})}{n_{Pubpeer}}$$

Thus, before proceeding with the normalization process, we first conducted a matching procedure between the publications commented on PubPeer and the publications available in the Web of Science (WoS) database, utilizing Digital Object Identifiers (DOIs) as identifiers. As a result of this matching process, a total of 46,775 (90%) out of the initial 51,882 commented publications were successfully matched with corresponding entries in the WoS database.

The normalization process involves two steps. Firstly, we calculated the share of Open Access (OA) publications (in this section, all OA types are considered: Diamond, Gold, Green and Bronze) per subject category within PubPeer and then divided it to the corresponding share at the global level (in the WoS database). This step ensures that the OA adoption in PubPeer is assessed relative to the broader publishing landscape. In the second step, to obtain an overall normalized indicator of OA for PubPeer, we computed a weighted average by considering the number of publications per discipline. This approach accounts for variations in the volume of OA publications across different fields and results in the Normalized Open Access Index (NOAI).

#### 2.4. Selection of most commented publishers and journals

To select the most commented publishers and journals, we used a discretization approach using the Fisher algorithm to choose the first class (the most commented). The Fisher algorithm, used for discretization, transforms continuous variables into discrete ones to simplify data analysis. It maximizes the separation between classes using a statistical criterion based on variance between different classes after dividing the continuous variable into intervals. The process involves searching for the optimal threshold that divides the variable into two classes, then repeating this process for each class until a predefined number of classes is reached. The advantage of this algorithm lies in its ability to capture significant data variations while reducing noise, although the choice of parameters can influence discretization results.

### 3. Results

In this section we present the results of our analysis. To commence, we outline a comprehensive depiction of the market structure within the scholarly publishing marked, as indexed in the OpenAlex database. This analysis involves delineating the market shares of the top publishers and constructing a Lorenz curve that illustrates the skewed distribution of publishing activity. Notably, this analysis is conducted at a holistic level rather than segmented by specific disciplines. Subsequently, we turn our focus to the publishers that have garnered the highest levels of commentary on PubPeer. Moreover, we delve into the most commented-upon journals and provide an examination of their Open Access status, thereby offering a holistic understanding of their place on the post-publication peer review process. Lastly, we present the outcomes derived from our analysis of the Normalized Open Access Index (NOAI), a crucial measure that helps rectify the disciplinary bias present in PubPeer, which exhibits an overrepresentation of life sciences publications (which tend to be more Open Access-oriented than other disciplines). Through the exploration of these diverse dimensions, our objective is to provide a comprehensive analysis aimed at determining whether, in the context of Post-Publication Peer Review (PPPR), reviewers exhibit a propensity to concentrate their focus on Open Access publications and journals or not. This investigation seeks to uncover potential patterns or biases in the post-publication review process, shedding light on whether the accessibility status of publications influences their likelihood of undergoing scrutiny within the PPPR framework. By examining these intricate dynamics, we endeavor to contribute valuable insights into the interplay between Open Access adoption, peer review practices, and the broader landscape of scholarly communication.

### **3.1.Landscape of scholarly publishing marked**

Table 1 offers a static yet illuminating snapshot of the current landscape of scholarly publishing, providing a glimpse into the prevailing market dynamics. Among the total of 10,097 publishers analyzed, the top 26 publishers emerge as pivotal players, collectively accounting for a substantial 60% share of the publications indexed in OpenAlex. This concentration underscores the considerable influence wielded by a relatively small number of publishers in shaping the dissemination of academic knowledge.

