Post-publication critique at top-ranked journals across scientific disciplines:
A cross-sectional assessment of policies and practice

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Abstract

Journals exert considerable control over letters, commentaries, and online comments that criticize prior research (post-publication critique). We assessed policies (Study One) and practice (Study Two) related to post-publication critique at 15 top-ranked journals in each of 22 scientific disciplines (N=330 journals). 207 (63%) journals accepted post-publication critique and often imposed limits on length (median 1000, interquartile range [IQR] 500-1200 words) and time-to-submit (median 12, IQR 4-26 weeks). The most restrictive limits were 175 words and 2 weeks; some policies imposed no limits. Of 2066 randomly sampled research articles published in 2018 by journals accepting post-publication critique, 39 (1.9%, 95% confidence interval [1.4, 2.6]) were linked to at least one post-publication critique (there were 58 post-publication critiques in total). Of the 58 post-publication critiques, 44 received an author reply, of which 41 asserted that original conclusions were unchanged. Clinical Medicine had the most active culture of post-publication critique: all journals accepted post-publication critique and published the most post-publication critique overall, but also imposed the strictest limits on length (median 400, IQR 400-550 words) and time-to-submit (median 4, IQR 4-6 weeks). Our findings suggest that top-ranked academic journals often pose serious barriers to the cultivation, documentation, and dissemination of post-publication critique.

Keywords: peer review, post-publication critique, letter to the editor, meta-research, journal policy, self-correction, scientific criticism

Introduction

Poor quality research frequently survives peer review and permeates through to the academic literature (Altman, 1994; Hardwicke, Serghiou, et al., 2020; Ioannidis, 2005; Nosek et al., 2022; Van Calster et al., 2021). This highlights the importance of ongoing critical scrutiny of published research to identify errors, limitations, or alternative interpretations that were not adequately addressed during pre-publication peer review. Such critiques may help research consumers to make more informed judgements about the utility and validity of published scientific claims (Altman, 2005; Bastian, 2014).

Journals exert considerable control over criticism of prior research submitted in the form of letters, commentaries, or online comments (Altman, 2002; Winker, 2015). We refer to these collectively as ‘post-publication critique’ (see Supplementary Information K for an operational definition). Currently, there is limited empirical data available to systematically evaluate how journals handle this important aspect of scientific self-correction. Prior studies of post-publication critique were narrow in scope, mainly focused on medical journals, and are now outdated (Altman, 2002; Kastner et al., 2013; Von Elm et al., 2009; Winker, 2013). In the present research, we sought to provide a systematic, cross-disciplinary, and more contemporary assessment of journal policies (Study One) and practice (Study Two) related to post-publication critique at 330 top-ranked journals operating in 22 scientific disciplines (Supplementary Information M provides a schematic illustration of the two studies). Our goal was to generate empirical evidence to inform debates about how scientific critique should be optimally handled by academic journals.

Study One

Methods

Sample

The sample consisted of 15 academic journals, top-ranked by 2017 Journal Impact Factor operating in each of 22 scientific disciplines (N = 330 journals). This represents the entire population of interest. Journal Impact Factors were identified using Clarivate Journal Citation Reports (<https://jcr.clarivate.com>). Scientific disciplines were defined by Clarivate Essential Science Indicators: <https://perma.cc/MD4V-A5X5>; Supplementary Information L). We did not include journals that only published reviews. The sample size was chosen based on a precision analysis which is documented in our preregistered protocol (<https://osf.io/hjvnw/>).

Design

The study had a cross-sectional design. The measured variables (see Supplementary Information B for details) were the name and description of any options for post-publication critique offered by each journal (e.g., letters), limits imposed on post-publication critique in terms of length (e.g., number of words), time-to-submit (e.g., weeks since publication of the target article), or number of references, and whether post-publication critiques are sent for independent external peer-review (reviews solicited from individuals who were not members of the editorial team or authors of the target article). We also obtained 2017 Journal Impact Factors and identified whether journals were members of the Committee on Publication Ethics (COPE). Procedure

1. Between November, 2019, and January, 2020, TEH and VEK identified and preserved the ‘article types’ section of the author submission guidelines on each journal’s website (Supplementary Information C).

2. Between February and August 2020, data extraction for each journal was performed independently by two authors using a Google Form (<https://osf.io/bkvnw/>) and instruction sheet (<https://osf.io/5fmhb/>). Authors were randomly assigned to 110 journals each as either first coders (SAH, TB, LT) or second coders (RTT, JEK, TEH) using the ‘sample’ function in R.
3. Coding was predominantly based on the preserved ‘article types’ documentation to ensure stability and reproducibility (live journal websites can be updated). It was only necessary to examine live journal websites to check for web-based commenting systems. When an ‘article types’ section was not found in step 1, each coder conducted an additional check of the live website and examined the most recently published issue of the journal to see if they could identify any examples of post-publication critique.
4. Any coding differences were resolved through discussion between the assigned coders, with arbitration by an additional coder if necessary. If coding differences highlighted ambiguities in the extraction instructions, we discussed as a team, amended the instructions, and adjusted any relevant prior coding to ensure alignment.
5. If an article type seemed like it might be post-publication critique, but the description was insufficient to judge, coders checked several published articles of this type to determine whether any met our operational definition of post-publication critique (Supplementary Information K).
6. Because journals used various naming conventions for similar types of post-publication critique and various units to specify limits (e.g., characters, words, or pages for length limits), we harmonized names to four types (‘letters [to the editor]’, ‘commentaries’, ‘web comments’, and ‘other’) and transformed units to words (length limits) and weeks (time-to-submit limits). Letters and commentaries were types of

articles submitted through the regular manuscript submission system, whereas web comments were submitted via an online interface on the target article webpage. For details, see Supplementary Information D.

Results

Journal characteristics

Across all 22 scientific disciplines ($n = 330$ journals), the median 2017 Journal Impact Factor was 7.39 (range 2.45 - 79.26). 237 (72%) journals were members of COPE. Characteristics for each scientific discipline are available in Supplementary Table E1.

How many journals offer post-publication critique?

Figure 1 shows the number of journals offering any form of post-publication critique, and specific types of post-publication critique, across 22 scientific disciplines (for equivalent tabular data, see Supplementary Table F1). Of 207 journals that offered post-publication critique, 154 (74%) were members of COPE. Of 123 journals that did not offer post-publication critique, 83 (67%) were members of COPE.

Journals offering post-publication critique were most common in Clinical Medicine ($n = 15$, 100%) and least common in Mathematics ($n = 2$, 13%). Overall, 166 journals offered one option for post-publication critique, 39 journals offered two options, and 2 journals offered three options, equating to a total of 250 individual post-publication critique options across journals.

Figure 1. Number and percentage of journals offering any (purple) and specific (green) options for post-publication critique (PPC) in all scientific disciplines (top-left panel, $n = 330$ journals) and in individual scientific disciplines (other panels, $n = 15$ journals). Note that individual journals can offer multiple post-publication critique options.

After post-publication critique names were harmonized into four types, there were journals offering letters, 85 journals offering commentaries, and 41 journals offering web comments. 6 journals offered other miscellaneous types of post-publication critique such as ‘Forum papers’ and ‘Update articles’. A complete list of journals and their post-publication critique options is available in Supplementary Table G1.

What limits did journals place on post-publication critique?

Table 1 shows how often journal policies imposed limits on post-publication critique in terms of length, time-to-submit, or number of references. Limits were mostly expressed quantitatively, but sometimes they were qualitative and more ambiguous, for example, stating that post-publication critique should be ‘concise’ or address ‘recently published’ articles. Often there was no information at all about a particular limit. Occasionally policies explicitly asserted that there was no limit. This happened once for length limits, 3 times for time-to-submit limits, and 21 times for reference limits. The full distribution of quantitative length limits and time-to-submit limits is displayed in Figure 2 and limits imposed by individual journals are available in Supplementary Table G1. Table 1 also shows whether post-publication critique was subject to independent external peer review (for details see Supplementary Table H1).

Figure 2. Limits imposed by journals on post-publication critique (PPC) in terms of (A) length and (B) time-to-submit since publication of the target article. A1 and B1 show the number of post-publication critique options for which the journal did not state if there was a limit (“Not stated”), explicitly stated there was not a limit (“None”), stated a qualitative limit (“Qual”), or stated a quantitative limit (“Quant”). Quantitative limits are displayed in A2 and B2 as a histogram and boxplot with the dark line representing the median, lower and upper hinges representing the 25th and 75th percentiles, and upper and lower whiskers representing the ± 1.5 interquartile range.

Table 1. Post-publication critique types and their length, time-to-submit, or reference limits.

The table shows the number (n) and percentage (%) of post-publication critique types that are subject to any (qualitative or quantitative) limit, quantitative limits specifically, and the median (Md) and interquartile range (IQR) for quantitative limits. The table also shows whether the author submission guidelines state that the post-publication critique types are sent for independent external peer review either routinely or at the editor's discretion (for details see Supplementary Information H).

Post-publication critique type	Length limits			Time-to-submit limits			Reference limits			Peer review
	<i>Any</i>	<i>Quantitative</i>		<i>Any</i>	<i>Quantitative</i>		<i>Any</i>	<i>Quantitative</i>		
	<i>n</i> (%)	<i>n</i> (%)	<i>Md</i> words (IQR)	<i>n</i> (%)	<i>n</i> (%)	<i>Md</i> weeks (IQR)	<i>n</i> (%)	<i>n</i> (%)	<i>Md</i> refs (IQR)	<i>n</i> (%)
Letters (n = 118)	92 (78%)	92 (78%)	500 (513)	50 (42%)	39 (33%)	8 (22)	68 (58%)	65 (55%)	6 (5)	24 (20%)
Commentaries (n = 85)	62 (73%)	59 (69%)	1200 (300)	25 (29%)	10 (12%)	26 (26)	41 (48%)	38 (45%)	15 (0)	47 (55%)
Web comments (n = 41)	11 (27%)	10 (24%)	600 (75)	5 (12%)	0 (0%)	-	2 (5%)	2 (5%)	8 (3)	0 (0%)
Other (n = 6)	2 (33%)	1 (17%)	10000 (0)	0 (0%)	0 (0%)	-	1 (17%)	0 (0%)	-	3 (50%)
All types (n = 250)	167 (67%)	162 (65%)	1000 (700)	80 (32%)	49 (20%)	12 (22)	112 (45%)	105 (42%)	10 (10)	74 (30%)

Because some journals offered more than one type of post-publication critique, Figure 2 does not give a complete picture of journal-level limits. For example, an individual journal may compensate for a restrictive form of post-publication critique by also offering a less restrictive form. This is difficult to assess systematically across the whole sample because of

interactions between different limit types and the ambiguity of qualitative limits. However, in Table 2 we provided a focused examination of the 20 journals that offered the most restrictive post-publication critique options in terms of quantitative length and time-to-submit limits. To build this table, we created two separate lists of post-publication critique ranked by quantitative length limits and time limits respectively. We then identified the top ten journals in each ranked list. To handle duplicates within- or between- lists, we retained the higher ranked instance and replaced the lower ranked instance until we had 20 unique journals overall (Table 2).

