



An expert criticism on post-publication peer review platforms: the case of pubpeer

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Abstract

While traditional peer review offers advantages in academic publishing, it is often hampered by significant weaknesses, leading to frustration among many authors. Scientific discoveries after publication depend on thorough discussions and critiques, making post-publication peer review (PPPR) an essential tool for identifying errors and encouraging authors to make necessary corrections. PPPR is defined as a critical, ongoing, and public review conducted by the broader scientific community once research findings are formally published. Its goal is to enable more academic experts to continuously examine, question, and validate the work, identifying potential flaws or strengths that might have been missed during the initial review. This ongoing dialogue promotes transparency and motivates authors to make necessary corrections. Although the goal of PPPR is to enhance scientific integrity, the open nature of PPPR platforms makes them vulnerable to misuse. It can also be exploited to undermine colleagues, suppress differing viewpoints, or further personal or organizational interests. We also observe an increase in “hyper-skepticism,” which differs from constructive criticism, reflecting an overly critical mindset that focuses on doubt rather than fostering understanding. To fully realize the benefits of PPPR and prevent misuse, the scientific community must build a more equitable and more responsible framework. Addressing these challenges requires a thoughtful strategy that integrates technological advancements, strengthens editorial policies, enhances transparency measures, and provides robust protections for good-faith scientific debate.

Highlights

- While traditional peer review has its strengths, it also suffers from some weaknesses.
- PPPR serves to safeguard science and supports the idea of continuous review of scientific knowledge.
- “Hyper-skepticism” in contrast to constructive criticism, involves overly critical attitudes that focus on doubt rather than understanding.
- A comprehensive strategy encompassing technological advancements, enhanced editorial policies, increased transparency measures, and robust protections for legitimate scientific discourse is necessary.

Keywords Post-publication peer review · Pubpeer · Scientific integrity · Publication ethics · Hyper-skepticism

The push for accountability and transparency in science has led to the creation of platforms for post-publication peer review (PPPR) [1]. These platforms, despite presenting specific challenges, offer significant benefits to the scientific community. They aim to uphold scientific integrity by allowing users to critique published research and identify potential errors, often anonymously [2]. In this way, they

serve as an essential check on traditional peer review, helping to correct oversights and improve the quality of scientific publication.

However, these valuable tools can also have a dark side and may be misused. Platforms such as PubPeer, sometimes referred to as the “guardians of science”, can blur the line between constructive feedback and destructive attack [3].

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Although they claim to support scientific integrity, they can easily be used to undermine colleagues, silence differing opinions, or promote personal or organizational interests, a phenomenon sometimes termed “weaponized criticism” [4].

These platforms promote the essential idea that scientific knowledge should be open to continuous review. While the peer review process is beneficial, it has its limitations, including widespread author dissatisfaction and an inability to detect sophisticated fraud or errors [5, 6]. Significant scientific advancements have emerged from ongoing discussions and scrutiny after publication. Therefore, PPPR enhances scientific progress by fostering a self-correcting, dynamic ecosystem [1].

Nevertheless, allowing anonymous critiques without sufficient editorial oversight poses serious risks to the review process. Platforms that permit users to comment without disclosing their identities, credentials, or potential conflicts of interest reduce accountability [7]. This lack of transparency can lead to misuse, as the motives behind critiques may be unclear or even malicious. Instead of focusing on the main findings of the studies, some comments target minor issues like statistical errors, formatting mistakes, or a simple typo. In the wrong hands, critics may exaggerate these details and use them to challenge the validity of the entire research without justification. This may jeopardize meaningful scientific discussions, shifting the focus from a substantive scientific debate to fault-finding. Thus, the ultimate victim is trust not only in the research itself, but also in the entire review process.

A concerning trend is the rise of “hyper-skepticism” [8]. This approach involves overly critical attitudes that focus on doubt rather than understanding. Unlike constructive criticism, which aims to improve methods or results, hyper-skepticism concentrates on minor details to undermine a study’s validity [9]. Since no research is perfect, any paper can appear questionable under constant close examination. Critics often highlight minor issues, such as a *p-value* slightly above a standard threshold, an image that is not perfectly aligned, or a slight inconsistency in data, turning these into reasons to damage reputations and question the authors’ professionalism.

