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Retraction Handling by Potential Predatory Journals

Abstract

Retraction, as a post-publication quality control measure increasingly adopted by mainstream journals, has been observed in a few potential predatory journals (PPJs), but the extent and handling of retractions by PPJs in general remain unclear. This study investigated retraction practices among the 1,511 standalone PPJs on the updated Beall's List. Data from the Retraction Watch Database revealed that only 46 of the PPJs, including 18 indexed by the Web of Science (WoS) Core Collection, had retracted a total of 645 publications as of 2022. The retraction handling performance of these PPJs was evaluated in terms of publicity of retraction policies, availability of retraction documents, visibility of retractions, and informativeness of retraction notices. Overall, the retracting PPJs performed poorly against these criteria and showed a trend of inadequate documentation of retraction policies and documents over time. A positive correlation was found between WoS inclusion and retraction handling performance of the PPJs except for the publicity of retraction policies. These findings suggest that retraction handling performance could serve as an additional important criterion of journal editorial practices and highlight the desirability of evaluating journal legitimacy in terms of post-publication quality control through retraction.

Keywords: potential predatory journal, predatory publishing, retraction, Beall's List, Retraction Watch Database, Web of Science

1. Introduction

Maintaining the integrity of scientific literature necessitates robust quality control both before and after publication. Predatory journals are frequently criticized for their purported lack of rigorous pre-publication peer review (Bartholomew, 2014; Grudniewicz et al., 2019; Nejadghanbar & Hu, 2022a; Oermann et al., 2018; Seadle, 2018) and pollution of the scientific literature (Akça & Akbulut, 2021; Forero et al., 2018; Frandsen, 2017; Salim, 2021). However, directly confirming this criticism through systematic assessment is challenging due to the inherent opacity of the peer review process. Reviewer comments, crucial for evaluating the rigor of pre-publication scrutiny, have been typically unavailable for research analysis[1]. Alternative approaches have their own set of limitations. "Sting operations"[2], such as Bohannon (2013) submission of flawed manuscripts to suspected potential predatory journals (PPJs) and Sorokowski et al.'s (2017) fake editor application, attempt to expose flaws in the peer review process and editor recruitment. However, this approach not only raises ethical concerns (Teixeira da Silva, 2021) but also lacks feasibility for comprehensive evaluation. Similarly, relying on self-reported data from authors, reviewers, and editors presents methodological challenges in identifying predatory journals, due to potential biases and the sensitivity of the subject matter. The extremely low response rate reported by Nejadghanbar et al. (2023) likely reflects authors' reluctance

[1] As one reviewer of our paper pointed out, more journals are starting to publish peer reviews or provide them when requested.

[2] Notably, "sting" papers have also been submitted to non-PPJs to expose their publishing flaws in general.

to discuss their journal selection behaviors, further compounding these challenges. Therefore, assessing journal performance in pre-publication quality control remains a complex and methodologically demanding endeavor. The lack of standardized, transparent processes and the difficulty in obtaining reliable data necessitate a cautious approach when evaluating claims about the rigor of pre-publication peer review in predatory journals.

In contrast to the challenges mentioned above, assessing a journal's performance in post-publication quality control can be achieved through an examination of post-publication peer review practices. This form of scrutiny, often occurring openly on platforms like PubPeer and Retraction Watch, plays a crucial role in identifying and rectifying issues in published literature. Post-publication peer review can lead to various rectifications, ranging from correction notices (errata and corrigenda) for minor errors to retraction notices for more serious flaws, depending on the severity of the problems identified. Importantly, these rectification documents are generally publicly accessible, making them valuable data sources for research on post-publication quality control practices. Retraction notices, in particular, offer significant insights into a journal's commitment to upholding the integrity of scientific literature. As a high-stakes genre in academic discourse (Lin, 2024; Lin & Chen, 2022; Xu & Hu, 2021, 2022), retraction notices represent a journal's most decisive action to address seriously flawed publications in many cases[3] and ensure the integrity of its contributions to the literature. How journals handle retractions, including their transparency, timeliness, and adherence to best practices, can serve as an indicator of their overall performance in post-publication quality control.

While PPJs are often criticized for profit-seeking at the expense of pre-publication quality control (Grudniewicz et al., 2019; Happe, 2020), it remains unclear whether this profit-driven approach extends to their post-publication quality control, if any, including retractions. It has been suggested that PPJs have little post-publication quality control for at least three reasons[4]. First, conducting post-publication quality control is time- and resource-consuming, potentially conflicting with their profit-driven nature. Second, a reputation for retractions could deter potential authors seeking quick and easy publication. Third, PPJs may be reluctant to retract published papers and refund the pocketed article processing charges (APCs) to researchers who have inadvertently published there. Anecdotal reports revealed that some PPJs even required a retraction fee to deter or profit from retractions (Cobey, 2017). However, these assumptions require empirical verification. A rigorous examination of retraction handling practices among PPJs is necessary to determine the validity of these assumptions and gain a more nuanced understanding of post-publication quality control in the context of predatory publishing.

Various watchlists of academic journals, such as Cabells Predatory Reports[5] and the Academic

[3] Retractions encompass a range of situations beyond addressing seriously flawed publications. For example, retractions can also occur for accidental duplicate publications due to journal or publisher error or withdrawal of patient consent, among other reasons.

[4] While these three factors may contribute to limited post-publication quality control in PPJs, they are not unique to PPJs. Small, independent journals or those belonging to smaller associations may face similar constraints due to limited resources or concerns about author reputation and financial stability.

[5] https://cabells.com/solutions/predatory-reports (Accessed on May 23, 2024)

Journal Predatory Checking System[6], have been compiled to alert the scientific community to predatory publishing (Bisaccio, 2018; Chen et al., 2023; Dony et al., 2020; Siler, 2020; Strinzel et al., 2022; Teixeira da Silva & Tsigaris, 2018). This effort began with Beall's List, initiated by Jeffrey Beall in 2008 and updated until its suspension in early 2017 (Oransky, 2017; Strielkowski, 2017) due to criticism of its reliability for identifying PPJs (Cukier et al., 2020; Krawczyk & Kulczycki, 2021; Mohammed et al., 2024; Walters, 2022). Beall's List was later revived and updated by an anonymous researcher using the same criteria[7]. While criticism over predatory publishing centers on the lack of rigorous pre-publication peer review (Beall, 2012, 2016; Cobey et al., 2018; Dale & Craft, 2021; Richtig et al., 2018), a critical yet under-examined aspect is whether these journals exercise post-publication quality control through retractions. If they have retracted publications, it would be essential to assess how they have handled retractions.

Inclusion in the four journal indexing databases of the Web of Science (WoS) Core Collection – Science Citation Index (SCIE), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), and Emerging Sciences Citation Index (ESCI) – is widely regarded as a marker of relatively high journal quality, particularly in metrics-based research assessments. However, some PPJs manage to enter these highly selective databases (Richtig et al., 2023). For example, categorized as a PPJ by Beall's List, *Oncotarget*[8] was indexed in but then excluded from the SCIE (McCook, 2018), and has retracted 47 publications, as documented by the Retraction Watch Database (RWDB)[9]. Conversely, the *Journal of Fundamental and Applied Sciences*[10], never indexed in WoS but included on Beall's List, attracted considerable attention in the academic community for retracting over 400 papers in one go (Oransky, 2019). Such cases raise questions about possible prevalence of WoS-indexed PPJs on Beall's List and potential differences in retraction practices between the PPJs indexed by WoS and their non-indexed counterparts.

Beyond the various defining characteristics of predatory publishing identified in previous studies (Downes, 2024; Nejadghanbar & Hu, 2022b; Richtig et al., 2018), a PPJ's performance in handling retractions has the potential to serve as a supplementary criterion for assessing its legitimacy. Motivated by this assumption, our study examines this underexplored area by investigating the retraction practices of the PPJs on the updated Beall's List, given its pioneering status and lasting influence on the current escalating fight against predatory publishing, despite criticisms over its validity (Butler, 2013; Crawford, 2014; Kimotho, 2019; Teixeira da Silva, 2017a, 2017b; Teixeira da Silva & Kendall, 2023). By assessing the retraction handling performance of these PPJs, our study aims to provide information bearing on the criticisms directed at Beall's List. Specifically, this study addresses four research questions:

1) *What is the prevalence of retractions among the PPJs on the updated Beall's List?*

[6] http://140.113.207.51:8000/ (Accessed on May 23, 2024)

[7] See the current version of Beall's List at https://beallslist.net (Accessed on May 23, 2024)

[8] https://www.oncotarget.com/

[9] The query on the Retraction Watch Database (http://retractiondatabase.org) was conducted on July 21, 2024.