Table 2. Twenty journals that offered the most restrictive options for post-publication critique. Journals were selected based on having the most restrictive quantitative length and time-to-submit limits for at least one of their post-publication critique options. Some of these journals also offered additional less restrictive options, which we have included and marked with asterisks. When post-publication critiques were subject to qualitative limits, the verbatim policy text is shown. Journals are presented in alphabetical order. Journal of the American Medical Association (*JAMA*) journals are clustered because they had identical post-publication critique policies.

Journal	Post-publication critique type	Length limit (words)	Time-to-submit limit
Annals of Internal Medicine	Letters	400	4 weeks
	Web comments*	Not specified	Not specified
Annals of Neurology	Letters	400	Not specified
Clinical Pharmacology & Therapeutics	Letters	400	6 months
Emerging Infectious Diseases	Letters	300	4 weeks
	Web comments*	1667	Not specified

JAMA, JAMA Internal Medicine, JAMA Neurology, JAMA Oncology, JAMA Psychiatry	Letters	400	“We may reject comments because they...are submitted a long time after article publication”	4 weeks
	Web comments	600		
Journal of the Royal Statistical Society Series B-Statistical Methodology	Letters	400		1 year
Lancet	Letters	250		2 weeks
Lancet Diabetes & Endocrinology	Letters	400		8 weeks
Lancet HIV	Letters	250		4 weeks
Lancet Infectious Diseases	Letters	400		6 weeks
Lancet Psychiatry	Letters	400		4 weeks
Lancet Respiratory Medicine	Letters	400		4 weeks
National Science Review	Letters	300		Not specified
Neurology	Letters	200	“...restricted to comments about studies published in Neurology within the past eight weeks, with the exception of submissions identifying possible errors in data or data analysis, or by appeal to the Editor”	
New England Journal of Medicine	Letters	175		3 weeks
	Web comments	200		Not specified
Science	Letters	300		3 months
	Web comments*	“...brief...”		Not specified
	Commentaries*	1000		3 months

* Journals are included in the table based on having the most restrictive post-publication critique options; however, for each journal we have also included all other options for post-publication critique they offered and marked them with asterisks.

177 From Table 2, it is notable that 8 of the journals offering the most restrictive options for post-
178 publication critique operate in the discipline of Clinical Medicine. Overall, medical journals
179 specified strict limits on length (19 policies with a quantitative limit: median 400, IQR 150
180 words; 3 policies did not mention a limit) and time-to-submit (13 policies with a quantitative
181 limit: median 4, IQR 2 weeks; 3 policies stated a qualitative limit, 5 policies did not mention
182 a limit, 1 policy stated there was no limit). Table 2 also suggests that restrictive options for
183 post-publication critique are sometimes accompanied by less restrictive options. Eleven of the
184 20 journals only offered one option for post-publication critique. Nine of the 20 journals
185 offered web comments in addition to letters and, in general, web comment policies appeared
186 to be less restrictive than letters. However, this was often unclear because exact quantitative
187 limits were not specified and most differences were marginal. For example, in the *JAMA*
188 family of journals, letters must be less than 400 words and submitted within 4 weeks of target
189 article publication. By contrast, web comments are marginally less restrictive in terms of
190 length (600 words), and ambiguous about their time-to-submit limits (“We may reject
191 comments because they...are submitted a long time after article publication”). One journal -
192 *Science* - offered commentaries (called ‘Technical Comments’) in addition to letters and web
193 comments. In this case, letters and commentaries shared a time-to-submit limit of 3 months,
194 and commentaries had a somewhat less restrictive length limit than letters (1000 vs. 300
195 words). By contrast, no time-to-submit limit was specified for web comments and an
196 ambiguous length limit was implied (web comments should be ‘brief’).

Study Two

Methods

Sample

The sample consisted of 10 randomly sampled eligible articles published in 2018 for each of the 207 journals that offered post-publication critique in principle (according to the results of Study One), aside from one journal, *Wildlife Monographs*, which only published 6 articles in 2018. Thus, the sample size was 2066 articles.

To obtain this sample, one author (TEH) downloaded bibliographic records from Clarivate Web of Science for all articles published in each journal offering post-publication critique in 2018. We did not include records with meta-data indicating that the article was a ‘Correction’, ‘Retraction’, ‘News Item’, ‘Book Review’, ‘Meeting Abstract’, or ‘Biographical-Item’. The remaining records were randomly shuffled using the ‘sample’ function in R. During manual inspection, additional articles were excluded if they (1) could not be found or accessed; (2) were non-English language; (3) had been retracted; or (4) did not include substantive research: specifically, we excluded news, book reviews, editorials, previews, or similar, and included empirical research, case studies, simulations, proofs, theoretical papers, reviews, meta-analyses, and perspectives (if they were predominantly evidence-based rather than opinion-based). If articles were themselves examples of post-publication critique, they were also excluded for the purposes of our primary prevalence measure, but included for the purposes of our secondary prevalence measure.

Design

The study had a cross-sectional design. The goal of Study Two was to examine post-publication critique in practice at the 207 journals that offered post-publication critique according to Study One. We used two measures of post-publication critique prevalence. Our

primary (preregistered) estimate of prevalence was based on how many of 10 randomly sampled articles per journal were linked to post-publication critique. As one journal - *Wildlife Monographs* only published 6 articles in 2018, the total number of assessed articles was 2066. An article was considered linked to post-publication critique if the article webpage mentioned the existence of relevant post-publication critique.

After Study One, but before beginning Study Two, we decided to also compute a secondary (not preregistered) prevalence estimate based on how many of the randomly sampled articles were themselves examples of post-publication critique. To align the two estimates, we only used the first 10 eligible articles for each journal, and therefore the total number of assessed articles was 2066 as above. These two prevalence measures have complementary strengths and limitations. For the primary prevalence estimate, post-publication critique was identified through searches of article web pages for linked post-publication critique. Its accuracy therefore depends on journals actively and visibly linking to post-publication critique on their webpages. However, it is not dependent on post-publication critique being indexed in Web of Science databases. By contrast, for the secondary prevalence estimate, post-publication critique was identified by checking if sampled articles were themselves examples of post-publication critique. Thus, it does not rely on journals linking to relevant post-publication critique, but it does rely on post-publication critique being indexed in Web of Science databases, because that is how the sampled articles were identified. Note that our primary estimate was also time-restricted in the sense that any identified post-publication critique must have been published after 2018 (when the sampled articles were published). By contrast, our secondary estimate could theoretically detect post-publication critiques pertaining to any prior articles, regardless of their publication date.

We also examined several variables related to how post-publication critique was conducted in practice. This assessment was only performed on post-publication critiques we

identified via the primary prevalence measure. For each post-publication critique, we categorised the type of issues that were addressed (design, implementation, analysis, reporting, interpretation, or other), length (in words), whether new data were collected, whether novel analyses were performed, time since publication of the target article (in days), open access status of target article and post-publication critique, whether post-publication critique included a conflict of interest statement and whether it declared any conflicts of interest, whether post-publication critique authors were anonymous, whether the post-publication critique triggered a correction to the target article, whether target article authors replied, and if they replied, whether they collected new data or performed novel analyses, and whether they stated that their core claims remained unchanged after reading the post-publication critique. For more detail about variables measured in Study Two, see Supplementary Table I.

Procedure

1. Between May 2021 and September, 2021, each coder (SAH, TB, RTT, JEK, LT, or TEH) self-assigned journals sequentially from a randomly shuffled list until they had coded an approximately equal amount. For each journal, the assigned coder worked sequentially through a list of randomly shuffled articles published by that journal in 2018. If a coder did not have access to a journal, it was skipped and assigned to the next available coder.
2. For each article, coders ascertained whether it (1) needed to be excluded; (2) was itself an example of post-publication critique; or (3) was linked to post-publication critique. When we encountered multiple post-publication critiques that were part of the same back-and-forth exchange between target article authors and post-publication critique authors, these were counted as a single instance of post-publication critique. Coders followed an instruction sheet (<https://osf.io/aejx4/>), which reminded them of the exclusion criteria and operational definition of post-publication critique (Supplementary Information K), and

entered data directly into a Google Sheet. Coders were encouraged to discuss any ambiguous cases with TEH and all positive post-publication critique classifications were independently verified by TEH.

3. When journals relied on third-party services (e.g., Elsevier's ScienceDirect) to distribute their articles we only used these websites if the journal did not also distribute their articles through their own dedicated website (as we noticed that links to post-publication critique were sometimes displayed on journal websites and not on third-party websites).
4. Coders worked sequentially through each journal's articles until they had examined ten that were eligible (i.e., they were not excluded or classified as themselves being post-publication critique).
5. For the assessment of post-publication critique features, one author (TEH) extracted information (see Supplementary Table I) from all linked post-publication critiques identified by the primary estimate method.

Data analysis

For prevalence estimates, 95% Wilson Confidence intervals computed by the R function 'prop.test' are reported in square brackets.

Results

How prevalent is post-publication critique in practice?

In total, we considered 3030 articles for inclusion before we reached our target of 2066 eligible research articles. 791 articles were excluded because they did not contain research (n = 770) or could not be found/accessed (n = 21). An additional 173 articles were classified as being themselves examples of post-publication critique and excluded from our primary prevalence estimate. In total, 39 of the 2066 research articles were linked to at least one post-

publication critique. Our primary post-publication critique prevalence estimate was therefore 1.9% [1.4, 2.6]. These articles were published in 22 individual journals (Supplementary Table J2).

We also computed a secondary prevalence estimate based on the proportion of articles that were themselves post-publication critique amongst the first 10 eligible articles assessed at each journal (first 6 articles in the case of *Wildlife Monographs*; N = 2066 articles). We only examined the first 10 eligible articles in order to align the denominator of the primary and secondary estimates. This meant that articles classified as being themselves examples of post-publication critique only contributed if they were found within the first 10 eligible articles, and thus, we did not include all of the 173 post-publication critiques mentioned above. 115 out of the 2066 articles were classified as post-publication critique, yielding a secondary prevalence estimate of 5.6% [4.6,6.7]. This is equivalent to 5.9 post-publication critiques for every 100 research articles. These articles were published in 45 individual journals (Supplementary Table J3).

Prevalence estimates varied substantially across scientific disciplines (Figure 3; for equivalent tabular data see Supplementary Table J1). The number of disciplines which had zero instances of post-publication critique was 15 according to our primary prevalence estimate and 7 according to our secondary prevalence estimate. The discipline with the most post-publication critique was Clinical Medicine with 19 (13%) of 150 research articles being linked to post-publication critique and 47 (31%) of 150 assessed articles being themselves instances of post-publication critique.