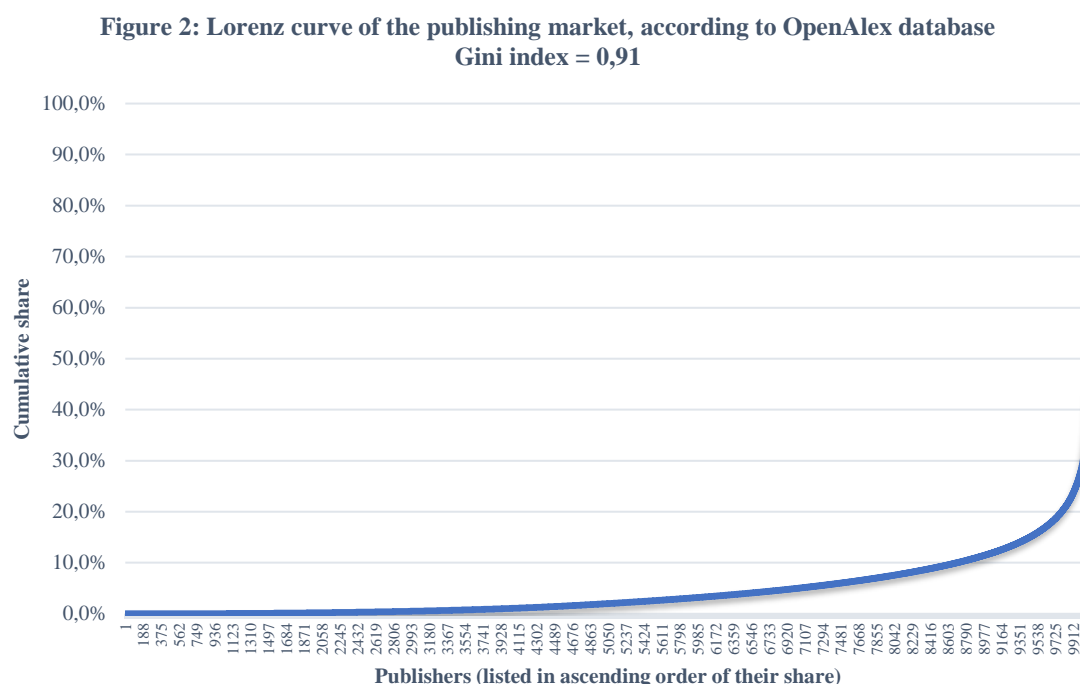
Within this landscape, Elsevier BV takes center stage with a dominant 17.4% share, while Springer Nature follows closely at 9.2%. Wiley commands a significant 8.5% share, and Taylor & Francis is represented at 3.3%. These findings underscore the established presence of these industry giants within the scholarly publishing domain. Notably, the emergence of newcomers like the Multidisciplinary Digital Publishing Institute (MDPI) adds an intriguing dimension to this tableau. While MDPI has gained traction and achieved an impressive 11th position, it is

important to acknowledge that its practices have been subject to critique by a substantial majority of open access advocates. MDPI's publication of numerous special issues and other aggressive strategies have raised concerns and skepticism within the scholarly community, drawing attention to ongoing debates surrounding responsible open access practices.

**Table 1: Top 26 publishers (out of 10 097) in OpenAlex**

N°	Publishers	Works count	Market share	Cumulative share
1	Elsevier BV	19 742 706	17,4%	17,4%
2	Springer Nature	10 418 723	9,2%	26,7%
3	Wiley	9 674 047	8,5%	35,2%
4	Taylor & Francis	3 705 323	3,3%	38,5%
5	Oxford University Press	3 633 513	3,2%	41,7%
6	SAGE Publishing	2 801 120	2,5%	44,2%
7	Lippincott Williams & Wilkins	2 172 203	1,9%	46,1%
8	Cambridge University Press	2 013 390	1,8%	47,9%
9	American Chemical Society	1 907 889	1,7%	49,6%
10	Institute of Electrical and Electronics Engineers (IEEE)	1 204 259	1,1%	50,6%
11	Multidisciplinary Digital Publishing Institute (MDPI)	1 135 521	1,0%	51,6%
12	BMJ	1 000 571	0,9%	52,5%
13	American Institute of Physics	882 739	0,8%	53,3%
14	IOP Publishing	795 996	0,7%	54,0%
15	Royal Society of Chemistry	780 349	0,7%	54,7%
16	De Gruyter	742 071	0,7%	55,3%
17	American Physical Society	709 382	0,6%	56,0%
18	American Medical Association	703 057	0,6%	56,6%
19	Thieme Medical Publishers (Germany)	627 903	0,6%	57,1%
20	University of Chicago Press	521 330	0,5%	57,6%
21	Emerald Publishing Limited	493 780	0,4%	58,0%
22	Chinese Medical Association	478 360	0,4%	58,5%
23	Frontiers Media	460 097	0,4%	58,9%
24	Routledge	445 724	0,4%	59,3%
25	Karger Publishers	444 252	0,4%	59,6%
26	American Association for the Advancement of Science	416 783	0,4%	60,0%