[10] https://www.jfas.info/index.php/JFAS

This question focuses on the baseline frequency of retractions by the PPJs, providing a basic measure of their engagement with post-publication accountability.

2) *How do the PPJs handle their retractions?*

Moving beyond mere quantity, this question targets the quality and transparency of retraction handling by the PPJs, assessing their adherence to ethical editorial practices. To this end, we develop a four-dimensional framework for evaluating journal performance in retraction handling, detailed in the following section.

3) *Does WoS inclusion positively correlate with better retraction handling performance by the PPJs?*

Recognizing WoS inclusion as an indicator of journal quality, this question explores whether PPJs indexed by WoS demonstrate better retraction handling compared to those not indexed. An informed answer to this question can contribute to the ongoing discussion about PPJs' editorial practices and provide implications for exploring potential differences in retraction handling between PPJs and non-PPJs.

4) *Does the availability of retraction policies and documents change over time?*

This question examines potential changes in the availability of retraction notices and retracted publications on the official PPJ websites, assessing whether the PPJs maintain adequate and permanent documentation of their retraction policies and documents.

As is evident in the above research questions, this study is descriptive and correlational in nature. Such a study is necessary for a research topic that has been hitherto little explored. It can provide a useful picture of the characteristics, behaviors, and practices associated with a particular phenomenon (e.g., prevalence, incidence, variation and temporal change), hence valuable data for generating hypotheses for further research utilizing more complex designs that may involve control groups, for example, non-PPJs (Aggarwal & Ranganathan, 2019).

2. A Framework for Assessing Journal Performance in Retraction Handling

Drawing upon existing retraction research (Ivory & Elson, 2024; Xu & Hu, 2021, 2023, 2024b), retraction guidelines proposed by the Committee on Publication Ethics (COPE Council, 2019) and Retraction Watch (Oransky, 2015), and recommendations on the communication of retractions from the US National Information Standards Organization (NISO)[11], we propose a four-dimensional framework for evaluating journal performance in handling retractions, each addressing a critical aspect of transparent and responsible retraction handling under the purview of journals and publishers.

Policy publicity. This dimension examines whether the journal has a retraction policy that is publicly accessible on its official website and whether the publicized retraction policy provides adequate information regarding its retraction handling. Publicity of a retraction policy suggests transparency and offers guidance about the journal's criteria and procedures for handling retractions.

Retraction documentation. This dimension assesses the availability of retracted publications

[11] https://www.niso.org/press-releases/niso-publishes-recommended-practice-communication-retractions-removals-and (Accessed on May 23, 2024)

and retraction notices. Retraction notices are expected to remain accessible on journal websites without subscription, registration, or payment. These notices are crucial to ensuring that readers are aware of the retractions and the underlying reason(s). Similarly, retracted publications should remain accessible on journal websites even after retraction [12] because the continued availability of (water)marked retracted publications facilitates the effective keeping of the research record.

Retraction visibility. This dimension addresses the visibility of retractions, encompassing five sub-criteria intended to maximize clarity and awareness:

1) *Connectivity*: Whether the retraction notice and its retracted publication are cross-hyperlinked, facilitating seamless navigation between them.
2) *Watermarking*: Whether the retracted publication is clearly watermarked to indicate its retracted status, preventing its unintentional dissemination or use as a valid publication[13].
3) *Specificity*: Whether the retraction notice pertains to a single publication, establishing a clear one-to-one relationship between the retraction notice and its retracted publication.
4) *Explicit titling*: Whether the title of the retraction notice unambiguously states its purpose of retracting a publication, leaving no doubt about its function.
5) *Dissemination*: Whether the HTML version of the retraction notice provides easy sharing options for other platforms, enhancing the reach and awareness of the retraction.
6) *Availability in PDF format*: Whether the retraction notice is made available in PDF format to allow for permanent off-line documentation, highlighting not only the formality of the retraction but also the journal's good documentation practice.

Informativeness of retraction notices. This dimension assesses the extent to which retraction notices include all essential information recommended by retraction guidelines and best practices. Effective retraction notices are critical to upholding the integrity of the academic record and ensuring transparency about why an article has been retracted, which helps maintain accountability within the scholarly community. Informativeness of retraction notices is measured by the disclosure of 11 types of compulsory information regarding retraction, as proposed by Xu and Hu (2023) and detailed in Table 1 in the following section.

3. Methods

To address the four research questions, we followed a seven-step procedure to collect, code, and

[12] Elsevier acknowledges that exceptional circumstances may necessitate the removal of a retracted publication from an online journal archive. This action is reserved for situations involving significant legal or ethical concerns, such as when the retracted publication contains defamatory content, violates legal rights, is subject to a court-ordered removal, or presents information that could pose serious health risks if acted upon (https://www.elsevier.com/about/policies-and-standards/article-withdrawal, accessed on May 23, 2024). It should be noted that other publishers have done so under legal obligations or to protect entities in retracted case reports. Removal of retracted publications is allowed, as suggested by COPE (https://publicationethics.org/sites/default/files/retraction-guidelines-cope.pdf)

[13] Although watermarking is a valid method for indicating a publication's retracted status and is recommended by the NISO guidelines (published June 2024), it is not the only acceptable method. For example, prominent headers on PDFs can serve the same purpose. Notably, the COPE retraction guidelines do not specify watermarking. Our focus on watermarking provides a specific, albeit non-universal, measure of identification clarity and serves as a consistent benchmark in our data analysis. However, it does not cover the full range of acceptable practices at the time of data collection, a factor that should be considered when interpreting the results of this study.

analyze data.

Step 1: Compiling a list of PPJs

We extracted the titles of all the 1,511 standalone PPJs on the Beall's List website[14], which provides the archived original list (last updated on January 9, 2017) and the "Update" (last updated on December 8, 2021). We copied these titles into one column of an Excel worksheet and formatted them consistently. We did not start with potential predatory publishers because they may publish both PPJs and legitimate journals. This step of identifying standalone PPJs also ensured the feasibility of the project within a reasonable timeframe.

Step 2: Retrieving PPJ data entries

In January 2024, we downloaded the RWDB dataset in CSV format from Crossref[15] and converted it into Excel for analysis. Using the VLOOKUP function, we matched the PPJ titles from our list with the *Journal* column in the RWDB dataset[16], identifying data entries specifically associated with our target PPJs. To align with our research objective of assessing retraction practices up to 2022, we extracted data entries within that timeframe. Data from 2023 in the RWDB dataset was excluded due to the significant surge in retractions (nearly 14,000) (Mallapaty, 2024), which were incompletely documented in the RWDB at the time of data collection. As the RWDB served as our sole source of retraction data, incorporating incomplete 2023 retraction data could have compromised our objective for comprehensive data coverage and thus potentially impacted the representativeness of our findings.

Step 3: Locating retraction documents

For easy reference, we use *retraction documents* to refer to retraction notices and their corresponding retracted publications. We utilized the hyperlinks provided on the Beall's List website to access the homepage of each PPJ to search for retraction documents. When the original links on Beall's List were inactive, we conducted searches using the journal titles to locate updated websites or alternative platforms. We utilized the search functionality on the PPJ websites, using data entry titles in the RWDB dataset. When a full title search yielded no results, we conducted additional searches using the first 3-6 words of the title to reduce the possibility of missing entries due to hidden formatting. For PPJ websites lacking a search function, we manually navigated through the archives to locate relevant retraction documents. We conducted a content analysis of these notices in PDF and/or HTML format to identify retractions, excluding all other types of editorial actions (i.e., corrections, expressions of concern, and 3 reinstatements[17]).

