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Pubpeer: vigilante science, journal club or alarm raiser? The controversies over anonymity in post-publication peer review.

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Extended abstract

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The more journal peer review (JPR) became a scientific topic, the more it has been the subject of criticisms and controversies. Repeated fake reports, confirmed reviewers' biases, lack of reproducibility, and a recurrent inability to detect fraud and misconduct have apparently condemned JPR in its supposedly traditional form. In fact, just like previous historical reforms and inventions, JPR has again been the object of many proposals to "fix it" since the beginning of the 21st century¹. Though these proposals are very diverse, two main directions have been identified: open peer review on one side, post-publication peer review (PPPR) on the other².

Even if its actual forms depend on 22 different definitions³, the first one relies on transparency and accountability to clean JPR from suspicion and criticism. These values are infused in pre-publication peer review by the mutual knowledge of reviewers and authors, the publication of referees' reports, the immediate availability of manuscripts or the organisation of a real discussion between authors, referees, editor-in-chief and sometimes whoever is interested in the manuscript. It has been implemented successfully in many new electronic-only journals and in working papers/preprint servers that are finally finding popularity, long after their success based on the ArXiv model has been announced⁴. The second one is also very diverse, including old practices such as citation counting in most natural and life sciences and book reviews in humanities and social sciences. It is also driven by innovations, such as the "publish first, review second" model developed by F1000⁵, the implementation of automated instruments by the Altmetrics movement⁶ or the systematic labelling of problematic published articles through an "expression of concern", a "correction" or a "retraction" by journals⁷. Would it be through modelisation⁸, common sense or experience, PPPR supporters strongly believe in the wisdom of the crowd and consequently empower readers as good judges to value and evaluate the published scientific literature⁹.

These two "fixes" share a common device, the open commenting of published articles, which is both an open peer review practice as it is visible to all readers and PPPR as it comes after the publication and often the certification of articles. At their intersection, it should thus thrive and indeed many journals have proposed this feature. As an experiment in 2006, Nature offered the "open comment" possibility to authors: only 5% of them agreed on the procedure, and among the 71 articles, less than half of them got comments and these were mostly non substantive¹⁰. New publishers also embraced it: BioMedCentral opened comments after it shifted to an open access journal model in 2002, so did PLOS One, with very little success¹¹. Even the PubMedCentral platform built them, and less than 1 paper out of 1000 were ever commented

before the PubMedCommons was recently shut down¹². These failures question the many reasons why scientists don't seem eager to become commentators in the digital age, whereas the "Letter to the Editor" format has thrived for ages. For Angela Cochran, it is ultimately the lack of community, which leads to this absence of engagement, contrary to other modes of scholarly communication such as workshops, conferences or formal journal activities¹³.

Nevertheless, there is an exception to the disappointment with open commentary in PPPR, which is the empirical case for this presentation: PubPeer, where commentators come in herds and comments flourish¹⁴. The only explanation given for this peculiar success is the possibility, largely used, to publish anonymized comments on the platform. So, how can you embrace the openness of discussion and, at the same time, enable anonymous commentators? What kind of PPPR practices is it connected with? Does it inform our views on traditional peer review and how? To answer these questions, we will first describe how the platform has been built and works, then to what kind of dynamics it leads as far as anonymity is concerned, then typify the arguments used for and against anonymity in PPPR, discuss its effects on published papers, before concluding on the way debates could be organized in PPPR. These first results are based on the systematic qualitative analysis of both threads on PubPeer, articles on specialized websites on PubPeer and anonymity (Scholarly Kitchen, RetractionWatch...) and on editorials from scientific journals that have commented on anonymity in PPPR¹⁵.

1. PubPeer: a success story?

PubPeer has been conceived by 3 biologists in 2012 as an online version of "journal clubs", a common practice at least in many medical departments for more than a century¹⁶. Their aim was mostly to educate young physicians, discuss applicability of published papers in clinical and health settings and develop critical thinking about the literature¹⁷. This last objective was at the heart of PubPeer creators, as they thought that raising specific questions about a given paper was insightful for the scientific debate. Moreover, the online translation of journal clubs would bring two new components to the debate: firstly, authors of the papers could actually answer the questions addressed to them; secondly, these discussions would be shared and cumulative across departments¹⁸. Strongly opposed to the evaluation of scientists and papers based on the journals in which they publish, they envisioned a device that is very similar to the initial project of Garfield with ISI in the 1950s: to have a unique place for the discussion and community surrounding any paper¹⁹. To do so, they would create a thread for each paper (using DOI as identification) and, once a comment has been posted, generate an automatic email to the authors of the paper in order to them to answer and start a conversation.