As Table 1 captures the current publishing landscape, it serves as a foundation for deeper explorations into the intricate dynamics that shape scholarly communication. This analysis contributes to our understanding of the evolving interplay between established publishing giants, emerging contenders, and the ongoing discussions regarding the ethical and strategic dimensions of open access publishing (Nicholas et al., 2023; Yamada & Teixeira da Silva, 2022).



The Lorenz curve (Figure 2), reveals a highly asymmetric distribution within the scholarly publishing market. The curve, which showcases the cumulative share of publications against the cumulative share of publishers, underscores a pronounced concentration of influence among a select few. With an accompanying Gini coefficient of 0.91, this curve conveys a staggering level of inequality in the distribution of publishing activities.

The steep upward slope of the Lorenz curve signifies that a disproportionately large portion of publications is concentrated among a handful of prominent publishers. This pattern is indicative of a highly centralized landscape, where a limited number of publishing entities wield substantial control over the dissemination of academic knowledge (Larivière et al., 2015; Roy & Yami, 2006). The wide divergence from the hypothetical line of perfect equality demonstrates the substantial variance between publishers, accentuating the market's lopsided nature.

As the scholarly community grapples with questions of access, equity, and influence, the striking asymmetry illustrated by the Lorenz curve, coupled with the elevated Gini coefficient

both serve as a powerful landmark for fostering discussions about the impact of market concentration and its implications for open access, diversity of voices, and the democratization of knowledge dissemination (Bernius et al., 2009; Ponte et al., 2017).

### 3.2. The most commented publishers in PubPeer

Table 2 provides an overview of publishers whose publications have garnered the highest number of commentaries within the PubPeer platform.