Features of post-publication critique in practice

We conducted a closer examination of the post-publication critique linked to the 39 articles identified above for our primary prevalence estimate. These 39 articles were each linked to

either one ($n = 27$), two ($n = 7$), three ($n = 3$), or four post-publication critiques ($n = 2$); a total of 58 post-publication critiques. Various features of these post-publication critiques are shown in Table 3 and features of target article author responses to these post-publication critiques are shown in Table 4.

Figure 3. Primary (Panel A) and secondary (Panel B) prevalence estimates for post-publication critique in all journals overall ($N = 330$ journals; black diamond, error bars represent 95% confidence intervals) and then in descending order by each scientific discipline ($n = 15$ journals; coloured circles). Discipline abbreviations: Agricultural Sciences (AGRI), Biology & Biochemistry (BIO), Chemistry (CHEM), Clinical Medicine (MED), Computer Science (COMSCI), Economics & Business (ECON), Engineering (ENGIN), Environment & Ecology (ECO), Geosciences (GEO), Immunology (IMMUN), Materials Science (MATSCI),

330 Mathematics (MATH), Microbiology (MICBIO), Molecular Biology & Genetics (MOLBIO),
 331 Multidisciplinary (MULTI), Neuroscience & Behavior (NEURO), Pharmacology &
 332 Toxicology (PHARM), Physics (PHYS), Plant & Animal Science (PLANT), Psychiatry &
 333 Psychology (PSY), Social Sciences (SOCSCI), Space Science (SPACE).

334

335 **Table 3.** Features of 58 assessed post-publication critiques.

<i>Post-publication critique type</i>	<i>n</i>
Commentaries	1
Web comments	13
Letters	44
<i>Journals</i>	<i>n</i>
New England Journal of Medicine	18
JAMA	6
Lancet Psychiatry	6
The BMJ	4
Lancet Oncology	3
Current Biology	2
Gastroenterology	2
Neurology	2
Science	2
13 other journals	1
<i>Disciplines</i>	<i>n</i>
Clinical Medicine	35

Psychiatry & Psychology	8
Multidisciplinary	5
Biology & Biochemistry	4
Neuroscience & Behavior	4
Immunology	1
Molecular Biology & Genetics	1
<i>Open access to target article and post-publication critique</i>	<i>n</i>
Target paywalled, post-publication critique paywalled	22
Target public, post-publication critique public	19
Target paywalled, post-publication critique public	10
Target public, post-publication critique paywalled	7
<i>Post-publication critique author anonymity</i>	<i>n</i>
Not anonymous	57
Anonymous	1
<i>Post-publication critique conflict of interest (COI)</i>	<i>n</i>
Statement declares no COI	30
Statement declares COI	15
No COI statement	13
<i>Type of issues raised in post-publication critique</i>	<i>n</i>
Design	19
Implementation	3

Analysis	19
Reporting	10
Interpretation	45
Ethics (other)	1
<i>Data availability in target article</i>	<i>n</i>
No data availability statement	43
Data sharing not applicable	7
Statement says data are available upon request	5
Statement says data are available	3
<i>Analyses/data included in post-publication critique</i>	<i>n</i>
No analyses or data	51
Novel analyses of new data	5
Novel analyses of original data	1
Novel analyses of original and new data	1
<i>Length of post-publication critique (words)</i>	
<i>Post-publication critique type</i>	<i>md min max IQR</i>
Letters	251 104 1420 177
Commentaries	1586 1586 1586 NC
Web comments	108 9 993 309
All types	251 9 1586 199
<i>Time of post-publication critique publication relative to target article publication (days)</i>	
<i>Post-publication critique type</i>	<i>md min max IQR</i>

Letters	133	21	1053	86
Commentaries	525	525	525	NC
Web comments	63	5	1066	789
All types	133	5	1066	112

Table note: NC = not calculable (because n = 1).

Table 4. Features of target article author response to 58 assessed post-publication critiques.

<i>Did the post-publication critique prompt publication of a correction?</i>	<i>n</i>
No	56
Yes	2
<i>Did the post-publication critique prompt publication of an author reply?</i>	<i>n</i>
Yes	44
No	14
<i>Did the authors' reply involve collection of new data?</i>	<i>n</i>
No	42
Yes	2
<i>Did the authors' reply involve new analyses?</i>	<i>n</i>
No	40
Yes	4
<i>Did the authors' reply assert that their core claims remain unchanged?</i>	<i>n</i>
Yes	41
No	3

Discussion

We found substantial variation in how post-publication critique was handled in both policy and practice at 330 top-ranked journals operating in 22 scientific disciplines. Post-publication critique was rare in most disciplines and a considerable number of journals (37%) did not offer any options for submitting post-publication critique. Journals that did offer post-

publication critique often imposed restrictive length and time-to-submit limits. Overall, top-ranked journals often represented a serious obstacle to the cultivation, documentation, and dissemination of post-publication critique.

There was substantial variation across scientific disciplines with journals in Clinical Medicine standing out as offering the most options for post-publication critique and publishing the most post-publication critique, but also imposed the most restrictive length and time-to-submit limits (for concordant evidence, see Altman, 2002; Kastner et al., 2013; Von Elm et al., 2009; Winker, 2013). In general, health-related disciplines seemed to have a more active post-publication critique culture than non-health related disciplines like the physical sciences and social sciences. Many disciplines, such as mathematics, showed little evidence of any post-publication critique activity, with few journals offering post-publication critique and scarce evidence of published post-publication critique. Our data do not speak to the causal forces that underlie these inter-discipline differences, but some potential contributing factors could be cultural (e.g., different attitudes towards scientific criticism and how it should be handled), pragmatic (e.g., differences in methodological standards and research quality, manifesting in differential need for scientific criticism), bureaucratic (e.g., different resources available to support post-publication critique), or historic (e.g., individuals or events that highlighted the value of post-publication critique).

Post-publication critique could usually be mapped to one of three main types (letters, commentaries, and web comments), of which letters were most common in policy and practice. Generally, letters had the most restrictive limits, followed by commentaries, then web comments. Typically, letters had to be shorter, submitted more quickly, and contain fewer references relative to commentaries. Usually, web comments had no stated limits, except for a quarter that had length limits. Policies implied that commentaries were more likely to be sent for independent external peer review, with letters more likely to be handled

exclusively by the editorial team. Web comments were typically subject to ‘light’ editorial moderation or no review at all. Some journals may offer less restrictive web comments to compensate for other more restrictive options for post-publication critique they offer (Table 2).

The extent to which journal limits on post-publication critique are reasonable or unreasonable is a somewhat subjective determination and there are likely to be competing interests between what is best for journals and what is best for the advancement of science. Restrictions on post-publication critique may arise from editorial bias against criticism of papers they have published. Editors may also prefer to allow only what they perceive as the most timely and concise debate. However, length restrictions arbitrarily limit the scope of post-publication critique, particularly if the criticism involves extended analyses or additional data. One can certainly say very little of substance in 175, 200, or 250 words (the most restrictive length limits). Restricting the number of references to 3, 4, or 5 (the most restrictive reference limits) may prevent links to relevant evidential, contextual, or methodological information, undermining an aspect of scholarship that is surely as important to post-publication critique as it is to regular articles. Finally, imposing time-to-submit limits on post-publication critique is clearly not justifiable from a scientific perspective because important critiques may arise at any time. Limiting the time allowed to submit post-publication critique to 2, 3, or 4 weeks (the most restrictive time-to-submit limits) seems especially unjustifiable and poses a serious threat to the dissemination of scientific critique. An earlier study describing strict length and time-to-submit limits imposed on post-publication critique at six leading medical journals led the author to trenchantly conclude that “In effect, there is a statute of limitations by which authors of articles in these journals are immune to disclosure of methodological weaknesses once some arbitrary (short) period has elapsed, which cannot be right.” (Altman, 2002; also see Altman, 2005).

Our exploration of how post-publication critique is used in practice suggested that letters are far more common than other types of post-publication critique, perhaps because they are the most frequently available post-publication critique option and also because, as formal articles, they may impart greater academic credit to their authors than informal web comments (Table 3). We found that half of the post-publication critiques we examined were behind a paywall, sometimes even when the target article was publicly accessible. This reduces access to post-publication critique for both professional scientists and other readers, like patients, journalists, and policy-makers (Winker, 2015). Most post-publication critiques had conflict of interest statements and a third of those statements declared a potential conflict. Conflict of interest statements enable readers to evaluate an important risk of bias and seem just as relevant to post-publication critiques as they are to other academic articles (Dunn et al., 2016).

The post-publication critiques we examined addressed a range of issues spanning the timeline of a research project, including design, implementation, analysis, reporting, and interpretation (for concordant evidence, see Kastner et al., 2013). The vast majority of post-publication critiques did not include new analysis of original or new data. This may be because very few original articles stated that data were available, as is typical in many scientific disciplines (Hardwicke et al., 2021; Hardwicke, Wallach, et al., 2020; Serghiou et al., 2021). Most of the post-publication critiques were short (~250 words) and published within five months of the target article, perhaps partly because they were published in some journals that imposed the strictest limits on post-publication critique (Table 2).

In the majority of cases, target article authors replied to post-publication critique, particularly for letters or commentaries relative to web comments. Author replies rarely included new data or analyses. We found that only 2 post-publication critiques prompted publication of a correction and in all but three cases, the target article authors asserted that

their core claims remained unchanged despite the arguments presented in the post-publication critique. It was beyond the scope of our study to examine whether author replies were appropriate and justified, but prior research has suggested that they are often inadequate (Gotzsche et al., 2010). In all, target article authors seemed almost entirely immune to the criticisms raised, with rare exceptions.

Our two studies have some important limitations. Firstly, we believe our operational definition of post-publication critique (Supplementary Information K) captures the most explicit journal-based avenues for scientific criticism, but it will inevitably miss indirect or less formal critique as is, for example, embedded in research or review articles with a broader focus, or as occurs outside of journals (e.g., on social media or external commenting platforms, such as PubPeer). We also did not include errata, corrections, corrigendums, retractions, or similar, in our definition, though such notifications can be prompted by peer scrutiny (e.g., Beheim et al., 2021; Whitehouse et al., 2021). Adopting a precise definition was necessary to ensure clarity and tractability. Secondly, for Study One we relied on information as stated on journal websites as of November, 2019, and for Study Two we relied on a random sample of articles published in 2018. Our assessment therefore cannot account for incomplete policy statements, more recent policy updates, or unpublished information, such as numbers of post-publication critiques rejected, modified, or delayed. Because of a lack of consistency and clarity in the presentation of post-publication critique policies, we were unable to reliably extract information on other potentially interesting features, such as fees to submit or publish, or whether post-publication critique is routinely indexed in academic databases. Thirdly, we focused on a sample of top-ranked journals only and it is unclear to what extent our findings may extend to other journals. For example, it may be that more recently established journals are more progressive and open to critical scrutiny of their publications compared to top-ranked journals. Articles published in lower-ranked journals

may also receive less attention overall, and thus receive even less post-publication critique. Fourthly, there is no objective method for delineating scientific disciplines, which are often porous and overlapping. All categorization schemes therefore have limitations. We opted to use an established categorization schema provided by Essential Science Indicators, but there is an element of arbitrariness to the assignment of journals to disciplines. For example, JAMA Psychiatry is assigned to the discipline of Psychology & Psychiatry, but could arguably also be assigned to Clinical Medicine.