Anonymity was not included by design: yet, the three founders were anonymous, but comments had initially been signed, until founders were repeatedly contacted by young scientists being afraid to comment in the open view of their senior peers. So they implemented this possibility by March 2013 and rapidly saw the number of comments rising on the platform²⁰. Anticipating trolling and other problems pervasive within internet anonymous forums, they add a moderation step for these anonymous users, aimed at verifying comments are "based on publicly verifiable information" and are "not *ad hominem*"²¹. Though the moderation didn't prevent the expansion of the website, the massive publication of such comments led to heated

discussions about anonymity (see section 2 and 3). In 2015, PubPeer became a Californian foundation, thus legally “forcing” one of its founders to become the public figure of the website, Brandon Stell, an American biologist working for the French institution CNRS.

From then, Stell has been invited to many conferences on misconduct, scientific integrity or peer review and PubPeer has still grown, embracing a major public role in PPPR at least in biology²². They have developed additional features, notably a browser plugin to show existing PubPeer comments when users visit a given article page, and recently, some paying dashboards for journals to manage all existing comments on the articles they have published. But their dream of organized debates on the published literature has faced notable critics and unexpected twists, because of their use of anonymous comments.

2. Discussing papers and anonymity

The PubPeer website contains a list of threads which are searchable with standard published literature metadata (DOI, authors, title, keywords, journal...). Yet, there are “general threads” on journal management or JPR, such as the accountability of COPE member journals or “the sociology of rejection” (sic!) on the treatment of manuscripts, a few PubPeer Blog entries, but the quasi-totality of threads are discussions about a specific published paper. Despite the moderation processes, anonymity often becomes an obstacle for at least some stakeholders in the debate.

In a typical example, a recent thread about a paper concerning the treatment for certain patients starts with an very strong anonymous comment, which is automatically given a name from the “tree of life”, *Ehrendorferia chrysantha*²³. As the corresponding author has subsequently received an email, she answers and starts by pointing out anonymity as a problem: “However, I am eager to know what makes you to be ashamed of your real name, of your profession, your specialty and your affiliation? Why do you want to hide your real name under the plant name of *Ehrendorferia chrysantha*?”, then showing her faith in another form of PPPR as she states that her article has already received a high number of views. In his reply, the first commentator excludes personal questions and tries to come back to the content of the paper : “I am not ashamed of my name or profession but I don't see how that makes a difference so I am using anonymous login and the names is automatically generated by Pubpeer. I admit that I also made a comment about the author's identity when I pointed out that the study has been done by single author in a private clinic but I think it's a noteworthy in this case.” Then, the editor of the journal answers, renewing the critique of anonymity: “First, in my opinion it is a disrespect to the author to contact her anonymously. If you pretend that you are a scientist, you should not use an anonymous way to debate scientific issues”. Finally, the first commentator comes back, thanking for answers, but considering they were not addressing the weaknesses of the paper, he concludes: “I hope people who read this paper can be critical and nobody makes any decision on treatment solely based on this paper”.

In disciplines where the value of statements is strongly attached to their author, the organisation of the debate with anonymous contributors often derived on a debate about anonymity, with conflicting views between those who wish to have content-based comments and others

who consider valid contributions only from known persons. As such, it is the very definition of “peer” in PubPeer which is at stake.

3. The pros and cons of anonymity

If many threads never lead to any kind of real debate, whether because they shift to anonymity discussions or just by the lack of answers from authors or other commentators, the “success” of PubPeer, both in number of comments and in some spectacular cases (see section 4), has led to very constructed opposing views on anonymity in PPPR. We present in Table 1 a first synthesis, notably based on these exchanges²⁴.

Pros	Cons
Efficiency	Non-constructive
Focus on content	Image manipulation fetish
Protecting commentators	Protecting authors
Science as agon	“Civil” science

Table 1 Main arguments on anonymity in PPPR

The first two lines of Table 1 derive directly from the conception of PubPeer. Its founders strongly state that their one of its kind success is the proof that anonymity has to be part of commenting in PPPR; otherwise the *omerta* of the academic milieu would prevent public criticism to flourish, as it is shown by the failures of other commenting platforms. It is the anonymity that allows commentators to raise issues on content itself, especially very technical questions on methods. Conversely, opponents and critics underline the non-constructive engagement produced by anonymous commentators, so whatever number they might be, it is useless for science. More specifically, for them, commentators seem to be obsessed to find image manipulation in seemingly every figure of any published paper: so, rather than really “commenting”, they just put an image on the website with arrows or squares pointing out supposed problems²⁵.

The last two lines of Table 1 point out to the organization of debates in science. For PubPeer founders and supporters, the protection of commentators is an absolute goal, for debate to happen, especially because they observed careers being crushed simply by the voicing out of young scientists. And for them, open debate, in the most classical scholasticism fashion, should be focused on arguments and counter-arguments on content, forbidding judgments about persons in favor of discussion on facts and writings. Conversely, its opponents would care about the protection of authors, especially in a context where fraud and misconduct has become a common issue in life sciences. They would defend a “civil” science in which participants in a debate would be known to one another and avoid personal accusations, in fact “be critical but fair”²⁶.