The primary difference between constructive peer evaluation and destructive skepticism lies in the intent behind them. Constructive reviews aim to promote scientific progress, whereas destructive criticism often arises from personal or ideological motivations [4]. Professional competition can lead individuals to discredit their peers over issues such as funding, recognition, or academic influence. Personal beliefs can also influence critiques, particularly when science addresses sensitive political, social, or ethical issues, leading to comments that reinforce biases rather than offering a fair evaluation.

Some individuals adopt a hyper-skeptical attitude to enhance scientific dialogue, but also to elevate their own visibility or assert authority. They see themselves as contrarians or self-appointed “watchdogs”, often prioritizing their own status over the enriching intellectual exchange [3]. This concerning trend shifts the focus away from meaningful discussions, undermining the essential role of nurturing constructive dialogue in the relentless pursuit of knowledge. It poses a significant risk to the fundamental processes that uphold scientific integrity and progress.

As demand for accountability in science has grown, new PPPR platforms have emerged. They help ensure scientific integrity by encouraging reviews of published studies to find errors, complement traditional peer review, and improve research quality. By promoting a culture of careful examination, these platforms aim to uphold the trustworthiness of research and push the boundaries of knowledge.

Even the most innovative tools can be misused in unexpected ways. Known as the “guardians of science,” these platforms often tread a delicate line between offering helpful feedback and launching harmful attacks. While their main goal is to support honest scientific research, they can be used as tools for ‘weaponized science’. In this situation, criticism shifts from being a means to promote understanding to a method for undermining rivals, silencing diverse opinions, or advancing personal or organizational interests. These platforms emphasize a crucial point: scientific knowledge should always be open to discussion and review. While traditional peer review is helpful, it has its limits. Many important discoveries have emerged from ongoing conversations and detailed examinations following the publication of research. Therefore, PPPR offers a valuable improvement to the scientific process. It creates a space where knowledge can grow through shared input and collaboration. Thus, PPPR is an essential and democratizing part of the scientific world if properly discussed, with both critics and authors contributing constructively.

However, simultaneous anonymity and a lack of strict editorial oversight pose serious risks to the review process. Platforms that allow users to publish critiques anonymously without revealing their identities, credentials, or potential conflicts of interest can lead to reduced accountability. This lack of transparency may promote misuse, as the real reasons behind critiques can become unclear, often appearing questionable or even harmful.

Many critiques focus on minor details, such as statistical errors, formatting issues, or typos. Critics often take these issues out of context and exaggerate them, causing people to doubt the validity of entire studies. This behavior undermines honest scientific discussions and shifts the focus to unnecessary criticism. It risks damaging trust in both the research itself and the peer review process.

A growing concern in scientific discourse is the rise of ‘hyper-skepticism,’ which involves excessive doubt regarding research findings rather than constructive efforts to understand or improve them. Unlike helpful criticism that highlights issues and helps refine methods, hyper-skepticism fixates on minor details to question the value of a study. Since no scientific work is perfect, every paper can appear flawed when subjected to constant and selective questioning. Critics often target minor problems, such as a p-value just meeting the threshold, a figure slightly off, or minor inconsistencies in data presentation, magnifying these issues to damage reputations and undermine the authors’ integrity.

A key concern is the distinction between fair critique and false doubt. Helpful peer reviews aim to advance science, while unfair skepticism often comes from personal or ideological motives. Professional rivalries can drive efforts to discredit colleagues, usually due to competition for funding, recognition, or academic power. Biases can also influence critiques, especially in fields where science intersects with contentious political, social, or ethical issues. This can lead to evaluations that support existing beliefs rather than pursuing objective inquiry based on established methods.