Step 4: Identifying WoS inclusion of retracting PPJs

[14] https://beallslist.net/standalone-journals/

[15] https://www.crossref.org/blog/news-crossref-and-retraction-watch/

[16] Following the completion of this research project, we conducted a *post hoc* search for variations in the PPJ titles, including those with or without opening definite/indefinite articles, conjunctions (e.g., *and*), and ampersands (&). This search yielded no additional valid PPJ titles.

[17] The three identified reinstatements, as documented by the RWDB, involved temporary removals of the original publications. These cases lacked associated reinstatement notices, and the reasons for reinstatement (e.g., replacement, court order, or otherwise) were not disclosed. Therefore, we excluded them from our dataset.

PPJs with a record of retractions were identified as retracting PPJs. A retracting PPJ was coded as being included in the WoS if it met two criteria. First, the title of the retracting PPJ could be retrieved in any of the four journal indexes of the WoS Core Collection (i.e., SCIE, SSCI, A&HCI, and ESCI). Second, the ISSN and/or e-ISSN of the retracting PPJ, as listed on the PPJ website, matched the information in WoS.

Step 5: Coding the data

- Analytical framework

We developed and revised the analytical framework collectively. The revised framework was then checked against the data, refined and finalized after a pilot data-coding exercise.

- Policy publicity

We defined retraction policies as journal guidelines on retractions, separated clearly from those intended for unpublished manuscripts. To locate retraction policies on PPJ websites, we utilized built-in search functions with keywords, such as *retract*, *withdraw*, *retraction policy*, and *withdrawal policy*. For websites without search capabilities, we manually examined various sections, such as homepage, editorial policy, publication ethics, and author guidelines.

Policy publicity was assessed based on PPJs rather than individual retractions. We first coded for availability of a retraction policy (i.e., presence vs. absence). Policy publicity was also coded for informativeness (i.e., informative vs. uninformative) of the retraction policy located. A retraction policy was deemed informative if it disclosed retraction criteria, provided a retraction flowchart, and/or specified entities responsible for handling retractions.

- Retraction documentation

We assessed retraction documentation based on individual retractions, using binary coding for the availability of both retraction notices and retracted publications. If a retraction notice was found in HTML and/or PDF format, it was coded as an instance of availability and downloaded for further analysis. When a retraction notice was available in both PDF and HTML formats, only the one in PDF format was downloaded for reasons detailed in the sub-section of "Informativeness of retraction notices". If a retracted publication was located in HTML and/or PDF format, it was coded as an instance of availability[18].

- Retraction visibility

We evaluated the visibility of each retraction, using binary coding for six aspects: 1) whether the two retraction documents were cross-hyperlinked; 2) whether the retracted publication was watermarked to indicate its retraction status; 3) whether the retraction notice pertained to a single retracted publication; 4) whether the title of the retraction notice clearly conveyed its communicative purpose of retracting a publication; 5) whether the HTML page of the retraction notice provided the function

[18] While our data coding simply classified retracted publications as either available (in HTML and/or PDF format) or unavailable, we acknowledge that this approach did not distinguish between legitimate reasons for unavailability, such as those outlined by COPE (e.g., court orders, privacy protection, etc.).

of forwarding the retraction notice to external platforms (e.g., Twitter, Facebook, WeChat, and email); 6) whether the retraction notice was available in PDF format.

- Informativeness of retraction notices

Following the framework proposed by Xu and Hu (2023) for mandatory disclosure of specific information in retraction notices, our assessment of the informativeness of each retraction notice centered on the 11 informativeness indicators listed in Table 1. To make our assessment more granular, 2 indicators were expanded into 8 sub-indicators each. We coded each of the retraction notice for the presence or absence of each informativeness (sub-)indicator.

Our analysis of informativeness drew on the retraction notices in PDF format, when both HTML and PDF versions were available, but it also included the 6 retraction notices available only in HTML format. We made this decision based on the inherent advantages of PDFs. Firstly, PDFs remain unchanged once downloaded (unless deliberately modified by the user through the Edit function), in contrast to their HTML counterparts, which can be altered or removed[19] (see Step 6). This difference makes retraction notices in PDF format a more reliable source of retraction-related information. Secondly, retraction notices in HTML format are often less informative than their PDF counterparts[20] or merely provide a download link to the PDF[21,22], making PDFs the primary sources of retraction-related information. For these reasons, the inclusion of the 6 HTML-only retraction notices might have introduced data inconsistencies that could potentially compromise the reliability of our comparison based on WoS inclusion. However, if the HTML-only retraction notices had been excluded, it would have undermined the completeness of our informativeness analysis.

- Data coding reliability

We maximized the reliability of our data coding through four key measures. First, the second author, who was responsible for data coding, thoroughly internalized the analytical framework by participating in the process of refining and finalizing it. Second, the second author consulted the first author for detailed explanations and illustrative examples of the indicators in the framework. Third, the second author conducted pilot coding on a portion of the data under the supervision of the first author before coding the full dataset. Fourth, any cases of uncertainty or ambiguity that arose during data coding were resolved through discussions between the first two authors.

Step 6: Exploring changes in the availability of retraction policies and documents over time

To investigate potential temporal changes in the availability of retraction policies and documents, we conducted a second round of data collection in May 2024 and compared them with those collected in January 2024. This additional step was not part of our initial research design but a response to an unexpected finding. Upon completing our data collection in January 2024, we noticed a significant

[19] https://geneticsmr.com/year2016/vol15-3/pdf/gmr007_retraction.pdf

[20] https://www.aging-us.com/article/203548

[21] https://www.amj.net.au/index.php/AMJ/issue/view/163

[22] https://www.hilarispublisher.com/archive/bej-volume-8-issue-4-year-2017.html

discrepancy between the number of PPJ retractions documented by RWDB and our own data. This discrepancy raised concerns that PPJs might make their retraction policies and documents available temporarily. To test this hypothesis, we re-examined the availability of retraction policies and documents every four months after our initial data collection until mid-September 2024. While a longer-term longitudinal analysis would have been ideal, our time constraints limited the scope of this study[23].

Step 7: Analyzing the coded data

We first provided descriptive statistics on the coded data, followed by inferential statistics, to profile the patterns of the PPJs' performance in retraction handling. Prior to this, we conducted an in-depth analysis of a top-performing PPJ, which served as a case study to flesh out the journal performance indicators used in this study and highlight best practices in retraction handling within the context of potential predatory publishing. The PPJ that met the most retraction handling performance criteria and had the highest number of retraction notices available for analysis was selected for the case study. This case study involved a thorough examination of the selected PPJ's performance across all indicators, providing a nuanced understanding of the PPJ's strengths and weaknesses.

4. Findings

4.1 A case study

We selected the *International Journal of Nanomedicine*[24] and one of its retractions as a case study. Established as a peer-reviewed journal by Dove Medical Press in 2006, the journal has been included in SCIE since 2007. From 2006 to 2022, the journal published an average of approximately 404 articles per year, with the lowest being 33 in 2009 and the highest being 710 in 2019. In 2012, the journal retracted publications for the first time but did not retract other publications until 2018. From 2018 to 2022, it retracted 49 publications, with a steadily increasing annual retraction rate from 0.32% to 6.59%. The 49 retractions all occurred after its publisher, Dove Medical Press, was acquired by Taylor & Francis Group. This acquisition may have resulted in improved editorial practices and retraction handling, potentially contributing to the journal's relatively strong performance in handling these retractions.

4.1.1 Policy publicity

The *International Journal of Nanomedicine* details its retraction policy in a section of its editorial policies entitled "Corrections, Expressions of Concern, and Retraction"[25]. This retraction policy outlines retraction criteria, describes how to launch an investigation into allegations, cites Dove Medical Press policies and COPE guidelines as sources of guidance. The retraction policy also

[23] Admittedly, the short timeframe of two 4-month intervals limits the strength of our findings about temporal trends in retraction documentation, and it may sound premature to characterize the analysis as a diachronic study. However, the findings could offer valuable preliminary insights into temporal changes in the documentation practice of the PPJs with retractions, calling for future research on this important editorial practice of PPJs.

[24] https://www.dovepress.com/international-journal-of-nanomedicine-journal (Accessed on May 23, 2024)

[25] https://www.dovepress.com/editorial-policies/corrections-retractions (Accessed on May 14, 2024)

includes what to do upon a retraction decision, including watermarking the retracted publication, issuing a formal retraction notice, establishing connectivity between the retraction notice and its retracted publication, and ensuring its online availability.