**Table 2: Most commented publishers in PubPeer\***

Publishers	# Commented publications in PubPeer	Works count (OpenAlex )	Share in PubPeer (1)	Share in total (OpenAlex ) (2)	Relativ e Share RS=1/2	Share of commente d publicatio n in the publisher' s total
Verduci Editore (European Review for Medical and Pharmacological Sciences)	691	10 724	1,33%	0,01%	140,53	6,4%
Cognizant Communication Corporation	140	3 154	0,27%	0,00%	96,81	4,4%
Impact Journals LLC	967	34 684	1,86%	0,03%	60,81	2,8%
Cell Press	1 104	77 134	2,13%	0,07%	31,22	1,4%
Spandidos Publishing	768	62 653	1,48%	0,06%	26,73	1,2%
e-Century Publishing Corporation	191	16 684	0,37%	0,01%	24,97	1,1%
Landes Bioscience	304	26 832	0,59%	0,02%	24,71	1,1%
Ivyspring International Publisher	130	14 489	0,25%	0,01%	19,57	0,9%
American Society for Biochemistry and Molecular Biology	1 975	223 770	3,81%	0,20%	19,25	0,9%
American Association for Cancer Research	1 216	142 756	2,34%	0,13%	18,58	0,9%
eLife Sciences Publications Ltd	120	14 657	0,23%	0,01%	17,86	0,8%
American Society for Clinical Investigation	265	39 450	0,51%	0,03%	14,65	0,7%
Dove Medical Press	540	83 201	1,04%	0,07%	14,16	0,6%
IOS Press	798	140 064	1,54%	0,12%	12,43	0,6%
Public Library of Science	1 810	327 689	3,49%	0,29%	12,05	0,6%
National Academy of Sciences	807	158 510	1,56%	0,14%	11,10	0,5%
Society for Neuroscience	226	44 720	0,44%	0,04%	11,02	0,5%
Springer Nature	8 777	10 418 723	16,92%	9,21%	1,84	0,4%
American Psychological Association	1 273	345 487	2,45%	0,31%	8,04	0,4%
American Phytopathological Society	165	45 791	0,32%	0,04%	7,86	0,4%
Rockefeller University Press	221	62 788	0,43%	0,06%	7,68	0,4%
Cold Spring Harbor Laboratory Press	141	42 123	0,27%	0,04%	7,30	0,3%
The Company of Biologists	203	71 358	0,39%	0,06%	6,20	0,3%
Association for Research in Vision and Ophthalmology	192	71 035	0,37%	0,06%	5,89	0,3%
American Association of Immunologists	248	103 880	0,48%	0,09%	5,21	0,2%
American Society for Microbiology	770	326 526	1,48%	0,29%	5,14	0,2%
American Diabetes Association	143	61 183	0,28%	0,05%	5,10	0,2%
BioMed Central	722	344 587	1,39%	0,30%	4,57	0,2%
Portland Press	289	148 919	0,56%	0,13%	4,23	0,2%
American Society of Hematology	288	181 671	0,56%	0,16%	3,46	0,2%

American Association for the Advancement of Science	589	416 783	1,14%	0,37%	3,08	0,1%
<b>Hindawi Publishing Corporation</b>	457	350 049	0,88%	0,31%	2,85	0,1%
Federation of American Societies for Experimental Biology	158	124 979	0,30%	0,11%	2,76	0,1%
Frontiers Media	551	460 097	1,06%	0,41%	2,61	0,1%
Informa	389	397 235	0,75%	0,35%	2,14	0,1%

\* Publishers with +117 publications (according to Fisher's discretization), and RS>1.5.

To delineate this selection, we employed a discretization approach utilizing the Fisher algorithm (see methods section). This methodology facilitated the identification of a threshold, leading us to focus on publishers whose works have exceeded a critical threshold of 117 commented publications. This careful approach ensures a concentrated analysis of the most discussed publishers within PubPeer.

Moreover, our analysis goes beyond sheer volume by introducing the concept of the Relative Share (RS), a dual ratio that measures the presence of publishers in PubPeer in relation to their representation within the broader OpenAlex dataset. The RS ratio, with a neutral value of 1, allows for a nuanced comparison. For instance, an RS value of 3 indicates that a publisher's presence in PubPeer is threefold higher than its representation within the total OpenAlex corpus. The publishers featured in Table 2 meet both criteria: a publication count surpassing 117 and an RS exceeding 1.5.

By employing this multidimensional approach, Table 2 presents a snapshot of the publishers that have elicited extensive commentary within the PubPeer platform. Notably, a predominant majority of the most discussed publishers in PubPeer hail from the field of life sciences, with a particular focus on medicine and biosciences. Many of these publishers have embraced the open access model, exemplified by Verduci Editore, where the "European Review for Medical and Pharmacological Sciences" has garnered commentary on PubPeer. Similarly, e-Century Publishing Corporation and the controversial Hindawi Publishing Corporation and Frontiers Media also stand out, exhibiting respective presence ratios (RS) of 2.8 and 2.6, indicating their significantly higher prominence within PubPeer compared to OpenAlex database.