Some people may take an overly skeptical view to gain attention or to appear authoritative, presenting themselves as critics or “watchdogs”. In these cases, their goal changes from promoting helpful scientific discussion to boosting their own image. This shift deviates from the original purpose of fostering thoughtful dialogue in the pursuit of knowledge. This trend damages the critical processes that support scientific integrity and progress. In these fields, certain critics assume a gatekeeping role, dismissing unconventional studies not through direct engagement with the data or methodologies but rather by categorizing them as pseudoscience. When used in this manner, these platforms serve to enforce ideological conformity rather than encourage open inquiry.

The impact on individuals can be deeply significant. Researchers targeted by anonymous and harsh criticism may experience substantial damage to their reputations, even if the claims are unfounded or later proven to be false [10]. Public accusations can trigger a chain reaction of repercussions, including heightened skepticism from peers and the public, loss of funding opportunities, and the initiation of formal institutional investigations, which may ultimately lead to a retraction of the original claims. A notable example is the retraction of a paper where concerns were first raised through PubPeer comments. The authors argue the retraction was unjust, claiming the journal misinterpreted standard practice regarding control data and ignored the comprehensive raw data they provided. This case highlights how PPPR platforms can precipitate retraction actions that

many authors consider premature or unjust, especially when editorial boards do not fully engage with author responses or supporting evidence [11]. Here, the principles of fairness and clarity are crucial. The 2025 COPE Retraction Guidelines emphasize that retractions are intended to correct the literature, not to punish authors. This distinction is vital, reframing the outcome of an investigation from a punitive action to a corrective measure aimed at protecting the scholarly record. These consequences are particularly severe for those without the safety net of institutional prestige or support, such as early-career scientists, scholars at underfunded institutions, and researchers from non-Western or marginalized areas who often suffer greatly. For them, a system intended for scientific accountability can become a means of exclusion, silencing, and professional setbacks. In such situations, the ideal of open critique may degenerate into a framework that reinforces existing hierarchies rather than challenging them [12].

The 2025 COPE guidelines directly confront these abuses and introduce a crucial safeguard by clearly defining scenarios where retraction is not appropriate. For instance, a publication should not be retracted solely on the grounds of an authorship dispute if the validity of findings is not in doubt. Similarly, if errors don’t fundamentally affect the article’s conclusions, the preferred answer is a correction, not a retraction. The guidelines also formally separate Expressions of Concern as an alternative tool when evidence is insufficient or inconclusive, preventing premature retractions. Most importantly, COPE states that an article should not be retracted for non-payment of publication fees, thereby establishing a clear distinction between editorial decisions and business practices, thereby protecting the integrity of the scholarly record [13].

To achieve the intended goals of post-publication reviews and prevent potential misuse, the scientific community needs to create a more equitable and accountable framework. The conventional reliance on anonymity requires thoughtful reconsideration, ideally allowing most critiques to be attributed to identifiable individuals willing to uphold their evaluations. Reviewers must disclose any conflicts of interest, just as authors are expected to do. Additionally, there should be enhanced editorial oversight to ensure that reviews meet established standards of tone, scientific validity, and fairness. Equally important is the authors’ right to respond: they should be promptly informed of critiques and allowed to reply publicly and proportionately, ensuring that their responses receive adequate visibility [14].

Science represents a demanding pursuit and fosters open discussion; however, it can break down when criticism shifts to personal or ideological assaults. PPPR holds transformative potential; yet, to function ethically and effectively, it needs to follow essential guidelines that promote

transparency and respect among peers. In the absence of these standards, such platforms risk compromising the integrity they aim to uphold, transforming the collaborative essence of science into a conflict of interest and distrust.

A thorough revision of PPPR systems requires a simultaneous focus on various aspects of the issue. To begin with, platforms should enforce tiered disclosure requirements, ensuring that the majority of criticisms can be attributed to identifiable individuals while allowing anonymity in rare, justifiable instances. This strategy would uphold accountability while protecting genuine whistleblowers and early-career researchers who might face retaliation.