4.1.2 Retraction documentation

The journal website provided a search function, which could be used to identify retraction documents by title. By typing in the first six words of the title of the retracted publication, we located both the retraction notice[26] and its retracted publication[27] in HTML format. By clicking on the provided links (i.e., Download Article [PDF]), we were able to download the retraction notice in PDF format[28]. Similarly, the retracted publication in PDF format[29] was also available.

4.1.3 Retraction visibility

Cross-hyperlinks connected the retraction notice and its corresponding retracted publication, both downloadable in PDF format. Clicking on the text *This retraction relates to this paper* (highlighted and underlined in blue) in the retraction notice led to a webpage of the retracted publication. Clicking on the word *retracted* (highlighted and underlined in blue) in the first sentence *This paper has been retracted* led to the retraction notice in HTML format, whose title ended with the word *Retraction* in square brackets, clearly indicating its communicative purpose of retraction. Under its title were six ways of sharing the retraction notice: Twitter, Facebook, WeChat, LinkedIn, Reddit, and email. Both its title and body text indicated that the retraction notice was issued to retract only one publication. Additionally, the corresponding retracted publication was watermarked with *RETRACTED* in red.

4.1.4 Informativeness of retraction notices

The retraction notice in PDF format presented six types of core bibliographic information about itself: journal title (i.e., *International Journal of Nanomedicine*), publisher name (i.e., Dovepress), retraction notice title (i.e., *Fabrication and Characterization of Glimepiride Nanosuspension…Inhibition [Retraction]*), publication date (i.e., 28 November 2022), volume number and page range (i.e., 17 and 5779-5780), and DOI (located at bottom of the page). Although the retraction notice did not name its authors and their affiliations, a textual analysis revealed the editor and publisher as the retraction notice authors, whose affiliations were found on the journal website.

The retraction notice discloses six types of core bibliographic information about the retracted publication: journal title (i.e., *Int J Nanomedicine*), publisher name (i.e., Dovepress), title (i.e., *Fabrication and Characterization of Glimepiride Nanosuspension…Inhibition*), author names (displayed under the title), publication date (i.e., 2019), and volume number and page range (i.e., 14 and 6287-6296).

[26] https://www.dovepress.com/retraction-fabrication-and-characterization-of-glimepiride-nanosuspens-peer-reviewed-fulltext-article-IJN (Accessed on May 23, 2024)

[27] https://www.dovepress.com/fabrication-and-characterization-of-glimepiride-nanosuspension-by-ultr-peer-reviewed-fulltext-article-IJN (Accessed on May 23, 2024)

[28] https://www.dovepress.com/getfile.php?fileID=85704 (Accessed on May 23, 2024)

[29] https://www.dovepress.com/getfile.php?fileID=85705 (Accessed on May 23, 2024)

The retraction notice began by announcing the editor and publisher's act of performing retraction (i.e., …*wish to retract the published article*) and then revealed an allegation against the retracted publication (i.e., *concerns were raised about the alleged duplication*) and the subsequent investigation by the editor and publisher (i.e., *The authors did respond to our queries*). After listing the problems with the publication (e.g., *the findings reported in the article were unreliable*), the retraction notice introduced the editor's request for retraction (i.e., *The Editor…requested for the article to be retracted*) and concluded by highlighting the online availability of the retracted publication (i.e., *The retracted article will remain online*).

The retraction notice failed to disclose four types of key information: the affiliations of the authors of the retracted publication, the entity who raised the allegation, a retraction announcement, and the timeline of key acts (i.e., raising the allegation, investigating the allegation, requesting retraction, performing retraction, and announcing retraction). These omissions notwithstanding, the retraction notice provided additional information beyond the informativeness criteria. For instance, it justified the retraction decision with the journal policy and reference to the COPE retraction guidelines (i.e., *We have been informed in our decision-making by our policy on publishing ethics and integrity and the COPE guidelines on retractions*) and noted the notification of the authors of the retracted publication about the retraction decision (i.e., *The authors were notified of this* [the retraction decision]). As a result, it is reasonable to conclude that the retraction notice demonstrated a relatively high level of informativeness.

4.2 Results Based on the Whole Dataset

Our analyses identified 645 retractions made between 2008 and 2022 by 46 of the 1,511 PPJs on Beall's List, as documented by the RWDB. Of the 46 retracting PPJs identified, 18 used to be or were still indexed by WoS, whereas the remaining 28 had never been included in WoS. None of the 35 retraction handling performance criteria was satisfied by all the retracting PPJs and their retractions. The satisfaction rates were: over 80% for 14 indicators, 60-80% for 3 indicators, 40-60% for 9 indicators, 20-40% for 6 indicators, and 0-20% for 3 indicators (see the first 3 columns of Table 1).

4.2.1 Policy publicity

Retraction policies were identified on the official websites of 26 retracting PPJs, and only half of these policies were found to be informative, as illustrated by the case of *International Journal of Nanomedicine*.

4.2.2 Retraction documentation

Among the 645 retractions, only 145 had a retraction notice available in HTML and/or PDF format, resulting in a silent retraction rate of 77.5%, and 420 had the retracted publications available in PDF and/or HTML, registering a documentation rate of 65.1%. Notably, only 19% (n = 122) of the 645 retractions had both the retraction notice and the retracted publication available. Of the 145 retraction notices located, 139 were available in PDF format.

4.2.3 Retraction visibility

Of the 145 retraction notices, 98% clearly conveyed their purpose of retracting a publication, using the term *retract* or its variants in their titles. Approximately 96% of the retraction notices were made available in PDF format. Almost 94% of the retraction notices adhered to the standard practice of issuing an individual retraction notice for each retracted publication. Of the 420 retracted publications, 26% were watermarked *retracted*. Just slightly over 73% of the retraction notices had reciprocal hyperlinks between their HTML versions and corresponding retracted publications. For about 61% of the retraction notices, the HTML versions offered options for quick sharing on various platforms.

4.2.4 Informativeness of retraction notices

Four types of bibliographic details, namely journal titles, retraction notice titles, publication dates, and volume/issue/page numbers, were disclosed in 88.3-93.8% of the 145 retraction notices in PDF and/or HTML formats. Publisher names and DOIs were revealed in approximately 58% and 57% of these retraction notices, respectively. Names of retraction notice authors and their affiliations were identified in slightly more than 8% and less than 1% of the retraction notices, respectively.

Five types of key bibliographic details concerning the retracted publications, namely journal titles, publication titles, author identities, original publication dates, and volume/issue/page numbers, were available in 93.8-99.3% of the 145 retraction notices. Publisher names were disclosed in slightly less than 58% of the retraction notices. DOIs of the retracted publications and the affiliations of their authors were found in just over 28% and 26% of the retraction notices, respectively.

Retraction reasons were revealed in just above 88% of the retraction notices. The agents responsible for key actions were identified in about 81% of the retraction notices. Over 55% of the retraction notices disclosed allegations against the retracted publications. Investigations into these allegations and the act of performing retraction were disclosed in approximately 54 % of the retraction notices. About 46% and 44% of the retraction notices mentioned retraction requests and retraction announcements. Just over 37% and 7% of the retraction notices indicated the (un)availability of the retracted publications and the timeline of key acts related to retraction handling, respectively.

4.2.5 Differences in retraction-handling performance

As shown in Table 1, no significant difference in the publicity of retraction policies was identified between the WoS-indexed and non-WoS PPJs. However, the WoS-indexed PPJs significantly outperformed the non-WoS ones for five other key retraction-handling indicators: accessibility of retracted publications, accessibility of retraction notices, cross-hyperlinks between retracted publications and retraction notices, retraction visibility, and informativeness of retraction notices in PDF format. Notably, the WoS-indexed PPJs outperformed the non-WoS-indexed ones in three of the six sub-indicators of retraction visibility, but significant differences were found in only 2 of the 11 sub-indicators of the informativeness of retraction notices: bibliographic information of retraction notices (i.e., four secondary sub-indicators) and bibliographic information of retracted publications (i.e., three secondary sub-indicators).