Among the major players in the top 20, Springer Nature captures attention with a substantial 16.92% of the publications commented on in PubPeer. This translates to an RS of 1.84, indicating its 84% higher presence in PubPeer relative to the total. While an observable trend emerges, showcasing a stronger representation of fully open access publishers among the most discussed in PubPeer, it is essential to exercise caution in attributing this pattern solely to their open access status. Instead, the orientation toward life sciences disciplines emerges as a critical driving factor, a phenomenon extensively discussed in the existing literature. The marked focus

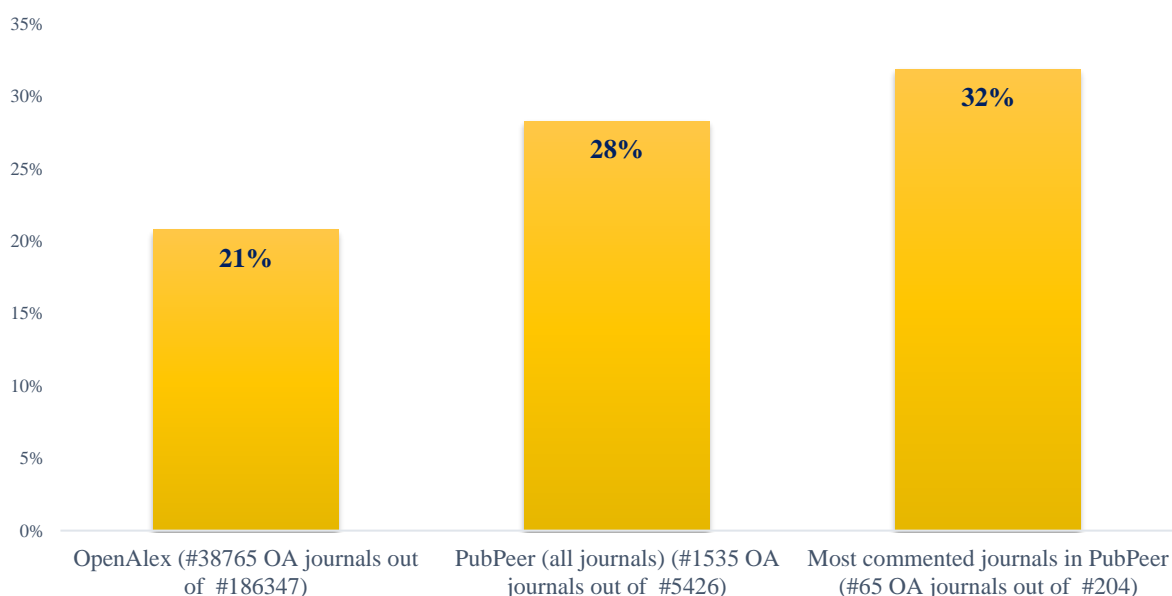
of Post-Publication Peer Review (PPPR) on life sciences disciplines significantly influences the prominence of certain publishers, underscoring the broader disciplinary underpinnings that shape engagement and discourse within the PPPR framework.

Finally, it is noteworthy that Elsevier does not appear among the most commented publications on PubPeer. Considering the significant presence of Elsevier as a prominent publisher in academic literature, this absence raises questions about the dynamics of post-publication peer review (PPPR) within the context of publications from this publisher. It would be intriguing to delve deeper into the underlying factors contributing to this result. Possible explanations could include differences in disciplinary focus, publication volume, or community engagement strategies employed by Elsevier compared to other publishers represented in the dataset. Additionally, exploring the specific characteristics of the publications themselves, such as subject matter, methodology, or controversial findings, may shed light on why Elsevier publications are comparatively less commented upon on PubPeer.