Indeed, supporters and opponents of anonymity as organized in PubPeer agree on what would be an ideal world, in which scientific debate would *not need* anonymity, where raising questions about a paper would not be seen as an accusation²⁷. They also agree on problems in science and share an interest in PPPR, but only diverge on the means to organise PPPR commenting²⁸. There is a striking similarity with the 1970s historical debates on anonymity in JPR, which predated the “single blind” and “double-blind” labels to designate competing practices²⁹. But there is also a major difference: if scandals and misconduct cases were already there in the 1970s, especially in the biomedical sciences in the US³⁰, they were not directly raised by peer review devices but rather by independent inquiries.

4. PubPeer outcomes

As a matter of fact, PubPeer and PPPR have been taken into a highly critical configuration, in which science and JPR have been considered in full crisis. As soon as anonymous commenting was available, the founders were deeply surprised by the number of comments on fabrication and manipulation of data as they were expecting something completely different: “when we created PubPeer, we expected to facilitate public, on-the-record discussions about the finer points of experimental design and interpretation, similar to the conversations we all have in our journal clubs”³¹. In the context of the “reproducibility crisis” and of massive discoveries of fraud, the PubPeer platform has become a key actor not only in the commenting of affairs and scandals, but also in their genesis and development.

Consequently, the desired outcomes, which initially revolved around scientific debate have been gradually transformed to “correcting science”, then “fraud detection”. PubPeer has gradually become a home not for whistleblowers but for alarm raisers as they would only point out potential problems rather than directly expressing a judgment about the authors actions³². For example, a commentator underlines about a problem on a PLOS paper, which, in his opinion, should have led to an expression of concern after his previous comment on the PLOS platform had no answer for more than a year ; by doing so, he shows the supposed alarming lack of response from journals³³. On a larger scene, the questioning of the “scientific establishment” by the “anonymous cowards” about a series of Nature journals articles has become directly staged by the PubPeer founders in a blog entry³⁴.

In fact, the debunking of big affairs/scandals through the use of PubPeer. has become another possible outcome. One of the most preminent cases has been the Voinnet affair, a French plant biologist who has been accused of using fabricated data in part of his papers. One paper after the other, his whole production seems to have been dissected and, more particularly, the figures in it³⁵. Moreover, it works the other way around: when expressions of concern and retractions happen, the role played by PubPeer and its anonymized commentators is underlined in the reports, sustaining a never-ending dynamic of suspicion on certain authors/labs³⁶. As more comments appeared on Pubpeer for some papers, the more concerned journals and institutions were pressured to launch investigations about the papers they published³⁷.

This role in uncovering misconduct has also led PubPeer in front of courts, as defamation was raised by a biologist who was fired after an investigation in his university had been triggered

by PubPeer comments. In particular, he wanted judges to force PubPeer to reveal the identity of anonymous commentators³⁸. While PubPeer even received support from ACLU in the US, the reaction of the platform show once again the importance of anonymity for them, as they first warned their users about the case, then urged them to use Tor to be completely anonymous³⁹, and finally developed a system in which they would have not even computer traces of users.

5. Conclusion : debating published literature

As this last example show, for PubPeer founders, anonymity is at the heart of its PPPR system: though they regret it, it seems the only way for them to have massive insightful comments about papers, targeting problematic issues⁴⁰. To have open information, they insist they need anonymity for their commentators and at least some part of their “efficiency” is now judged based not only on the debates they host, but rather on the debunked misconduct they informed, mostly as an alarm raiser platform.

Then, the contrasted opinions on this kind of PPPR may be summed up into the couple “Vigilante Science/ Vigilants for Science”, the former one being uttered by the editor-in-chief of *Plant Physiology*⁴¹ about the anonymous crowd of commentators, the latter one by PubPeer founders, pointing out that the real problem was “flood of low-quality, overinterpreted and ultimately unreliable research”⁴². They both show that, thanks to the PubPeer platform, public commenting of published literature has found its niche, far from initial aims: PPPR as a post-publication problem resolution, where fraud and misconduct, incorrectly treated by JPR, would be, if not solved, inquired and dealt with.

While Altmetrics, the Open Citation movements and others have supported a view of PPPR as “usage measurements”, where the content of the papers themselves is untouched and JPR (and especially “sound science JPR”) reinforced, anonymous PPPR commenting undermines journals as certification devices and appear as a competitor/corrector⁴³. Whether they are angry, seek for revenge or idealistic, the wisdom of the anonymous crowd questions more profoundly the weight and qualities attributed to JPR.

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⁴⁰ As they repeatedly wrote e.g. : "Our own experience suggests that strong anonymity is the key to encouraging useful comments, as do the failed experiments with journal-run commenting systems. We suspect that PubMed will eventually come to the same conclusion", PubMed Commons, <https://blog.pubpeer.com/publications/F058394663FD3840B9AF3A4D4DCAD9>, PubPeer Blog, 2013.

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