Many of our findings imply that the extant culture of journal-based post-publication critique is suboptimal, though more detailed scrutiny of policies and practice at specific journals will enhance this diagnosis. It is interesting to note that, of the 123 journals that did not offer any options for submitting post-publication critique, 83 were members of COPE, an organisation whose guidelines state that “Journals must allow debate post publication either on their site, through letters to the editor, or on an external moderated site, such as PubPeer” (Committee on Publication Ethics, 2019)¹. Further research is needed to explore the extent to which the current state of post-publication critique is a result of principled editorial decisions or practical obstacles. It is tempting to look outside of the journal system for solutions to facilitate post-publication critique (Bastian, 2014); however, attempts to establish dedicated platforms have met with limited success — one major platform, PubMed Commons, was shut down in 2018 due to low usage (*NCBI Insights*, 2018). In Box 1, we offer some tentative policy suggestions for journals to consider that may facilitate post-publication critique.

¹ Note that these journals could technically claim they are in compliance with this guideline because post-publication critique is always possible on PubPeer, which operates independently of journals. Also note that the International Committee of Medical Journal Editors recommends that ‘Medical journals should provide readers with a mechanism for submitting comments, questions, or criticisms about published articles, usually but not necessarily always through a correspondence section or online forum.’

Box 1. Policies journals could consider adopting to facilitate post-publication critique.

1. Offer at least one option for post-publication critique.
2. Clearly identify and describe options for post-publication critique in instructions to authors.
3. Clearly state whether post-publication critique will be independently peer reviewed. Recognise that the authors of the target article may provide useful feedback, but cannot be considered neutral.
4. Facilitate expedient handling of post-publication critique submissions to ensure timely dissemination of relevant critique to research consumers.
5. Foster a culture of critique. Actively encourage and highlight post-publication critique to the journal's readership, for example, via editorials.
6. Enhance access to and discoverability of post-publication critique: (a) Tag post-publication critique with appropriate meta-data so they can be indexed in third-party databases, websites and referencing software; (b) display prominent links to post-publication critique alongside target articles; (c) make post-publication critique open access.
7. Remove strict length, time-to-submit, and reference limits. Judge post-publication critique on a case-by-case basis and promote concise writing via editorial feedback.
8. Ensure transparent reporting of research articles (e.g., sharing of data, analysis code, and materials, and adherence to reporting guidelines) to enable informed critique and debate.
9. Adopt a two-tier post-publication critique system. Tier One involves rapid publication of lightly moderated contributions on the journal's website (i.e., web comments). Tier Two curates the most informative Tier One contributions and converts them to formal articles (letters) that become a permanent part of the scientific record and provide appropriate academic credit to their authors. For an example two-tier system, see BMJ Rapid Responses (Delamothe & Smith, 2002).
10. Improve transparency and accountability by hiring an independent editor responsible for handling post-publication critique (Schriger & Altman, 2010). Publish all editorial decisions related to post-publication critique, including the number submitted, rejected, and published.

Conclusion

The cultivation, documentation, and dissemination of post-publication critique is an important part of a healthy and self-correcting research literature. Our study reveals considerable variation in how post-publication critique is handled by journals operating across scientific disciplines. Clinical Medicine had a more active post-publication critique culture than other disciplines; but its journals also imposed the strictest limits. Overall, post-publication critique appears to be tightly controlled and restricted by top-ranked academic journals. At many journals, it was apparently not possible to publish post-publication critique at all, and journals that did offer options for post-publication critique often imposed strict length and time-to-submit restrictions. The post-publication critique we did identify appeared to have negligible impact on target article authors' conclusions. These data provide a stratum of empirical evidence upon which to base debates about how scientific critique should be optimally handled. We encourage stakeholders across the academic ecosystem to explore ways to foster a richer culture of post-publication critique.

Open practices statement

The study protocol (rationale, methods, and analysis plan) was pre-registered on February 14th, 2020 (<https://osf.io/hjvnw/>). All departures from this protocol are explicitly acknowledged in Supplementary Information A. All data exclusions and measures conducted during this study are reported in this manuscript. All data, materials, and analysis scripts are publicly available on the Open Science Framework (<https://osf.io/8b6jy/>). To facilitate reproducibility this manuscript was written by interleaving regular prose and analysis code using knitr (Xie, 2017) and papaja (Aust & Barth, 2020), and is available in a Code Ocean container (<https://doi.org/10.24433/CO.3805142.v1>) which re-creates the software environment in which the original analyses were performed.

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Conflict of interest statement

All authors declare no conflicts of interest.

Author contributions

Conceptualization: T.E.H. and J.P.A.I. Data curation: T.E.H. Formal analysis: T.E.H. Investigation: T.E.H., R.T.T., T.B., J.E.K., L.T., S.A.H., and V.E.K. Methodology: T.E.H., R.T.T., T.B., and J.P.A.I. Project administration: T.E.H. Resources: T.E.H. Software: T.E.H. Supervision: T.E.H. and J.P.A.I. Validation: T.E.H. Visualization: T.E.H. Writing - original draft: T.E.H. Writing - review & editing: T.E.H., R.T.T., T.B., L.T., and J.P.A.I.

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Supplementary Information

for

Post-publication critique at top-ranked journals across scientific disciplines:

A cross-sectional assessment of policies and practice

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Theiss Bendixen, Vivian E. Köneke, & John P. A. Ioannidis

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Supplementary Information A. Protocol amendments.

The study protocol (rationale, methods, and analysis plan) was pre-registered on February 14th, 2020 (<https://osf.io/hjvnw/>). Supplementary Table A1 outlines amendments between the pre-registered protocol and final report.

Supplementary Table A1. Protocol amendments.

Issue	Pre-registered protocol	Amendment	Rationale	Amendment made after observing relevant study results?
Terminology	We used the term ‘post-publication peer review’ (PPPR).	We now use the term ‘post-publication critique’.	We adopted the new term to avoid confusion with certain types of PPPR which we did not examine (e.g., the PPPR model of the journal F1000).	Yes.
Study Two sample selection	“To evaluate the frequency of PPPR we will examine the last 10 articles involving empirical data published prior to 31 st December 2018 by each PPPR-offering journal.”	We instead examined a random sample of articles published in 2018.	The previous method could have introduced selection bias (e.g., due to clustering of article types or a themed special issue).	No. The amendment decision applies only to Study 2 and was introduced before Study 2 data had been obtained.

Study One limit / peer review variables	“YES” response options.	All “YES” response options were reclassified to either “YES - QUANTITATIVE” or “YES - QUALITATIVE”.	We found that some limits were stated qualitatively rather than quantitatively.	Yes, the change was motivated by observing Study One results.
Study One peer review variable	N/A	We added the response option “EDITOR’S DISCRETION”	We found that some policies stated post-publication critique was sent for peer review at the editor’s discretion.	Yes, the change was motivated by observing Study One results.
Dual-coding in Study Two.	We planned to code all articles in duplicate.	Duplicate coding was only performed for positive post-publication critique classifications. Coders discussed all cases they felt were ambiguous with TEH. All assessment of post-publication critique features was completed by a single author (TEH).	We did not have the resources needed to evaluate all 2066 articles in duplicate.	Yes, the change was made after completion of Study One but before starting Study Two.
Study Two additional prevalence estimate.	We planned to compute only one PPPR	We introduced a secondary prevalence estimate based	We realised that a limitation of the primary prevalence estimate (insensitivity	No, the amendment was introduced after completion of

	prevalence estimate based on the number of articles linked to PPPR.	on the number of articles that were themselves examples of post-publication critique.	to non-linked post-publication critique) could be compensated for with the secondary prevalence estimate. See main text for details.	Study One but prior to Study Two.
Study Two exclusion criteria.	We prespecified that articles to be assessed in Study Two for the prevalence estimate had to be research articles, but did not specify more detailed inclusion/exclusion criteria.	We clarified that articles included in Study Two were excluded if they (1) could not be found or accessed; (2) were non-English language; (3) had been retracted; or (4) did not include substantive research: specifically, we excluded news, book reviews, editorials, previews, or similar, and included empirical research, case studies, simulations, proofs, theoretical papers, reviews, meta-analyses, and perspectives (if	The original inclusion/exclusion criteria were not specified with sufficient clarity or we didn't realise certain criteria would be necessary.	Yes, the amendments were introduced after starting, but before completing, Study Two.

		they were predominantly evidence-based rather than opinion-based).		
Operational definition of PPPR.	Our original definition of PPPR was “any avenue for publicly sharing peer-initiated scientific discourse related to published articles”	We’ve made slight adjustments to the original definition: “Any journal-based avenue for sharing peer-initiated critical discourse related to specific research articles previously published in the same journal.” (also see Supplementary Information K).	The new definition is a clearer expression of how we operationalised the term post-publication critique.	Yes. The decision was made after observing Study One data.
Definition of peer review variable.	For the variable assessing whether PPPR was sent for peer review, we did not provide a strict definition in the protocol.	We now provide a clearer definition of ‘peer review’, as 'independent external peer review' by which we mean reviews solicited from individuals who were not	The original definition was not specific enough.	Yes. The decision was made after observing Study One data.