Table 1. Statistics on retraction-handling performance of the PPJs

1. Policy publicity	All PPJs (46)		WoS PPJs (18)		Non-WoS PPJs (28)		X^2	p
	f	%	f	%	f	%		
1.1. A retraction policy being available	26	56.5	11	61.1	15	53.6	0.04	.842
1.2 The retraction policy being content-rich	13	28.3	4	22.2	9	32.1	0.16	.694
2. Retraction documentation	**All PPJs (645)**		**WoS PPJs (155)**		**Non-WoS PPJs (490)**		X^2	p
	f	%	f	%	f	%		
2.1 The retracted publication (RP) being available	420	65.1	114	73.5	306	62.4	5.91	.015
2.2 The retraction notice (RN) being available	145	22.5	131	84.5	14	2.9	445.89	<.001
3. Retraction visibility	**All PPJs (145)**		**WoS PPJs (131)**		**Non-WoS PPJs (14)**		X^2	p
	f	%	f	%	f	%		
3.1 The RN title indicating retraction	142	97.9	128	97.7	14	100.0	[b]	1.000
3.2 The RN being available in PDF format	139	95.9	128	97.7	11	78.6	[a]	.012
3.3 One RN intended for one RP	136	93.8	122	93.1	14	100.0	[a]	.600
3.4 The RP being watermarked ($N = 420$) [#]	109	26.0	100	87.7	9	2.9	306.24	<.001
3.5 The RN and the RP being cross-hyperlinked	106	73.1	98	74.8	8	57.1	[a]	.203
3.6 The RN in HTML enabling instant sharing	89	61.4	85	64.9	4	28.6	5.59	.018
4. Informativeness of the RN	**All PPJs (145)**		**WoS PPJs (131)**		**Non-WoS PPJs (14)**		X^2	p
	f	%	f	%	f	%		
4.1 Bibliographic information of the RN								
4.1.1 Journal title	136	93.8	127	96.9	9	64.3	[a]	<.001
4.1.2 Volume/issue/page number	134	92.4	125	95.4	9	64.3	[a]	.001
4.1.3 Title	129	89.0	119	90.8	10	71.4	[a]	.051
4.1.4 Publication date	128	88.3	119	90.8	9	64.3	[a]	.013
4.1.5 Publisher name	84	57.9	81	61.8	3	21.4	6.90	.009
4.1.6 DOI	82	56.6	75	57.3	7	50.0	0.06	.813
4.1.7 Author name(s)	12	8.3	10	7.6	2	14.3	[a]	.326
4.1.8 Author affiliation(s)	1	0.7	0	0.0	1	7.1	[b]	.097

4.2 Bibliographic information of the RP								
4.2.1 Title	144	99.3	131	100.0	13	92.9	[b]	.097
4.2.2 Journal title	140	96.6	127	96.9	13	92.9	[b]	.403
4.2.3 Author name(s)	140	96.6	130	99.2	10	71.4	[b]	<.001
4.2.4 Publication date	136	93.8	126	96.2	10	71.4	[a]	.005
4.2.5 Volume/issue/page numbers	136	93.8	124	94.7	12	85.7	[a]	.210
4.2.6 Publisher name	84	57.9	81	61.8	3	21.4	6.90	.009
4.2.7 DOI	41	28.3	34	26.0	7	50.0	[a]	.068
4.2.8 Author affiliation(s)	38	26.2	32	24.4	6	42.9	[a]	.197
4.3 Retraction reason(s)	128	88.3	117	89.3	11	78.6	[a]	.214
4.4 Indication of agents of key acts	118	81.4	108	82.4	10	71.4	[a]	.296
4.5 Allegation(s) against the RP	80	55.2	75	57.3	5	35.7	1.58	.209
4.6 Investigation(s) into the allegation(s)	78	53.8	73	55.7	5	35.7	1.31	.252
4.7 Act of performing retraction	78	53.8	71	54.2	7	50.0	0.00	.986
4.8 Request for retraction	67	46.2	63	48.1	4	28.6	1.23	.267
4.9 Announcement of retraction	64	44.1	56	42.7	8	57.1	0.56	.455
4.10 Indication of (un)availability of the RP	54	37.2	52	39.7	2	14.3	2.49	.114
4.11 Indication of time points of key acts	11	7.6	10	7.6	1	7.1	[a]	1.000

Note. WoS PPJs = potential predatory journals indexed by the journal databases of the Web of Science Core Collection; non-WoS PPJs = potential predatory journals that had not been indexed by Web of Science as of May 2024; # = Different from the 145 retraction notices under examination in this category, the focus here is on the 420 retracted publications, including 114 in the WoS-indexed PPJs and 306 in the non-WoS PPJs; Key acts = raising the allegation, investigating the allegation, requesting retraction, performing retraction, and announcing retraction. The latter *a* in superscript indicates a case where the expected frequencies in one cell in the contingency table are smaller than 5; Fisher's exact test was run to obtain the *p* value. The letter *b* in superscript refers to a case where the expected frequencies in two cells in the contingency table are smaller than 5; Fisher's exact test was carried out to obtain the *p* value.

4.2.6 Changes over time in documentation of retraction policies and documents

Our analysis in May and September 2024, every four months after the initial data collection and coding, revealed changing numbers of available retraction polices and documents, as shown in Table 2[30].

Table 2. Changes over time in the availability of retraction policies and documents

Retraction handling performance indicator	Jan-2024		May-2024		Sep-2024	
	f	%	*f*	%	*f*	%
1. Policy publicity (*N* = 46)						
1.1 A retraction policy being available	26	56.5	24	52.2	25	54.3
1.2 The retraction policy being informative	13	28.3	13	28.3	14	30.4
2. Retraction documentation (*N* = 645)						
2.1 The retracted publication being available	420	65.1	414	64.2	420	65.1
2.2 The retraction notice being available	145	22.5	137	21.2	146	22.6

5. Discussion

5.1 Overall Poor Retraction Handling by the PPJs

The finding that only about half of the 46 retracting PPJs publicized a retraction policy on their official websites suggests that some publications might have been retracted without clear guidelines and that many publications in need of retraction could have been under the radar, raising serious concerns about transparency and potential mishandling. The identified (un)availability of a retraction policy can be explained from two perspectives. First, some PPJs may intentionally avoid adopting or publicizing retraction policies to attract potential clients – individuals holding low ethical standards and seeking easy publication unscrupulously – who shy away from the risk of retractions and their associated negative consequences. Second, some PPJs may strategically publicize a retraction policy to appear more legitimate and deceive less discerning researchers into mistaking them for credible journals, thereby enticing them to pay APCs.

Our closer scrutiny revealed that half of these publicized retraction policies were superficial and very uninformative. Many retraction policies publicized by the PPJs are more likely to serve as a façade to disguise their disregard for or sloppiness in safeguarding publication integrity through proper retraction handling. A case in point is *Tropical Plant Research*. According to its website, the journal published a total of 501 articles between 2014 and 2023, and its archive did not show any publications for 2024[31]. While the journal claimed to have adopted a retraction policy, the policy was limited to a one-sentence claim that the journal followed the COPE retraction guidelines, accompanied by an inactive link[32]. Notably, according to the RWDB, the journal's first and only retraction occurred in 2017, but no retraction notice could be retrieved for the retraction.

The widespread unavailability of retraction documents identified in this study indexes poor

[30] This table will be updated every four months until this article is accepted for publication.

[31] https://www.tropicalplantresearch.com/archives (Accessed on July 21, 2024)

[32] https://www.tropicalplantresearch.com/publication-policy (Accessed on July 21, 2024)

documentation practices among the retracting PPJs, which contravene the COPE retraction guidelines (COPE Council, 2019) and the best retraction practices advocated by NISO (National Information Standards Organization et al., 2024). The absence of retraction notices results in "silent or stealth retractions", a practice giving rise to various problems (Teixeira da Silva, 2015). Notably, while the RWDB documents 645 retractions in the PPJs, only 420 retracted publications could be retrieved on the PPJ websites in January 2024, and 6 of these disappeared four months later. In a short interval of only four months, 2 retracting PPJs withdrew their retraction polices. Another four months later, there appeared to be an increase in the availability of retraction documents. However, such an increase arose partly from the resurgence of previously unavailable cases of documentation. The generally deteriorating documentation of retraction policies and documents over time is further evidence of the unprofessionalism, irresponsibility, and unethicality of PPJs as academic publishing venues. Therefore, we argue that poor documentation practices (e.g., only temporary availability) concerning retractions and publications, together with invalid URLs of PPJ websites encountered repeatedly during our data collection, can be adopted as telltale indicators for poor editorial practices of PPJs[33]. Admittedly, it would be technically and financially challenging to monitor the documentation practices of PPJs.