### **3.3. The most commented journals in PubPeer**

In this subsection, our focus shifts towards a comprehensive examination of scholarly journals within the context of our study. This exploration encompasses two primary phases. Firstly, we delve into the realm of open access publishing, analyzing the prevalence of fully open access journals within the OpenAlex database, their representation within PubPeer, and their prominence among the most discussed journals on the PubPeer platform. Secondly, we embark on an analysis of the distribution of journals with the highest volumes of commented publications on PubPeer, subsequently examining their distribution based on their open access status. Furthermore, our investigation extends to journals with the most significant Relative Share (RS), an indicator that gauges their prominence within PubPeer relative to their representation in the broader OpenAlex dataset.

**Figure 3: Share of Open Access journals, by dataset**



At first glance, these results appear to suggest a distinct focus of Post-Publication Peer Review (PPPR) on open access journals. However, it is imperative to exercise caution in drawing definitive conclusions, as this apparent trend could be influenced by various factors. Indeed, these findings lay the groundwork for deeper exploration, and as we delve into the normalization process (Section 4), a more nuanced and comprehensive understanding will emerge. Through this critical analysis, we aim to disentangle the intricate dynamics that shape the PPPR process, shedding light on the interplay between open access status, peer review engagement, and the broader landscape of scholarly communication.

**Table 3: Most commented journals in PubPeer**

<i>Journals</i>	<i>Is OA</i>	<i># Commented publications in PubPeer</i>	<i>Share in PubPeer (1)</i>	<i>Share in OpenAlex (2)</i>	<i>Relative Share RS=(1)/(2)</i>
<i>Journal of Biological Chemistry</i>	True	1951	3,760%	0,131%	28,61
<i>PLOS ONE</i>	True	1556	2,999%	0,180%	16,68
<i>Oncotarget</i>	True	842	1,623%	0,017%	93,67
<i>Proceedings of the National Academy of Sciences of the United States of America</i>	False	807	1,555%	0,101%	15,38
<i>European Review for Medical and Pharmacological Sciences</i>	False	691	1,332%	0,007%	194,61
<i>Cancer Research</i>	False	649	1,251%	0,055%	22,95

<i>Journal of Intelligent and Fuzzy Systems</i>	False	623	1,201%	0,007%	177,28
<i>Oncogene</i>	False	588	1,133%	0,014%	81,60
<i>Molecular and Cellular Biology</i>	False	429	0,827%	0,020%	40,94
<i>Cell</i>	False	416	0,802%	0,016%	49,84
<i>Nature Communications</i>	True	407	0,784%	0,034%	23,25
<i>Journal of Cellular Biochemistry</i>	False	377	0,727%	0,010%	70,76
<i>Biomedicine &amp; Pharmacotherapy</i>	True	333	0,642%	0,010%	61,38
<i>Cell Death and Disease</i>	True	329	0,634%	0,006%	112,05
<i>Journal of Cellular Physiology</i>	False	305	0,588%	0,012%	48,47

Table 3 offers a focused glimpse into the landscape of scholarly journals, spotlighting the 15 journals that have garnered the highest volume of commented publications within the PubPeer platform. An intriguing observation surfaces as the data unfolds: the three most commented-upon journals all belong to the open access category. These prominent journals—Journal of Biological Chemistry, PLOS ONE, and Oncotarget. Impressively, within the expansive array of 5,426 commented journals on PubPeer, this trio alone commands attention, collectively constituting more than 8% of the total commented publications.

Furthermore, an additional observation comes to light from this table: a substantial majority of the featured journals align with the life sciences domain. This consistent trend serves to reinforce the earlier observation we gleaned from Table 2, albeit on a more granular level, pertaining to publishers.