(a) members of the editorial team, or (b) authors of the original article				
“Other limits” variable not measured.	In the protocol we stated that we would record any “other limits” imposed on PPPR by journals	We did not obtain this data.	The relevant question was erroneously excluded from the data extraction form.	No. The question was never included in the extraction form.
Article PPPR content variable.	The response options for this variable in the protocol were “procedural issues” or “research issues”.	We instead adopted a more nuanced classification scheme.	The original classification was too crude, the new one has more informational value.	Yes. The decision to change the variable was made whilst examining the first few examples of post-publication critique in Study Two.
Does the original article share data?	The original response options were YES, MAYBE, and NO.	We changed the response options to TRUE (i.e., data are shared), FALSE (i.e., data are not shared), STATES AVAILABLE ON REQUEST (i.e., there’s a statement saying the data	These are subtle changes to the original classification to more clearly reflect the data e.g., that in some cases data sharing is not applicable.	Yes. The decision to change the variable was made whilst examining the first few examples of post-publication critique in Study Two.

		are available on request), NOT APPLICABLE (i.e., the article does not involve empirical data).		
Target article open access	Variable not included.	Included new variable in Study Two - the open access status of the target article	We already recorded the open access status of the post-publication critique, so it seemed useful to also record this for the target article.	Yes. The decision to change the variable was made whilst examining the first few examples of post-publication critique in Study Two.
Target article correction	Variable not included.	Included new variable in Study Two - did the post-publication critique trigger a correction to the original article.	After finding one example where post-publication critique triggered a correction it seemed useful to measure this for all articles.	Yes. The decision to change the variable was made whilst examining the first few examples of post-publication critique in Study Two.
Author reply claims unchanged	Variable not included.	Included new variable in Study Two - in their reply to post-publication critique, do original authors assert their core	During data extraction, this seemed like a useful additional piece of information to record.	Yes. The decision to change the variable was made whilst examining the first few examples of post-publication critique in Study Two.

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Supplementary Information B. Variables measured in Study One.

2017 Journal Impact Factors were obtained via Clarivate Journal Citation Reports (<https://jcr.clarivate.com>). Journal discipline classifications were defined by Clarivate Essential Science Indicators (<https://perma.cc/MD4V-A5X5>). Journal COPE membership status was established by manually searching the members list (<https://publicationethics.org/members>). All other Study One variables were obtained via the data extraction form completed by coders (<https://osf.io/bkvnw/>; Supplementary Table B1).

Supplementary Table B1. Variables measured in Study One based on data extraction form (<https://osf.io/bkvnw/>). PPC = post-publication critique.

Variable name	Extraction form question	Response options
Journal PPC	Does the journal offer any type of PPC?	YES NO OTHER (please specify)
Journal PPC name	Enter the name of the PPC type offered by the journal:	Free text response
Journal PPC description	Enter the verbatim description of this type of PPC provided by the journal	Free text response
Journal PPC word or comment limits	Are there any word/comment limits for this type of PPC?	YES - QUANTITATIVE (provide number of words/comments) YES - QUALITATIVE NO NOT STATED UNCLEAR (provide detail)
Journal PPC time limits	Are there any time limits for submission of this type of PPC?	YES - QUANTITATIVE (provide detail of time limits) YES - QUALITATIVE NO

		NO STATED UNCLEAR (provide detail)
Journal PPC reference limits	Are there any reference limits for this type of PPC?	YES - QUANTITATIVE (provide number of references) YES - QUALITATIVE NO NOT STATED UNCLEAR (provide detail)
Journal PPC peer review	Is this type of PPC peer reviewed?	YES EDITOR'S DISCRETION NO NOT STATED UNCLEAR (provide detail)

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634 *Table notes:*

635 1. For limits / peer review variables, the response option “NOT STATED” meant that no
 636 relevant information about this variable could be found whereas the response option “NO”
 637 meant that the policy explicitly stated there was no limit / peer review.

638 2. For limits / peer review variables, the response option “YES” in the data extraction form
 639 was subsequently reclassified as YES - QUANTITATIVE and YES - QUALITATIVE. This
 640 was to handle cases where a limit was implied, but not stated numerically, for example,
 641 stating that articles must be 'short', 'brief', or 'concise'.

642 3. For limits / peer review variables, policy wording that referred to the majority of PPC (e.g.,
 643 “usually” or “typically”) was interpreted as “YES”. Policy wording for peer review that used
 644 vague language (e.g., “may be”) was grouped with “editor’s discretion” cases.

645 4. By ‘peer review’, we mean 'independent external peer review' which we defined as reviews
 646 solicited from individuals who were not (a) members of the editorial team, or (b) authors of
 647 the original article.

648 5. If limits were stated as a range (e.g., “500-750 words”) we recorded the upper limit.

649 **Supplementary Information C. Document preservation.**

650 We used three methods to preserve journal webpages. During our examination of webpages
651 between November, 2019, and January, 2020, we firstly attempted to preserve webpages
652 using the service perma.cc (<https://perma.cc>). Occasionally, when this tool failed, we made a
653 PDF copy of the webpage which we stored on the OSF (<https://osf.io/tzjc6/>). Occasionally,
654 we retroactively realised we needed to preserve a journal webpage, in which case we used the
655 Internet Archive's Wayback Machine tool (<https://web.archive.org/>) to obtain a copy of the
656 webpage as it existed in November, 2019. Links to the preserved documents are available in a
657 data file on the OSF (<https://osf.io/5atjd/>). All coding was performed using the copied
658 information to avoid reproducibility problems if journals updated their websites during
659 coding.

Supplementary Information D. Harmonization and transformation.

Harmonization of names

Prior to data collection, we anticipated that post-publication critique types would mainly fall into three categories: ‘letters’, ‘commentaries’, and ‘web-based comments’. Examination of the data confirmed that most verbatim post-publication critique names matched these expectations, though slightly different naming conventions were used between journals (e.g., "letters", "letter to the editor", “correspondence”, etc.). In such cases, we assigned each post-publication critique to whichever of the above three ‘harmonized’ names we deemed most appropriate. Other than cases involving straightforward grammatical similarity, we note that (1) post-publication critiques identified as “correspondence”, “Discussion Forum”, “Disputes & Debates”, and “Reader Comments” were harmonized as “Letters”; (2) post-publication critiques identified as “Technical Comments”, “Matters Arising”, “Transaction Comments”, and “Comments” (where these referred to articles and not website comments), were harmonized as “Commentaries”; (3) post-publication critiques identified as “Rapid Responses”, “Annotations”, “eLetters”, and “Comments” (where these referred to website comments and not articles), were harmonized as “Web comments”; (4) post-publication critiques identified as “Forum Papers”, “Research Advance”, “Replications and Corrigenda”, and “Update articles”, were classified as “Other”. Note that we also classified one instance of “News and Views” and one instance of “Perspectives” as “Other”, though we typically did not consider articles of this name to be post-publication critique because all but these two examples did not meet our operational definition (Supplementary Information K).

At least two journals (The British Journal of Psychiatry and The BMJ) offered a hybrid type of post-publication critique whereby selected web comments (known as ‘eLetters’ and ‘Rapid Responses’ respectively) were chosen by editors to be subsequently (re-

) published in the journal print edition as letters. To avoid double counting this data, we classified them only as web comments. There were no cases where multiple types of post-publication critique offered by the same journal were classified with the same harmonized label.

Transformation of quantitative limits.

Quantitative limits were expressed in a variety of different units. To address this, all length limits were converted to ‘word’ units and all time limits were converted to ‘week’ units. We multiplied length limits expressed as ‘pages’ by 500 (i.e., 500 words per page), divided length limits expressed as ‘characters’ by 6 (i.e., 6 characters per word), multiplied time limits expressed as ‘months’ by 4.35 (i.e., 4.35 weeks in a month), and multiplied time limits expressed as ‘years’ by 52 (i.e., 52 weeks in a year). The conversion factors for length limits were derived from estimates based on examination of our own recently published articles.

Supplementary Table E1: Characteristics of journals in each of 22 scientific disciplines (n = 15) and in all disciplines combined (n = 330).

Scientific discipline	2017 Journal Impact Factor			COPE Signatories (n)
	Median	Min	Max	
Agricultural Sciences	4.09	3.74	5.42	12
Biology & Biochemistry	11.61	7.62	35.72	13
Chemistry	11.23	7.41	30.07	13
Clinical Medicine	23.42	18.88	79.26	9
Computer Science	7.17	4.67	22.74	3
Economics & Business	6.48	5.40	8.49	12
Engineering	7.36	6.38	46.86	9
Environment & Ecology	7.30	6.09	19.18	14
Geosciences	5.07	4.52	14.39	11
Immunology	8.37	6.05	25.15	12
Materials Science	13.18	8.81	39.24	9
Mathematics	3.06	2.45	4.89	5
Microbiology	5.75	3.91	17.87	14
Molecular Biology & Genetics	15.39	9.46	32.62	12
Multidisciplinary	7.27	2.77	41.58	13
Neuroscience & Behavior	11.64	8.05	27.14	13
Pharmacology & Toxicology	5.73	4.60	7.88	14
Physics	9.21	5.54	32.52	11
Plant & Animal Science	6.30	4.69	14.08	14
Psychiatry & Psychology	6.48	5.47	30.00	9
Social Sciences	5.85	5.06	8.36	10
Space Science	4.63	2.98	8.56	5
All disciplines	7.39	2.45	79.26	237

697 **Supplementary Information F. How many journals offer post-**
 698 **publication critique? Tabular data.**

Supplementary Table F1. Number and percentage of journals in each scientific discipline offering any options for post-publication critique and the number of specific types of post-publication critique available. Note that the latter does not necessarily sum to the former because individual journals can offer multiple post-publication critique options.

Scientific discipline	Any post-publication critique	Letters	Commentaries	Web comments	Other
Agricultural Sciences	6 (40%)	5	1	0	1
Biology & Biochemistry	12 (80%)	4	6	7	2
Chemistry	10 (67%)	6	4	1	0
Clinical Medicine	15 (100%)	14	0	8	0
Computer Science	7 (47%)	3	4	0	0
Economics & Business	3 (20%)	0	2	0	1
Engineering	7 (47%)	5	2	0	0
Environment & Ecology	11 (73%)	5	7	1	0
Geosciences	12 (80%)	2	10	0	0
Immunology	12 (80%)	10	1	3	0
Materials Science	12 (80%)	5	7	1	0
Mathematics	2 (13%)	2	0	0	0
Microbiology	12 (80%)	5	4	3	0
Molecular Biology & Genetics	12 (80%)	6	7	5	0
Multidisciplinary	11 (73%)	5	6	7	0
Neuroscience & Behavior	14 (93%)	11	2	2	0

Pharmacology & Toxicology	13 (87%)	13	3	0	0
Physics	7 (47%)	2	6	0	0
Plant & Animal Science	9 (60%)	5	3	1	1
Psychiatry & Psychology	10 (67%)	6	4	2	0
Social Sciences	5 (33%)	3	2	0	0
Space Science	5 (33%)	1	4	0	1
All disciplines	207 (63%)	118	85	41	6

700 **Supplementary Information G. Post-publication critique types and**
701 **limits for each journal**

Supplementary Table G1. Post-publication critique types (letters, commentaries, web comments, other) and limits (length, time-to-submit) for each journal. Length limits are in words. Time limits are in weeks. x = Post-publication critique type not offered. QL = Qualitative limit. NS = No limit specified. UL = Unlimited (explicitly says there is no limit of this type). Journals are ordered by discipline (alphabetical) and Journal Impact Factor (descending).