This study revealed a dismally low level of retraction visibility, which might have stemmed from conflicting interests among stakeholders. Ensuring proper retraction connections and adequate retraction visibility poses significant challenges for journals, both in terms of resource allocation and financial implications. Highly visible PPJ retractions may prompt authors of retracted publications to demand refunds of their paid APCs and deter potential clients from submitting manuscripts. Additionally, increased visibility of retractions may subject authors of retracted publications to adverse consequences, potentially motivating the retracting PPJs to intentionally minimize retraction visibility to "protect" their clients. Conversely, some researchers, upon realizing their dupery by PPJs, may insist on publicizing their retractions so as to submit the retracted publications to legitimate journals.

The uninformativeness of most PPJ retraction notices examined in this study is consistent with previous findings about inadequate disclosure concerning retraction handling by journals in general (Bakker et al., 2024; Shi et al., 2024; Xu & Hu, 2021, 2024a). This perpetuates a disconcerting trend of inadequate disclosure about retraction handling, despite increasing calls for more informative retraction notices (Vuong, 2020; Xu & Hu, 2023). PPJ owners and operators may prioritize profit over academic responsibility, hence unresponsive to calls to improve retraction practices. Unlike mainstream journals, which are believed to strive for sustainability by achieving a balance between commercial and academic objectives, predatory journals may view the costs associated with thorough retractions—such as investigations and obtaining DOIs for retraction notices—as detrimental to their profit margins.

[33] Consistently poor documentation practices should raise serious concerns about the legitimacy of non-PPJs and should be considered alongside other criteria when evaluating their editorial practices.

5.2 Differences in Retraction Handling Performance among the PPJs

This study found no significant difference in 23 of the 35 performance indicators of retraction handling between the WoS-indexed PPJs and the non-WoS ones. However, the former outperformed the latter for the remaining 12 performance indicators[34]. The absence of significant differences with respect to the 23 performance indicators might explain why the retracting PPJs remain on Beall's List. However, the better performance of the WoS-indexed PPJs for the 12 indicators suggests that their inclusion in WoS set higher standards and expectations for their editorial practices, as reflected by the stringent journal selection criteria of the WoS Core Collection[35]. Therefore, the WoS inclusion of these PPJs and their markedly better performance in retraction handling may justify, to some extent, criticisms over Beall's categorization of them as PPJs.

While post-publication quality control through retractions is not a direct criterion for inclusion in the WoS Core Collection, this study of 46 PPJs reveals a positive correlation between WoS inclusion and better retraction handling performance. Despite the limited sample of the study, the findings suggest that the framework developed for this study can provide helpful guidance on what to look at when evaluating non-PPJs' retraction handling performance. The implication is highlighted by the case of the *International Journal of Nanomedicine*. The journal, part of the SCIE since 2007, demonstrated consistent adherence to robust post-publication quality control, as evidenced by its proactive retraction of problematic publications and its overall effective handling of those retractions.

However, relying solely on a journal's retraction handling performance to distinguish between legitimate and predatory journals is untenable. A more nuanced evaluation is necessary, as evidenced by the differences in comprehensive literature-correcting efforts between journals. For example, in 2022, the journal *Oncotarget*, which was included in the SCIE for only six years (2011–2016), had a retraction rate of 5.1% (8 retractions out of 158 publications), but its overall literature-correction rate was 31.6% when including 15 addendums and 27 corrections. In contrast, the *International Journal of Nanomedicine* had a higher retraction rate (6.6%), but its literature-correction rate was significantly lower at 13.4% (29 retractions, 29 corrigenda, and 1 erratum) for the same period. The notable difference in literature-correction rates (13.4% vs. 31.6%) suggests that the *International Journal of Nanomedicine* likely had more robust pre-publication quality control measures in place, which may have contributed to its continued inclusion in the SCIE, whereas *Oncotarget* was delisted. Furthermore, the high volumes of literature corrections other than retractions (6.8% and 26.6%) in both journals raise concerns that some publications that warranted retraction may have instead received corrections or amendments, potentially to protect the interests of "pay-to-publish" clients. This highlights the need for a more comprehensive evaluation of journal legitimacy that considers multiple factors other than retraction rates and retraction handling performance.

[34] This study did not evaluate the relative importance or usefulness of each indicator. Future research can explore the weighting of these indicators in assessing journal legitimacy. Findings of such research would provide valuable implications for developing more robust criteria for identifying and evaluating predatory publishing practices.

[35] https://clarivate.com/products/scientific-and-academic-research/research-discovery-and-workflow-solutions/webofscience-platform/web-of-science-core-collection/editorial-selection-process/editorial-selection-process/#

The discontinued inclusion of *Oncotarget* in the SCIE highlights that journal legitimacy is not static and can evolve over time, either positively or negatively. While *Oncotarget* lost legitimacy recognition, some other journals labeled (potentially) predatory may be able to improve their editorial practices and gain recognition as legitimate journals. Although predatory journals prioritize profit over quality, some journals labeled as such may genuinely aspire to uphold ethical publishing standards but lack the resources for robust quality control. In other words, it is inappropriate to bundle misconduct with poor quality when it comes to evaluating journals (Eriksson & Helgesson, 2018). With a clear vision and increased investment, these journals can enhance their pre- and post-publication quality control measures and ultimately achieve recognition as legitimate journals. Therefore, evaluating journal legitimacy requires a multifaceted approach that is rigorously, constantly, and regularly assessed for effectiveness.

6. Conclusion

Retraction is a crucial post-publication quality control mechanism for academic journals, and retraction handling should be considered an essential criterion when evaluating editorial practices. This study proposes four criteria for assessing the retraction handling performance of PPJs, arguing that a journal's legitimacy can be determined in part by how it handles retractions. While inclusion in the WoS correlates positively with better retraction handling among PPJs, it is important to scrutinize the retraction rates of these journals, even those with seemingly acceptable practices. A higher retraction rate can indicate two contrasting possibilities, namely looser pre-publication quality control and closer post-publication scrutiny, in addition to other factors such as editors' over-reactions to public complaints, changes in editorial processes and policies over time, or even availability of more resources to handle the extra workload entailed. In conclusion, while better retraction handling is a positive indicator, it should not be the sole factor in determining a journal's legitimacy. Therefore, a holistic approach, considering both pre- and post-publication quality control measures, is necessary for a comprehensive evaluation of academic journals.

This study focused on the 1,511 standalone PPJs on the updated Beall's List for two reasons, as explained earlier. First, this focused approach allowed for an in-depth investigation of PPJ retraction handling practices within the time constraints of our research project. Second, by examining this particular group of journals, we aimed to generate empirical data that could contribute to the ongoing discussions about the editorial practices of PPJs on Beall's List. Notably, because our study did not include a control group of non-PPJs, its findings are primarily descriptive, despite its intra-PPJ comparisons (i.e., WoS-indexed vs. non-WoS PPJs). Consequently, we are not in a position to draw any conclusion about differences in retraction handling performance between PPJs on Beall's List and non-PPJs. However, the analytical framework, together with the findings of this study, can serve as a starting point for future research comparing retraction handling practices between PPJs and non-PPJs. The significant differences along the faultline of WoS indexing, as identified in this study, suggest a hypothesis for future research: mainstream WoS-indexed journals may significantly outperform PPJs in retraction handling (at least for some indicators). To test this hypothesis requires

a comparative study with a rigorous ex post facto design that establishes *tertium comparationis* (i.e., a common platform of comparison).