Secondly, enhancing editorial oversight is crucial to ensure that reviews adhere to established standards of tone, scientific rigor, and objectivity. This necessitates training editors to identify and counter weaponized critiques while remaining open to genuine scientific disagreement. The updated COPE guidelines provide editors with a clear and structured playbook, offering clarity for different retraction scenarios and improving consistency across journals. This playbook provides prescriptive guidance on the content of retraction notices, emphasizing that they must be factual, objective, and free from inflammatory language. The guidelines also mandate adding “Retracted:” to the article title, watermarking each page of the PDF, clearly stating who is retracting the article (e.g., editor, publisher), and specifying the retraction category (e.g., retraction with replacement). These notices must be linked to the article, remain free for anyone to read, and be published as fast as possible to minimize the spread of unreliable findings [13]. Detailed guidelines should clearly distinguish between constructive criticism that seeks to advance scientific knowledge and destructive criticism aimed at attacking individuals or advancing personal agendas.

Additionally, it is crucial to establish effective right-of-reply mechanisms that enable authors to respond quickly and appropriately to critiques. This ensures that their rebuttals receive comparable visibility alongside the initial criticism. Such a balanced approach helps to avoid one-sided attacks while promoting the collaborative spirit that is intrinsic to scientific discourse. The 2025 guidelines introduce an option, “retract and republish,” for a cooperative spirit when significant errors are discovered in a published article. In such cases, authors may collaborate with journal editors to withdraw the original work and, simultaneously, release a revised version that addresses the identified issues. This innovative approach provides a transparent means to correct the scientific paper. It enables authors who actively participate in correcting mistakes to contribute to research integrity, rather than being solely subject to penalizing authors who are willing to rectify their work [13].

The development of PPPR systems is expected to progress as technology evolves and the scientific community acquires more experience with these platforms. Integrating emerging technologies, such as artificial intelligence and blockchain, may present new solutions to existing issues, while also potentially introducing new challenges that will require continued attention.

International cooperation will be essential for developing consistent standards across various platforms and jurisdictions. The global nature of scientific research suggests that researchers may encounter critiques from platforms with differing standards and protections, making the harmonization of best practices vital for ensuring fair treatment, regardless of where research is published or critiqued. The key risks identified in this article, along with their corresponding solutions, are summarized in Table 1.

Experience with platforms like PubPeer shows that authors or their teams sometimes initiate false allegations, deliberately posting inaccurate comments to harass other

Table 1 Summary of risks in post-publication peer review and proposed solutions

Identified risk/misuse	Solution/strategy
<i>Lack of accountability due to anonymity</i>	Implement tiered disclosure requirements, where anonymity is reserved for justifiable cases and critiques are attributed.
<i>Weaponized criticism & personal attacks</i>	Strengthen editorial oversight to filter comments based on established standards and scientific validity.
<i>Suppression of differing viewpoints & ideological gatekeeping</i>	Establish clear guidelines that distinguish between constructive scientific debate and destructive criticism.
<i>Hyper-skepticism & fixation on minor flaws</i>	Train editors to recognize and deprioritize critiques that exaggerate minor issues to undermine the overall validity of the work.
<i>Reputational damage to authors (especially early-career)</i>	Guarantee a prominent right of reply and implement COPE’s safeguards, such as not retracting for authorship disputes alone and offering a “process of recourse” in batch retractions.
<i>Undeclared conflicts of interest (personal, financial, academic)</i>	Mandate all reviewers to disclose potential conflicts of interest, mirroring the standards required for authors and prepublication reviewers.
<i>Inconsistent standards across platforms</i>	Foster international cooperation to harmonize best practices and ethical guidelines across different PPPR platforms.
<i>Misinterpretation of ethical guidelines (e.g., cope)</i>	Promote and adhere to the structured framework of the 2025 COPE Guidelines, using its detailed criteria, formats, and notice requirements to reduce ambiguity and ensure fair, consistent decisions.
<i>Legal threats and post-retraction citation chaos</i>	Adopt clear policies in author agreements, ensure publisher support for editors, and implement prepublication checks to prevent inappropriate citation of retracted articles.