	Letters		Commentaries		Web comments		Other	
Journal	Length	Time	Length	Time	Length	Time	Length	Time
<i>Agricultural Sciences</i>								
Global Change Biology Bioenergy	800	QL	1500	QL	x	x	x	x
Molecular Nutrition & Food Research	x	x	x	x	x	x	x	x
Food Hydrocolloids	x	x	x	x	x	x	x	x
Soil Biology & Biochemistry	x	x	x	x	x	x	QL	NS
Agronomy for Sustainable Development	x	x	x	x	x	x	x	x
Journal of Nutrition	500	26.1	x	x	x	x	x	x
Nutrients	450	13.05	x	x	x	x	x	x
Food Microbiology	NS	NS	x	x	x	x	x	x
Agricultural & Forest Meteorology	x	x	x	x	x	x	x	x
Journal of the Academy of	500	26.1	x	x	x	x	x	x

Nutrition & Dietetics								
Theoretical & Applied Genetics	x	x	x	x	x	x	x	x
Industrial Crops & Products	x	x	x	x	x	x	x	x
Soil & Tillage Research	x	x	x	x	x	x	x	x
Biology & Fertility of Soils	x	x	x	x	x	x	x	x
<i>Biology & Biochemistry</i>								
Genetics Selection Evolution	x	x	x	x	x	x	x	x
Nature Biotechnology	x	x	1200	QL	x	x	x	x
Nature Methods	500	NS	1200	NS	x	x	x	x
Science Translational Medicine	x	x	1500	NS	NS	NS	x	x
Nature Chemical Biology	x	x	1200	NS	x	x	x	x
Nature Structural & Molecular Biology	x	x	1200	NS	x	x	x	x
Nature Protocols	x	x	1200	NS	NS	NS	x	x
Bone Research	800	NS	x	x	x	x	x	x
Journal of Pineal Research	x	x	x	x	x	x	x	x
Nucleic Acids Research	x	x	x	x	NS	NS	x	x
Current Biology	1000	NS	x	x	NS	NS	x	x
PLOS Biology	x	x	x	x	NS	NS	NS	NS

Cell Systems	x	x	x	x	NS	NS	x	x
Matrix Biology	x	x	x	x	x	x	x	x
Metabolic Engineering	x	x	x	x	x	x	x	x
eLife	1500	52	x	x	NS	NS	NS	NS
<i>Chemistry</i>								
Energy & Environmental Science	x	x	x	x	x	x	x	x
Nature Chemistry	x	x	1200	NS	x	x	x	x
Journal of the American Chemical Society	x	x	x	x	x	x	x	x
Chem	x	x	x	x	NS	NS	x	x
Angewandte Chemie-International Edition	NS	NS	x	x	x	x	x	x
Applied Catalysis B - Environmental	NS	NS	x	x	x	x	x	x
ACS Catalysis	NS	NS	x	x	x	x	x	x
ACS Central Science	x	x	x	x	x	x	x	x
Chemical Science	x	x	NS	NS	x	x	x	x
Journal of Physical Chemistry Letters	x	x	x	x	x	x	x	x
Acta Crystallographica Section C-Structural Chemistry	NS	NS	x	x	x	x	x	x
Green Chemistry	x	x	NS	NS	x	x	x	x

Biosensors & Bioelectronics	x	x	x	x	x	x	x	x
Acta Crystallographica A-Foundation & Advances	NS	NS	NS	NS	x	x	x	x
ChemSusChem	NS	NS	x	x	x	x	x	x
<i>Clinical Medicine</i>								
New England Journal of Medicine	175	3	x	x	200	NS	x	x
Lancet	250	2	x	x	x	x	x	x
JAMA	400	4	x	x	600	QL	x	x
Lancet Oncology	400	8	x	x	x	x	x	x
Journal of Clinical Oncology	750	6	x	x	x	x	x	x
Cancer Discovery	500	13.05	x	x	x	x	x	x
The BMJ	x	x	x	x	NS	NS	x	x
European Heart Journal	500	NS	x	x	500	NS	x	x
Lancet Respiratory Medicine	400	4	x	x	x	x	x	x
JAMA Oncology	400	4	x	x	600	QL	x	x
Gastroenterology	750	4.35	x	x	x	x	x	x
JAMA Internal Medicine	400	4	x	x	600	QL	x	x
Annals of Internal Medicine	400	4	x	x	NS	NS	x	x

Lancet Diabetes & Endocrinology	400	8	x	x	x	x	x	x
Circulation	500	6	x	x	NS	UL	x	x
<i>Computer Science</i>								
Journal of Statistical Software	x	x	x	x	x	x	x	x
IEEE Wireless Communications	x	x	x	x	x	x	x	x
IEEE Transactions on Cybernetics	x	x	x	x	x	x	x	x
IEEE Transactions on Evolutionary Computation	x	x	1000	NS	x	x	x	x
IEEE Transactions on Neural Networks & Learning Systems	x	x	1500	NS	x	x	x	x
IEEE Transactions on Cloud Computing	x	x	1000	NS	x	x	x	x
Neural Networks	1000	NS	x	x	x	x	x	x
IEEE Journal on Selected Areas In Communications	x	x	x	x	x	x	x	x
Information Fusion	x	x	x	x	x	x	x	x
IEEE Computational Intelligence Magazine	4000	NS	x	x	x	x	x	x

IEEE Transactions on Wireless Communications	x	x	500	NS	x	x	x	x
IEEE Internet of Things Journal	x	x	x	x	x	x	x	x
IEEE Transactions on Information Forensics and Security	1000	NS	x	x	x	x	x	x
Medical Image Analysis	x	x	x	x	x	x	x	x
IEEE Transactions on Communications	x	x	x	x	x	x	x	x
<i>Economics & Business</i>								
Journal of the Academy of Marketing Science	x	x	x	x	x	x	x	x
Journal of Management	x	x	x	x	x	x	x	x
Quarterly Journal of Economics	x	x	x	x	x	x	x	x
Journal of Marketing	x	x	x	x	x	x	x	x
Journal of Service Research	x	x	x	x	x	x	x	x
Academy of Management Journal	x	x	NS	NS	x	x	x	x
Journal of Human Resources	x	x	x	x	x	x	x	x
Journal of Economic Growth	x	x	x	x	x	x	x	x

Journal of International Business Studies	x	x	x	x	x	x	x	x
Journal of Supply Chain Management	x	x	x	x	x	x	x	x
Journal of Business Venturing	x	x	x	x	x	x	x	x
Administrative Science Quarterly	x	x	x	x	x	x	x	x
Strategic Management Journal	x	x	10000	NS	x	x	x	x
Journal of Retailing	x	x	x	x	x	x	x	x
Journal of Finance	x	x	x	x	x	x	10000	NS
<i>Engineering</i>								
Nature Energy	x	x	1200	QL	x	x	x	x
International Journal of Computer Vision	x	x	x	x	x	x	x	x
IEEE Transactions on Pattern Analysis & Machine Intelligence	x	x	1250	NS	x	x	x	x
Renewable & Sustainable Energy Reviews	x	x	x	x	x	x	x	x
Proceedings of The IEEE	x	x	x	x	x	x	x	x
IEEE Transactions on Fuzzy Systems	1500	NS	x	x	x	x	x	x
Applied Energy	x	x	x	x	x	x	x	x

IEEE Transactions on Smart Grid	X	X	X	X	X	X	X	X
IEEE Transactions on Industrial Electronics	X	X	X	X	X	X	X	X
International Journal of Engineering Science	NS	NS	X	X	X	X	X	X
IEEE Transactions on Power Electronics	1000	NS	X	X	X	X	X	X
Chemical Engineering Journal	1000	NS	X	X	X	X	X	X
Progress in Photovoltaics	X	X	X	X	X	X	X	X
Journal of Hazardous Materials	NS	NS	X	X	X	X	X	X
Energy Conversion & Management	X	X	X	X	X	X	X	X
<i>Environment & Ecology</i>								
Nature Climate Change	X	X	1200	NS	X	X	X	X
Ecology Letters	X	X	800	26.1	NS	NS	X	X
Global Change Biology	800	QL	1500	QL	X	X	X	X
Systematic Biology	X	X	X	X	X	X	X	X
Environmental Health Perspectives	X	X	X	X	X	X	X	X

Frontiers in Ecology & the Environment	800	NS	x	x	x	x	x	x
Ecological Monographs	x	x	x	x	x	x	x	x
Environment International	NS	NS	x	x	x	x	x	x
Conservation Letters	500	6	x	x	x	x	x	x
Land Degradation & Development	x	x	x	x	x	x	x	x
Molecular Ecology Resources	x	x	QL	NS	x	x	x	x
Water Research	x	x	1200	17.4	x	x	x	x
Environmental Science & Technology	1000	26.1	x	x	x	x	x	x
Molecular Ecology	x	x	QL	NS	x	x	x	x
Environmental Science-Nano	x	x	NS	NS	x	x	x	x
<i>Geosciences</i>								
Nature Geoscience	x	x	1200	NS	x	x	x	x
Earth System Science Data	x	x	NS	NS	x	x	x	x
Bulletin of the American Meteorological Society	x	x	1500	104	x	x	x	x
Remote Sensing of Environment	x	x	x	x	x	x	x	x
ISPRS Journal of Photogrammetry & Remote Sensing	NS	NS	x	x	x	x	x	x

Gondwana Research	x	x	1500	26.1	x	x	x	x
Atmospheric Chemistry & Physics	x	x	NS	NS	x	x	x	x
Geology	x	x	1250	26.1	x	x	x	x
Journal of the Meteorological Society of Japan	x	x	4500	NS	x	x	x	x
GPS Solutions	x	x	x	x	x	x	x	x
Geochimica Et Cosmochimica Acta	x	x	2000	52.2	x	x	x	x
IEEE Transactions on Geoscience & Remote Sensing	NS	NS	x	x	x	x	x	x
Journal of Climate	x	x	1500	104	x	x	x	x
Journal of Geodesy	x	x	x	x	x	x	x	x
Cryosphere	x	x	500	52	x	x	x	x
<i>Immunology</i>								
Lancet Infectious Diseases	400	6	x	x	x	x	x	x
Nature Immunology	x	x	1200	QL	x	x	x	x
Immunity	1500	8.7	x	x	x	x	x	x
Journal of Allergy & Clinical Immunology	500	QL	x	x	x	x	x	x
Lancet HIV	250	4	x	x	x	x	x	x
Journal of Experimental Medicine	x	x	x	x	x	x	x	x