**Table 4: Most commented journals in PubPeer (with the highest RS)**

<b>Journals</b>	<b>Is OA</b>	<b># Commented publications in PubPeer (n &gt;=100)</b>	<b>Share in PubPeer (1)</b>	<b>Share in OpenAlex (2)</b>	<b>Relative Share RS=(1)/(2)</b>
Artificial Cells Nanomedicine and Biotechnology	True	199	0,384%	0,001%	284,18
Oncology Research	False	140	0,270%	0,001%	227,70
European Journal of Psychology of Education	False	108	0,208%	0,001%	211,13
European Review for Medical and Pharmacological Sciences	False	691	1,332%	0,007%	194,61
Journal of Intelligent and Fuzzy Systems	False	623	1,201%	0,007%	177,28
Journal of Experimental & Clinical Cancer Research	True	148	0,285%	0,002%	124,72

Cancer Cell	False	136	0,262%	0,002%	114,48
Cell Death and Disease	True	329	0,634%	0,006%	112,05
Molecular Cancer	True	111	0,214%	0,002%	111,60
Molecular Plant-microbe Interactions	True	157	0,303%	0,003%	102,73
Cellular Physiology and Biochemistry	True	216	0,416%	0,004%	102,26
Cell Metabolism	False	118	0,227%	0,002%	98,89
OncoTargets and Therapy	True	197	0,380%	0,004%	93,89
Oncotarget	True	842	1,623%	0,017%	93,67
Bioscience Reports	True	171	0,330%	0,004%	89,20

Table 4 presents a selection of the most commented journals, with the highest relative share (RS) scores. While occupying a distinctly modest stature within the OpenAlex database, these journals display a demonstrably increased presence relative to their weight on the PubPeer platform.

An important observation emanates from this table: a significant majority of these widely reviewed journals align with the open access paradigm, accounting for 9 of the top 15 entries (or 60%). This trend aligns with the patterns we explored in Tables 2 and 3, further accentuating the prominence of open access journals in the body of commented publications on PubPeer. In addition, an overarching thematic thread connects these results to the focus of these journals, with a clearly dominant representation of medical and bioscience publications within PubPeer.

### 3.4. The Normalized Open Access Index (NOAI)

In the previous sections, we examined the composition of publishers and journals within the PubPeer platform and the comprehensive OpenAlex database, highlighting the prevalence of open access entities. This section goes further in terms of granularity by examining the composition of commented publications on PubPeer, according to their open access status. This analytical phase represents a deliberate effort to mitigate the disciplinary bias evident in the earlier analyses, which might suggest an inherent tendency for open access journals to attract more commentary within PubPeer. As elucidated in the "Methods" section, our application of the Normalized Open Access Index (NOAI) serves as a potent tool in unraveling the intricate interplay between open access practices and post-publication peer review.

$$NOAI_i = \frac{\sum(OA_{Pubpeer_{category}} \times n_{Pubpeer_{category}})}{n_{Pubpeer}} = \mathbf{0.84}$$

The culmination of our analysis yields a NOAI value of 0.84 (the data by discipline are available on Zenodo). This metric conveys a nuanced revelation: open access publications, when normalized for disciplinary equivalency, exhibit a relative underrepresentation of

approximately 16% within PubPeer compared to their prevalence within the global corpus of publications. This consequential insight serves to refute the Streetlight Effect hypothesis within the context of Post-Publication Peer Review (PPPR).

The NOAI's discernible departure from parity elucidates that PPPR in PubPeer transcends the constraints of the Streetlight Effect, emphasizing its capacity to uphold its review integrity across diverse realms of scholarly publishing, regardless of open access status. This finding underscores the robustness and impartiality of PPPR in PubPeer in fostering rigorous scholarly scrutiny and engagement.

#### **4. Discussion**

Our investigation uncovers a nuanced narrative that illuminates the potential interplay between accessibility and post publication peer review engagement. Our findings, guided by a comprehensive analysis, contribute to the broader understanding of PPPR dynamics, revealing that the bias introduced by the Streetlight Effect may be mitigated through discipline-normalized assessments.

These findings carry several implications from a research policy standpoint. Firstly, the results, for the first time, demonstrate, on the basis of our PubPeer data, that Post-Publication Peer Review (PPPR) operates independently of publication access status, dispelling concerns of bias from this perspective. In essence, publications, once published, undergo consistent scrutiny irrespective of their accessibility, suggesting that the review process remains resilient to access constraints. The notion of "pirate libraries" like Sch-hub emerges intriguingly as a potential facilitator of reviewer access to scientific contents, prompting further inquiry into their potential role. This avenue presents a compelling direction for future exploration.