authors. Occasionally, they reference COPE without fully understanding its guidelines. For example, COPE has a principle known as 3Rs (Replacement, Reduction, and Refinement), which encourages reducing animal usage. COPE clarifies that researchers do not always require separate control groups and can use a single group across multiple parallel and non-parallel studies [15]. This includes results that look similar and claims that authors have employed identical images without retracting their articles. In other words, misunderstanding this can lead to claims that authors have duplicated images without cause. Such incidents have become more common over the past five years, as many allegations appear to stem from a misunderstanding of the updated COPE regulations. Moreover, claims are made that cell images are identical despite many papers being retracted last year due to such resemblances. A noteworthy point is that most cell studies utilize fibroblasts or similar fast-growing cells. Interestingly, although the cell structures in images may appear unchanged, they can produce varying levels of different proteins and enzymes, which are typically tested to demonstrate their effectiveness. Nonetheless, many research articles were retracted on this basis. Accumulated comments targeting a specific author are prohibited and considered misconduct by COPE; however, this conduct has been frequently noted on PubPeer, with moderators often overlooking its violation of COPE guidelines [16]. The untrained staff at publishers or journals associated with an Integrity Office usually makes erroneous decisions against specific authors, indicating that an intentional conflict is in progress. When contacted regarding the misconduct by their staff in the Integrity Office, higher-ups at journal publishers have learned to sidestep responses, as this contravenes COPE regulations. COPE has recently established a new unit to assist authors in addressing allegations. This unit has been instrumental in prompting journals to respond to complaint letters, although more decisive measures are anticipated [17].

In recent years, anonymous discussions on platforms like PubPeer have shown how informal examination can eventually lead to significant editorial actions, such as article retractions. The COPE guidelines directly address the diverse nature of such cases and advise moving beyond overly rigid protocols. Instead, they outline a detailed checklist for editors when deciding to retract. This checklist includes factors such as unreliable results due to data irregularities, fabricated data, or significant errors; misrepresentation, including fraud, identity theft, or undisclosed AI involvement; unethical research practices; copyright violations; and fake peer review processes. Additionally, the guidelines address modern challenges and emerging threats to scholarly communication, such as organizations involved in producing fraudulent publications, commonly known as

paper mills, which COPE formally defines as the systematic manipulation of the publication process [13].

COPE now provides a clear approach for these operations and recommends that, when inappropriate actions affect multiple publications, publishers coordinate the retraction of all implicated works collectively. To ensure the process recognizes different levels of author fault, editors are encouraged to offer a re-review opportunity to those whose articles might have been improperly included in a retraction decision. Additionally, to better address the retractions situation, the updated framework presents several options. Editors may choose to leave the retracted article available with a warning if the issues arise from honest mistakes, or remove it entirely in cases involving fraud, privacy violations, or legal concerns. In some instances where authors actively correct errors, a revised article may be published, replacing the retracted one. These procedures help reflect both integrity and fairness in editorial decisions.

The guidelines assign new responsibilities to editors and publishers, advising that all editorial decisions be documented, transparent, and based on clearly communicated policies. They strongly recommend that journals provide authors with a mechanism for appeal and emphasize the importance of an accurate and impartial retraction notice. COPE also recommends that these notices attribute judgments regarding misconduct to formally recognized investigators in academic institutions or funding agencies. Finally, COPE draws attention to the need for care in citing sources. Both journal staff and submitting authors are responsible for checking if a cited study has been retracted. Therefore, this can prevent unreliable research findings from being used as support for new research [13].

We need a PPPR platform to advance scientific publishing, potentially improving research quality and reliability. However, these platforms are vulnerable to manipulation, threatening scientific integrity and researchers' careers. Addressing these challenges requires a comprehensive approach with technological innovations, stronger editorial policies, increased transparency, and protections for legitimate discourse. Only through broad reforms can PPPR enhance scientific quality and prevent misuse for biases that harm the collaborative spirit vital to scientific progress.

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