Clinical Infectious Diseases	500	NS	x	x	NS	NS	x	x
Journal For Immunotherapy of Cancer	x	x	x	x	NS	NS	x	x
Journal of Autoimmunity	x	x	x	x	x	x	x	x
Cellular & Molecular Immunology	x	x	x	x	x	x	x	x
Emerging Infectious Diseases	300	4	x	x	1667	NS	x	x
Mucosal Immunology	NS	QL	x	x	x	x	x	x
Eurosurveillance	600	12	x	x	x	x	x	x
Journal of Allergy & Clinical Immunology-In Practice	500	QL	x	x	x	x	x	x
Allergy	600	NS	x	x	x	x	x	x
<i>Materials Science</i>								
Nature Materials	x	x	1200	NS	x	x	x	x
Nature Nanotechnology	x	x	1200	QL	x	x	x	x
Materials Today	x	x	1200	NS	NS	NS	x	x
Advanced Materials	NS	NS	x	x	x	x	x	x
Advanced Energy Materials	NS	NS	x	x	x	x	x	x
ACS Nano	NS	NS	x	x	x	x	x	x

Advanced Functional Materials	NS	NS	x	x	x	x	x	x
Materials Horizons	x	x	NS	NS	x	x	x	x
Nano Energy	x	x	x	x	x	x	x	x
ACS Energy Letters	x	x	x	x	x	x	x	x
Journal Of Materials Chemistry A	x	x	NS	NS	x	x	x	x
Chemistry Of Materials	x	x	NS	NS	x	x	x	x
Small	NS	NS	x	x	x	x	x	x
NPJ Computational Materials	x	x	1200	NS	x	x	x	x
Biomaterials	x	x	x	x	x	x	x	x
<i>Mathematics</i>								
Siam Review	x	x	x	x	x	x	x	x
Annals of Mathematics	x	x	x	x	x	x	x	x
Advances in Nonlinear Analysis	x	x	x	x	x	x	x	x
Journal of the American Mathematical Society	x	x	x	x	x	x	x	x
Nonlinear Analysis-Hybrid Systems	x	x	x	x	x	x	x	x
Communications on Pure & Applied Mathematics	x	x	x	x	x	x	x	x

Mathematical Models & Methods in Applied Sciences	x	x	x	x	x	x	x	x
Foundations of Computational Mathematics	x	x	x	x	x	x	x	x
Journal of the Royal Statistical Society Series B-Statistical Methodology	400	52	x	x	x	x	x	x
Fractional Calculus & Applied Analysis	x	x	x	x	x	x	x	x
Applied & Computational Harmonic Analysis	5000	NS	x	x	x	x	x	x
Inventiones Mathematicae	x	x	x	x	x	x	x	x
Annals of Statistics	x	x	x	x	x	x	x	x
Applied Mathematics Letters	x	x	x	x	x	x	x	x
Archive for Rational Mechanics & Analysis	x	x	x	x	x	x	x	x
<i>Microbiology</i>								
Cell Host & Microbe	x	x	x	x	NS	NS	x	x
Nature Microbiology	x	x	1200	QL	x	x	x	x
ISME Journal	x	x	1500	NS	x	x	x	x
Microbiome	NS	NS	x	x	x	x	x	x

Mbio	500	NS	x	x	x	x	x	x
PLOS Pathogens	x	x	x	x	NS	NS	x	x
Emerging Microbes & Infections	x	x	x	x	x	x	x	x
Msystems	500	NS	x	x	x	x	x	x
Journal of Oral Microbiology	x	x	NS	NS	x	x	x	x
Cellular Microbiology	x	x	x	x	x	x	x	x
Journal of Virology	500	NS	x	x	x	x	x	x
NPJ Biofilms & Microbiomes	x	x	1200	NS	x	x	x	x
Journal of Clinical Microbiology	500	NS	x	x	x	x	x	x
Frontiers in Microbiology	x	x	x	x	NS	NS	x	x
Microbial Biotechnology	x	x	x	x	x	x	x	x
<i>Molecular Biology & Genetics</i>								
Nature Medicine	500	NS	1200	QL	x	x	x	x
Cell	x	x	7500	NS	NS	NS	x	x
Nature Genetics	x	x	1200	NS	x	x	x	x
Cell Stem Cell	1000	NS	7500	NS	x	x	x	x
Cancer Cell	900	8.7	x	x	NS	NS	x	x
Cell Metabolism	1000	NS	x	x	NS	UL	x	x
Nature Cell Biology	x	x	1200	QL	x	x	x	x
Cell Research	x	x	x	x	x	x	x	x

Molecular Cell	x	x	7500	NS	NS	UL	x	x
Genome Biology	800	NS	x	x	x	x	x	x
Autophagy	x	x	QL	QL	x	x	x	x
EMBO Journal	NS	NS	x	x	x	x	x	x
Molecular Biology & Evolution	x	x	x	x	x	x	x	x
Developmental Cell	x	x	x	x	NS	NS	x	x
Genes & Development	x	x	x	x	x	x	x	x
<i>Multidisciplinary</i>								
Nature	x	x	1200	QL	NS	NS	x	x
Science	300	13.05	1000	13.05	QL	NS	x	x
Nature Communications	x	x	1200	NS	NS	NS	x	x
Science Advances	x	x	x	x	1000	NS	x	x
Proceedings of the National Academy of Sciences of the United States of America	500	26.1	x	x	NS	NS	x	x
National Science Review	300	NS	x	x	x	x	x	x
Nanoscale Horizons	x	x	NS	NS	x	x	x	x
Gigascience	x	x	x	x	x	x	x	x
Scientific Data	x	x	x	x	x	x	x	x
Journal of Advanced Research	NS	NS	x	x	x	x	x	x

Annals of the New York Academy of Sciences	x	x	x	x	x	x	x	x
Science Bulletin	500	NS	1000	NS	x	x	x	x
Scientific Reports	x	x	1200	NS	NS	NS	x	x
Journal of the Royal Society Interface	x	x	x	x	x	x	x	x
PLOS One	x	x	x	x	NS	NS	x	x
<i>Neuroscience & Behavior</i>								
Lancet Neurology	400	8	x	x	x	x	x	x
Nature Neuroscience	x	x	1200	QL	x	x	x	x
Acta Neuropathologica	1000	NS	x	x	x	x	x	x
Neuron	x	x	x	x	NS	NS	x	x
Progress in Neurobiology	x	x	x	x	x	x	x	x
Alzheimers & Dementia	750	NS	x	x	x	x	x	x
Biological Psychiatry	1000	QL	x	x	x	x	x	x
Molecular Psychiatry	700	NS	x	x	x	x	x	x
JAMA Neurology	400	4	x	x	600	QL	x	x
Brain	1500	QL	x	x	x	x	x	x
Annals of Neurology	400	NS	x	x	x	x	x	x
Neuro-Oncology	600	26.1	x	x	x	x	x	x
Movement Disorders	500	8	x	x	x	x	x	x

Translational Stroke Research	x	x	1000	NS	x	x	x	x
Neurology	200	QL	x	x	x	x	x	x
<i>Pharmacology & Toxicology</i>								
Journal of Controlled Release	x	x	x	x	x	x	x	x
Alimentary Pharmacology & Therapeutics	500	104.4	x	x	x	x	x	x
British Journal of Pharmacology	800	QL	x	x	x	x	x	x
Clinical Pharmacology & Therapeutics	400	26.1	x	x	x	x	x	x
Particle & Fibre Toxicology	1000	NS	NS	NS	x	x	x	x
Acta Pharmaceutica Sinica B	x	x	x	x	x	x	x	x
Nanotoxicology	NS	NS	NS	NS	x	x	x	x
Archives of Toxicology	500	NS	NS	NS	x	x	x	x
Expert Opinion on Drug Delivery	1500	NS	x	x	x	x	x	x
Value in Health	NS	26.1	x	x	x	x	x	x
Journal of Antimicrobial Chemotherapy	800	NS	x	x	x	x	x	x
Therapeutic Advances in Chronic Disease	1000	NS	x	x	x	x	x	x
Pharmacological Research	NS	NS	x	x	x	x	x	x
Drugs	1000	NS	x	x	x	x	x	x

Expert Opinion on Therapeutic Targets	1500	QL	x	x	x	x	x	x
<i>Physics</i>								
Nature Photonics	x	x	1200	QL	x	x	x	x
Nature Physics	500	NS	1200	NS	x	x	x	x
Physical Review X	x	x	3500	NS	x	x	x	x
Light-Science & Applications	x	x	x	x	x	x	x	x
Applied Physics Reviews	x	x	x	x	x	x	x	x
Advanced Science	NS	NS	x	x	x	x	x	x
Nano Letters	x	x	x	x	x	x	x	x
NPJ Quantum Information	x	x	1200	NS	x	x	x	x
Laser & Photonics Reviews	x	x	x	x	x	x	x	x
Nano Research	x	x	x	x	x	x	x	x
Optica	x	x	1500	26.1	x	x	x	x
Nanoscale	x	x	NS	NS	x	x	x	x
ACS Photonics	x	x	x	x	x	x	x	x
Nanophotonics	x	x	x	x	x	x	x	x
Journal of High Energy Physics	x	x	x	x	x	x	x	x
<i>Plant & Animal Science</i>								
Fungal Diversity	x	x	x	x	x	x	x	x

Studies in Mycology	x	x	x	x	x	x	x	x
Nature Plants	x	x	1200	QL	x	x	x	x
Molecular Plant	1200	NS	x	x	x	x	x	x
Plant Cell	1000	NS	x	x	x	x	x	x
Persoonia	x	x	x	x	x	x	x	x
New Phytologist	1500	NS	NS	NS	x	x	x	x
Plant Biotechnology Journal	x	x	x	x	x	x	x	x
Plant Physiology	1000	NS	x	x	x	x	x	x
Cladistics	x	x	x	x	x	x	NS	NS
Plant Journal	x	x	x	x	x	x	x	x
Plant Cell and Environment	x	x	x	x	x	x	x	x
Journal of Experimental Botany	x	x	x	x	NS	NS	x	x
Wildlife Monographs	5000	QL	x	x	x	x	x	x
Evolutionary Applications	x	x	NS	QL	x	x	x	x
<i>Psychiatry & Psychology</i>								
World Psychiatry	x	x	NS	NS	x	x	x	x
JAMA Psychiatry	400	4	x	x	600	QL	x	x
Lancet Psychiatry	400	4	x	x	x	x	x	x
American Journal of Psychiatry	500	6	x	x	x	x	x	x
Psychotherapy & Psychosomatics	500	NS	x	x	x	x	x	x

Perspectives on Psychological Science	x	x	x	x	x	x	x	x
Journal of Child Psychology & Psychiatry	x	x	x	x	x	x	x	x
Psychological Methods	x	x	x	x	x	x	x	x
Journal of the American Academy of Child & Adolescent Psychiatry	750	NS	x	x	x	x	x	x
Psychological Science	x	x	1500	NS	x	x	x	x
British Journal of Psychiatry	x	x	1200	NS	500	NS	x	x
Journal of Personality & Social Psychology	x	x	UL	NS	x	x	x	x
Epidemiology and Psychiatric Sciences	x	x	x	x	x	x	x	x
Personnel Psychology	x	x	x	x	x	x	x	x
Psychological Medicine	1500	NS	x	x	x	x	x	x
<i>Social Sciences</i>								
International Journal of Epidemiology	700	26.1	x	x	x	x	x	x
European Journal of Epidemiology	1000	NS	x	x	x	x	x	x
Economic Geography	x	x	x	x	x	x	x	x