It is also crucial to acknowledge that the generalizability of our findings to PPJs not included on the updated Beall's List may even be limited due to the focused nature of our analysis. To build on the findings of this study and gain a more comprehensive understanding of predatory publishing, future research should expand its scope of analysis. Specifically, utilizing the analytical framework developed in this study, future investigations could expand on our findings by examining the retraction handling performance of the PPJs listed in Cabells Predatory Reports. Investigations in this direction are particularly relevant given the increasing use of Cabells Predatory Reports in identifying predatory publishing practices. Cabells Predatory Reports offers broader coverage than Beall's List, including a larger number of journals and providing more information for each journal[36]. Such follow-up research holds the potential to deepen our understanding of predatory publishing practices and provide additional insights to inform and strengthen our efforts to combat this issue.

To further empower our fight against predatory publishing, future research should focus on developing a systematic approach to analyzing the retraction handling practices of alleged predatory publishers, with the goal of identifying indicators of publisher illegitimacy. However, determining publisher illegitimacy presents a greater challenge than assessing legitimacy of individual journals. A publisher may engage in a form of "reputation washing" by operating a portfolio that includes both ethically managed journals with robust quality control measures and predatory journals focused on profit maximization. This strategy allows them to build a positive brand reputation in the academic community while financially benefiting from predatory practices. The revenue generated from predatory journals can then be reinvested in legitimate journals, further complicating efforts to assess the publisher's overall legitimacy. As the number of legitimate journals within a publisher's portfolio grows, so does the difficulty in critically evaluating their editorial practices and characterizing them definitively. This complexity highlights the need for a nuanced and comprehensive approach to publisher evaluation that goes beyond simply counting the number of legitimate or predatory journals under their umbrella.

[36] While Cabells Predatory Reports offers potential advantages and was considered for this study, accessing it proved infeasible. Cabells primarily serves institutional subscribers, and our request to the university library for subscribing to Cabells was unfortunately declined. Future research utilizing Cabells data should account for this potential access limitation.

References

Aggarwal, R., & Ranganathan, P. (2019). Study designs: Part 2 - Descriptive studies *Perspectives in Clinical Research*, *10*, 34-36. https://doi.org/10.4103/picr.PICR_154_18

Akça, S., & Akbulut, M. (2021). Are predatory journals contaminating science? An analysis on the Cabells' Predatory Report. *The Journal of Academic Librarianship*, *47*(4), 102366. https://doi.org/https://doi.org/10.1016/j.acalib.2021.102366

Bakker, C. J., Reardon, E. E., Brown, S. J., Theis-Mahon, N., Schroter, S., Bouter, L. M., & Zeegers, M. P. (2024). Identification of retracted publications and completeness of retraction notices in public health. *Journal of Clinical Epidemiology*, *173*, 111427. https://doi.org/10.1016/j.jclinepi.2024.111427

Bartholomew, R. E. (2014). Science for sale: The rise of predatory journals. *Journal of the Royal Society of Medicine*, *107*(10), 384-385. https://doi.org/10.1177/0141076814548526

Beall, J. (2012). Predatory publishers are corrupting open access. *Nature*, *489*(7415), 179-179. https://doi.org/10.1038/489179a

Beall, J. (2016). Predatory journals: Ban predators from the scientific record. *Nature*, *534*(7607), 326. https://doi.org/10.1038/534326a

Bisaccio, M. (2018). Cabells' Journal Whitelist and Blacklist: Intelligent data for informed journal evaluations. *Learned Publishing*, *31*(3), 243-248. https://doi.org/10.1002/leap.1164

Bohannon, J. (2013). Who's afraid of peer review? *Science*, *342*(6154), 60-65. https://doi.org/10.1126/science.2013.342.6154.342_60

Butler, D. (2013). Investigating journals: The dark side of publishing. *Nature*, *495*(7442), 433-435. https://doi.org/10.1038/495433a

Chen, L. X., Su, S. W., Liao, C. H., Wong, K. S., & Yuan, S. M. (2023). An open automation system for predatory journal detection. *Scientific Reports*, *13*(1), 2976-2976. https://doi.org/10.1038/s41598-023-30176-z

Cobey, K. D. (2017). Illegitimate journals scam even senior scientists. *Nature*, *549*(7670), 7. https://doi.org/10.1038/549007a

Cobey, K. D., Lalu, M. M., Skidmore, B., Ahmadzai, N., Grudniewicz, A., & Moher, D. (2018). What is a predatory journal? A scoping review. *F1000Res*, *7*, 1001. https://doi.org/10.12688/f1000research.15256.2

Committee on Publication Ethics Council. (2019, December 10). *Retraction guidelines*. Retrieved December 16, 2023 from https://publicationethics.org/retraction-guidelines

Crawford, W. (2014). Ethics and access 1: The sad case of Jeffrey Beall. *Cites & insights : Crawford at large.*, *14*(4), 1-14.

Cukier, S., Helal, L., Rice, D. B., Pupkaite, J., Ahmadzai, N., Wilson, M., Skidmore, B., Lalu, M. M., & Moher, D. (2020). Checklists to detect potential predatory biomedical journals: A systematic review. *BMC Medicine*, *18*(1), 104. https://doi.org/10.1186/s12916-020-01566-1

Dale, J., & Craft, A. R. (2021). Professional applications of information literacy: Helping researchers learn to evaluate journal quality. *Serials Review*, *47*(3-4), 129-135. https://doi.org/10.1080/00987913.2021.1964337

Dony, C., Raskinet, M., Renaville, F., Simon, S., & Thirion, P. (2020). How reliable and useful is Cabell's blacklist? A data-driven analysis. *Liber Quarterly*, *30*(1), 1-38. https://doi.org/10.18352/LQ.10339

Downes, M. (2024). The stock characters in the editorial boards of journals run by predatory

publishers. *Learned Publishing*, *n/a*(n/a). https://doi.org/https://doi.org/10.1002/leap.1608

Eriksson, S., & Helgesson, G. (2018). Time to stop talking about 'predatory journals'. *Learned Publishing*, *31*(2), 181-183. https://doi.org/10.1002/leap.1135

Forero, D. A., Oermann, M. H., Manca, A., Deriu, F., Mendieta-Zerón, H., Dadkhah, M., Bhad, R., Deshpande, S. N., Wang, W., & Cifuentes, M. P. (2018). Negative effects of "predatory" journals on global health research. *Annals of Global Health*. https://doi.org/10.29024/aogh.2389

Frandsen, T. F. (2017). Are predatory journals undermining the credibility of science? A bibliometric analysis of citers. *Scientometrics*, *113*(3), 1513-1528. https://doi.org/10.1007/s11192-017-2520-x

Grudniewicz, A., Moher, D., Cobey, K. D., Bryson, G. L., Cukier, S., Allen, K., Ardern, C., Balcom, L., Barros, T., Berger, M., Ciro, J. B., Cugusi, L., Donaldson, M. R., Egger, M., Graham, I. D., Hodgkinson, M., Khan, K. M., Mabizela, M., Manca, A.,…Lalu, M. M. (2019). Predatory journals: No definition, no defence. *Nature*, *576*(7786), 210-212. https://doi.org/10.1038/d41586-019-03759-y

Happe, L. E. (2020). Distinguishing predatory from reputable publishing practices. *Journal of Managed Care & Specialty Pharmacy*, *26*(8), 956-960. https://doi.org/10.18553/jmcp.2020.26.8.956

Ivory, J. D., & Elson, M. (2024). A tale of three retractions: A call for standardized categorization and criteria in retraction statements. *Current Psychology*, *43*(17), 16023-16029. https://doi.org/10.1007/s12144-023-05216-6

Kimotho, S. G. (2019). The storm around Beall's List: A review of issues raised by Beall's critics over his criteria of identifying predatory journals and publishers. *African Research Review*, *13*(2), 1-11.