Secondly, a noteworthy outcome is the reduced concentration of open access (OA) publications within PubPeer, following normalization. This observation hints at the possibility that OA publications may be subject to fewer issues, warranting a deeper investigation. In essence, this poses the critical question of whether the openness of publications, encompassing research data as well, contributes to bolstering scientific integrity. In other words, to what extent does the opening of publications (including research data) contribute to the strengthening of scientific integrity? This question beckons for future exploration and could serve as a catalyst for shaping research policy and practices.

#### **5. Conclusion**

Through this article, our aim was to delve into the potential existence of the Streetlight Effect within the realm of Post-Publication Peer Review (PPPR) carried out on the PubPeer platform. In other words, we sought to investigate whether reviewers display a propensity to scrutinize

open access publications more extensively due to their greater accessibility. To address this inquiry, we meticulously analyzed a corpus of 51,882 commented publications within the PubPeer platform. Specifically, we juxtaposed the structural composition of publishers and journals within this subset against the broader OpenAlex and Web of Science databases.

In the absence of normalization, our initial findings revealed a discernible concentration of open access journals within PubPeer, vis-à-vis the wider publishing landscape. Additionally, our results underscored a notable prevalence of life sciences disciplines among the commented publications within PubPeer. Consequently, the pronounced prevalence of open access journals could potentially emanate from this disciplinary bias, as the open access practice exhibits a heightened prevalence within these specific domains.

The calculated Normalized Open Access Index (NOAI) serves to corroborate this hypothesis. Upon normalization, we observed that open access publications, when discipline-normalized, were relatively underrepresented by approximately 16% within PubPeer as compared to the global publication corpus. This substantiates the notion that the skew towards open access journals is largely a byproduct of the underlying disciplinary landscape, where the concentration of life sciences disciplines significantly influences the open access prevalence.

In conclusion, these results reverberate across the landscape of scholarly communication and research policy, challenging preconceived notions and stimulating a reconsideration of the interplay between open access, peer review dynamics, and self-correction of science. As we chart the course ahead, these insights underscore the multifaceted nature of the scholarly enterprise, prompting us to delve deeper into the mechanisms that underpin peer review, publication accessibility, and their collective contribution to the advancement of knowledge.

## **6. Avenues for Future Research**

An intriguing avenue for future research could involve exploring another facet of the "Streetlight Effect" not addressed in this article. This time, the focus would be on investigating whether researchers tend to concentrate their Post-Publication Peer Review (PPPR) efforts on articles published in the most renowned or dominant journals in their field, potentially at the expense of less well-known or marginal journals. This form of research bias could potentially have implications for the quality and objectivity of PPPR, as prestigious journals often garner more attention and funding, which could influence the frequency of comments and critiques. By examining whether such a "Spotlight Effect" exists in the context of PPPR, researchers could gain a better understanding of how publication dynamics influence the processes of scientific evaluation and correction while aiming to promote a more balanced assessment of academic literature.

Another limitation of this study lies in its narrow focus on a single source of post-publication peer review (PPPR). With the vast volume of academic publications exceeding two million papers annually, the platform investigated, discussing less than 35,000 papers per year, may not exert significant influence on scientific progress in any discernible manner. Moreover, the study overlooked alternative PPPR platforms such as Faculty Opinions (<https://connect.h1.co>), as well as discussions occurring on blogs and social media platforms. Neglecting these additional sources restricts the scope of the investigation and may obscure the broader manifestations of the streetlight effect within the PPPR landscape. Therefore, a more comprehensive exploration encompassing diverse PPPR platforms and online discourse channels would be necessary to provide a nuanced understanding of this phenomenon.

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