Krawczyk, F., & Kulczycki, E. (2021). How is open access accused of being predatory? The impact of Beall's lists of predatory journals on academic publishing. *The Journal of Academic Librarianship*, *47*(2), 102271. https://doi.org/10.1016/j.acalib.2020.102271

Lin, Y. (2024). Correcting the scientific record. *Pragmatics and Society*, *15*(4), 532-556. https://doi.org/10.1075/ps.22008.lin

Lin, Y., & Chen, M. (2022). "The more important findings are sustained": A diachronic perspective on the genre of the retraction notice. *English for Specific Purposes*, *67*, 18-30. https://doi.org/10.1016/j.esp.2022.03.002

Mallapaty, S. (2024). China conducts first nationwide review of retractions and research misconduct. *Nature*, *626*(8000), 700-701. https://doi.org/10.1038/d41586-024-00397-x

McCook, A. (2018, January 19). Indexing company praises cancer journal, then kicks it out. *Retraction Watch*. https://retractionwatch.com/2018/01/19/indexing-company-praises-cancer-journal-kicks/

Mohammed, K. K., Hama, J. I., & Kakamad, F. H. (2024). Beyond Beall's list: The need for contemporary evaluation tools in predatory publishing research. *Learned Publishing*, *37*(2), 157-158. https://doi.org/10.1002/leap.1602

National Information Standards Organization, Bakker, C., Choma, M., Conaway, A., Czerepowicz, J., Edmunds, T., Flanagin, A., Flockton, S., Griffin, J., Hargitt, P., Hazzard, E., Hunter, S., Kean, E., Kwakkelaar, R., Lammey, R., Longobardi, L., McVeigh, M., Oransky, I., Renaville, F.,…Zalm, M. (2024). *Communication of retractions, removals, and expressions of concern*

(CREC) recommended practice (978-1-950980-26-0). https://www.niso.org/standards-committees/crec

Nejadghanbar, H., & Hu, G. (2022a). Where predatory and mainstream journals differ: A study of language and linguistics journals. *Learned Publishing*, *35*(4), 574-584.

Nejadghanbar, H., & Hu, G. (2022b). Predatory and Legitimate Open Access Journals in Language and Linguistics: Where Do They Part Ways? *Journal of Scholarly Publishing*, *53*(4), 224- 248. https://doi.org/10.3138/jsp-2022-0021

Nejadghanbar, H., Hu, G., & Jahangiri Babadi, M. (2023). Publishing in predatory language and linguistics journals: Authors' experiences and motivations. *Language Teaching*, *56*(3), 297-312. https://doi.org/10.1017/S0261444822000490

Oermann, M. H., Nicoll, L. H., Chinn, P. L., Ashton, K. S., Conklin, J. L., Edie, A. H., Amarasekara, S., & Williams, B. L. (2018). Quality of articles published in predatory nursing journals. *Nursing Outlook*, *66*(1), 4-10. https://doi.org/10.1016/j.outlook.2017.05.005

Oransky, I. (2015, May 21). What should an ideal retraction notice look like? *Retraction Watch*. https://retractionwatch.com/2015/05/21/what-should-an-ideal-retraction-notice-look-like/

Oransky, I. (2017, January 17). Why did Beall's List of potential predatory publishers go dark? *Retraction Watch*. https://web.archive.org/web/20180418225328/https://retractionwatch.com/2017/01/17/bealls-list-potential-predatory-publishers-go-dark/

Oransky, I. (2019, February 20). Journal retracts more than 400 papers at once. *Retraction Watch*. https://retractionwatch.com/2019/02/20/journal-retracts-more-than-400-papers-at-once/

Richtig, G., Berger, M., Koeller, M., Richtig, M., Richtig, E., Scheffel, J., Maurer, M., & Siebenhaar, F. (2023). Predatory journals: Perception, impact and use of Beall's list by the scientific community–A bibliometric big data study. *PLOS ONE*, *18*(7), e0287547. https://doi.org/10.1371/journal.pone.0287547

Richtig, G., Berger, M., Lange‐Asschenfeldt, B., Aberer, W., & Richtig, E. (2018). Problems and challenges of predatory journals. *Journal of the European Academy of Dermatology and Venereology*, *32*(9), 1441-1449. https://doi.org/10.1111/jdv.15039

Salim, M. (2021). Contamination by citations: References to predatory journals in the peer-reviewed marketing literature. *South Asian Journal of Marketing*, *2*(1), 5-27. https://doi.org/10.1108/SAJM-02-2021-0021

Seadle, M. (2018). Publication quality, peer review and predatory journals. *Proceedings of the Association for Information Science and Technology*, *55*(1), 730-731. https://doi.org/https://doi.org/10.1002/pra2.2018.14505501094

Shi, A., Bier, B., Price, C., Schwartz, L., Wainright, D., Whithaus, A., Abritis, A., Oransky, I., & Angrist, M. (2024). Taking it back: A pilot study of a rubric measuring retraction notice quality. *Accountability in Research*, 1-12. https://doi.org/10.1080/08989621.2024.2366281

Siler, K. (2020). Demarcating spectrums of predatory publishing: Economic and institutional sources of academic legitimacy. *Journal of the Association for Information Science and Technology*, *71*(11), 1386-1401. https://doi.org/10.1002/asi.24339

Sorokowski, P., Kulczycki, E., Sorokowska, A., & Pisanski, K. (2017). Predatory journals recruit fake editor. *Nature*, *543*(7646), 481-483. https://doi.org/10.1038/543481a

Strielkowski, W. (2017). Predatory journals: Beall's List is missed. *Nature*, *544*(7651), 416-416. https://doi.org/10.1038/544416b

Strinzel, M., Severin, A., Milzow, K., & Egger, M. (2022). Blacklists and whitelists to tackle predatory publishing: A cross-sectional comparison and thematic analysis. *mBio*, *13*(3). https://doi.org/10.1128/mbio.01305-22

Teixeira da Silva, J. A. (2015). Silent or stealth retractions, the dangerous voices of the unknown, deleted literature. *Publishing Research Quarterly*, *32*(1), 44-53. https://doi.org/10.1007/s12109-015-9439-y

Teixeira da Silva, J. A. (2017a). Caution with the continued use of Jeffrey Beall's "predatory" open access publishing lists. *AME Medical Journal*, *2*. https://doi.org/10.21037/amj.2017.06.14

Teixeira da Silva, J. A. (2017b). Jeffrey Beall's "predatory" lists must not be used: they are biased, flawed, opaque and inaccurate. *Bibliothecae.it*, *6*(1), 425-436. https://doi.org/10.6092/issn.2283-9364/7044

Teixeira da Silva, J. A. (2021). Assessing the ethics of stings, including from the prism of guidelines by ethics-promoting organizations (COPE, ICMJE, CSE). *Publishing Research Quarterly*, *37*(1), 90-98. https://doi.org/10.1007/s12109-021-09784-y

Teixeira da Silva, J. A., & Kendall, G. (2023). Academia should stop using Beall's lists and review their use in previous studies. *Central Asian Journal of Medical Hypotheses and Ethics*, *4*(1), 39-47. https://doi.org/10.47316/cajmhe.2023.4.1.04

Teixeira da Silva, J. A., & Tsigaris, P. (2018). What value do journal whitelists and blacklists have in academia? *The Journal of Academic Librarianship*, *44*(6), 781-792. https://doi.org/10.1016/j.acalib.2018.09.017

Vuong, Q. H. (2020). Reform retractions to make them more transparent. *Nature*, *582*(7811), 149-149. https://doi.org/10.1038/d41586-020-01694-x

Walters, W. H. (2022). The citation impact of the Open Access accounting journals that appear on Beall's List of potentially predatory publishers and journals. *The Journal of Academic Librarianship*, *48*(1), 102484. https://doi.org/https://doi.org/10.1016/j.acalib.2021.102484

Xu, S. B., & Hu, G. (2021). Retraction notices as a high-stakes academic genre: A move analysis. In K. L. Lin, I. N. Mwinlaaru, & D. Tay (Eds.), *Approaches to specialized genres* (pp. 101–120). Routledge. https://doi.org/https://doi.org/10.4324/9780429053351

Xu, S. B., & Hu, G. (2022). Retraction stigma and its communication via retraction notices. *Minerva*, *60*(3), 349-374. https://doi.org/10.1007/s11024-022-09465-w

Xu, S. B., & Hu, G. (2023). What to communicate in retraction notices? *Learned Publishing*, *36*(3), 463-467. https://doi.org/10.1002/leap.1548

Xu, S. B., & Hu, G. (2024a). Construction and management of retraction stigma in retraction notices: An authorship-based investigation. *Current Psychology*, *43*, 16030-16043. https://doi.org/10.1007/s12144-022-03738-z

Xu, S. B., & Hu, G. (2024b). *Research retraction and its communication* (D. B. A. M. Khosrow-Pour, Ed.). IGI Global. https://doi.org/10.4018/978-1-6684-7366-5.ch030