Global Environmental Change-Human & Policy Dimensions	x	x	x	x	x	x	x	x
Bulletin of the World Health Organization	x	x	x	x	x	x	x	x
Milbank Quarterly	x	x	x	x	x	x	x	x
Tourism Management	x	x	x	x	x	x	x	x
Internet & Higher Education	x	x	x	x	x	x	x	x
International Journal of Behavioral Nutrition & Physical Activity	x	x	x	x	x	x	x	x
MIS Quarterly	x	x	x	x	x	x	x	x
American Journal of Political Science	x	x	x	x	x	x	x	x
Yale Law Journal	x	x	x	x	x	x	x	x
Journal of Travel Research	NS	NS	x	x	x	x	x	x
Annals of Tourism Research	x	x	3000	NS	x	x	x	x
American Sociological Review	x	x	3000	NS	x	x	x	x
<i>Space Science</i>								
Astrophysical Journal Supplement Series	x	x	x	x	x	x	x	x

Astrophysical Journal Letters	x	x	x	x	x	x	x	x
Physics of the Dark Universe	x	x	x	x	x	x	x	x
Astronomy & Astrophysics	x	x	NS	NS	x	x	x	x
Astrophysical Journal	x	x	x	x	x	x	x	x
Monthly Notices of the Royal Astronomical Society	x	x	x	x	x	x	x	x
Journal of Cosmology & Astroparticle Physics	x	x	NS	NS	x	x	x	x
Publications of the Astronomical Society of Australia	x	x	x	x	x	x	x	x
Astronomical Journal	x	x	x	x	x	x	x	x
Acta Astronomica	x	x	x	x	x	x	x	x
Astrobiology	500	NS	x	x	x	x	NS	NS
Journal of Geophysical Research-Planets	x	x	2500	NS	x	x	x	x
Publications of the Astronomical Society of the Pacific	x	x	x	x	x	x	x	x
Astroparticle Physics	x	x	x	x	x	x	x	x
Icarus	x	x	NS	NS	x	x	x	x

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Supplementary Information H. Peer review.

Supplementary Table H1. Number of different post-publication critique types that are sent for independent external peer review. The denominator for percentages is the total number of each post-publication critique type offered.

Post-publication critique type	Is post-publication critique sent for independent external peer review?			
	Yes	Editor discretion	No	Not stated
Letters (n = 118)	10 (8%)	14 (12%)	20 (17%)	74 (63%)
Commentaries (n = 85)	42 (49%)	5 (6%)	3 (4%)	35 (41%)
Web comments (n = 41)	0 (0%)	0 (0%)	30 (73%)	11 (27%)
Other (n = 6)	3 (50%)	0 (0%)	0 (0%)	3 (50%)

707 **Supplementary Information I. Variables measured in Study Two.**

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Supplementary Table I. Variables related to post-publication critique (PPC) measured in Study Two.

Variable name	Query	Response options
Secondary PPC prevalence	Is the (eligible) article PPC?	TRUE FALSE
Primary PPC prevalence	Is the (eligible) article linked to PPC?	TRUE FALSE
For the instances of PPC identified by the primary PPC prevalence measure...		
Target data availability	Does the target article share data?	TRUE STATES AVAILABLE UPON REQUEST FALSE NOT APPLICABLE
Target open access	Is the target article open access?	TRUE FALSE
PPC open access	Is the PPC open access?	TRUE FALSE
PPC anonymous	Are PPC authors anonymous?	TRUE FALSE
PPC COI Statement	Does the PPC include a conflict of interest statement?	TRUE FALSE
PPC COI Actual	Do PPC authors state that there may be a conflict of interest?	TRUE FALSE NOT APPLICABLE (i.e., if no COI statement)
PPC publication time	How long after publication of the target article was the PPC published?	Difference between publication date of PPC and publication date of target article.

PPC content	What does the PPC address? (indicate all that apply)	Design Implementation Analysis Reporting Interpretation Other (specify)
PPC length	How many words are included in the PPC (in main text, excluding references, etc)?	Number of words.
PPC analysis	Does the PPC include analysis of target article data?	TRUE FALSE
PPC new data	Does the PPC include analysis of new data?	TRUE FALSE
Target correction	Did PPC trigger correction?	TRUE FALSE
Target author reply	Have the target article authors replied?	TRUE FALSE
Reply new data	Did the author reply involve collection of new data?	TRUE FALSE NOT APPLICABLE (i.e., if no reply)
Reply new analyses	Did the author reply involve new analyses?	TRUE FALSE NOT APPLICABLE (i.e., if no reply)
Reply claims unchanged	Do target article authors assert their core claims remain unchanged?	TRUE FALSE NOT APPLICABLE (i.e., if no reply)

710 **Supplementary Information J: How prevalent is post-publication**
711 **critique in practice? Tabular data.**

Supplementary Table J1. Primary and secondary prevalence estimates for the use of post-publication critique in practice across disciplines. Disciplines are in descending order by primary estimate.

Scientific discipline	Prevalence estimate (%)	
	primary	secondary
Clinical Medicine	13	31
Psychiatry & Psychology	5	17
Multidisciplinary	5	3
Neuroscience & Behavior	3	9
Biology & Biochemistry	3	1
Immunology	1	10
Molecular Biology & Genetics	1	2
Social Sciences	0	6
Environment & Ecology	0	4
Pharmacology & Toxicology	0	4
Economics & Business	0	3
Geosciences	0	3
Plant & Animal Science	0	2
Chemistry	0	1
Microbiology	0	1
Agricultural Sciences	0	0
Computer Science	0	0
Engineering	0	0
Materials Science	0	0

Mathematics	0	0
Physics	0	0
Space Science	0	0

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Supplementary Table J2. Number of articles linked to post-publication critique (*n*) by journal. Journals not shown had zero articles in our sample linked to post-publication critique.

Journal	Scientific discipline	<i>n</i>
New England Journal of Medicine	Clinical Medicine	8
The BMJ	Clinical Medicine	3
Lancet Psychiatry	Psychiatry & Psychology	3
Current Biology	Biology & Biochemistry	2
Gastroenterology	Clinical Medicine	2
JAMA	Clinical Medicine	2
Lancet Oncology	Clinical Medicine	2
Neurology	Neuroscience & Behavior	2
Science	Multidisciplinary	2
Annals of Internal Medicine	Clinical Medicine	1
British Journal of Psychiatry	Psychiatry & Psychology	1
Cell Stem Cell	Molecular Biology & Genetics	1
eLife	Biology & Biochemistry	1
JAMA Oncology	Clinical Medicine	1
JAMA Psychiatry	Psychiatry & Psychology	1

Lancet Infectious Diseases	Immunology	1
Lancet Neurology	Neuroscience & Behavior	1
National Science Review	Multidisciplinary	1
Nature Communications	Multidisciplinary	1
Neuron	Neuroscience & Behavior	1
Science Advances	Multidisciplinary	1
Science Translational Medicine	Biology & Biochemistry	1

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Supplementary Table J3. Number of articles that were classified as post-publication critique (*n*) amongst the first ten eligible articles for each journal. Journals not shown had zero articles in this sample classified post-publication critique.

Journal	Scientific discipline	<i>n</i>
Lancet Oncology	Clinical Medicine	7
Lancet Psychiatry	Psychiatry & Psychology	6
JAMA Internal Medicine	Clinical Medicine	5
JAMA Oncology	Clinical Medicine	5
Lancet Infectious Diseases	Immunology	5
New England Journal of Medicine	Clinical Medicine	5
Annals of Internal Medicine	Clinical Medicine	4
JAMA	Clinical Medicine	4
Lancet	Clinical Medicine	4
Alimentary Pharmacology & Therapeutics	Pharmacology & Toxicology	3
Circulation	Clinical Medicine	3
Frontiers in Ecology and the Environment	Environment & Ecology	3
Journal of Clinical Oncology	Clinical Medicine	3
Lancet Respiratory Medicine	Clinical Medicine	3

Neurology	Neuroscience & Behavior	3
Acta Neuropathologica	Neuroscience & Behavior	2
Allergy	Immunology	2
American Journal of Psychiatry	Psychiatry & Psychology	2
Annals of Neurology	Neuroscience & Behavior	2
Biological Psychiatry	Neuroscience & Behavior	2
British Journal of Psychiatry	Psychiatry & Psychology	2
International Journal of Epidemiology	Social Sciences	2
JAMA Neurology	Neuroscience & Behavior	2
Journal of the American Academy of Child and Adolescent Psychiatry	Psychiatry & Psychology	2
Lancet Diabetes & Endocrinology	Clinical Medicine	2
Lancet HIV	Immunology	2
Pharmacological Research	Pharmacology & Toxicology	2
Psychological Science	Psychiatry & Psychology	2
Psychotherapy and Psychosomatics	Psychiatry & Psychology	2
Science	Multidisciplinary	2
ACS Catalysis	Chemistry	1
The BMJ	Clinical Medicine	1
Brain	Neuroscience & Behavior	1
Cladistics	Plant & Animal Science	1
Clinical Infectious Diseases	Immunology	1
Current Biology	Biology & Biochemistry	1
European Journal of Epidemiology	Social Sciences	1
Eurosurveillance	Immunology	1
Evolutionary Applications	Plant & Animal Science	1
Gastroenterology	Clinical Medicine	1

Geology	Geosciences	1
Gondwana Research	Geosciences	1
JAMA Psychiatry	Psychiatry & Psychology	1
Journal of Allergy and Clinical Immunology-In Practice	Immunology	1
Journal of Climate	Geosciences	1
Mbio	Microbiology	1
Molecular Ecology	Environment & Ecology	1
National Science Review	Multidisciplinary	1
Nature Cell Biology	Molecular Biology & Genetics	1
Nature Geoscience	Geosciences	1
Nature Medicine	Molecular Biology & Genetics	1
Strategic Management Journal	Economics & Business	1

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Supplementary Information K: Definition of post-publication critique

We adopted the following operational definition of post-publication critique:

Any journal-based avenue for sharing peer-initiated critical discourse related to specific research articles previously published in the same journal.

For scientific discourse to constitute post-publication critique under this definition, it had to meet the following specific criteria:

(a) *Journal-based*. The mode of sharing critical discourse had to be directly or indirectly controlled by the journal. Online commenting systems developed by 3rd party services (e.g., Disqus), still counted as post-publication critique if the journal was responsible for operating them.

(b) *Shared*. The critique had to be accessible to the journal's readership, rather than, for example, handled privately within the editorial team. Critical discourse published behind a paywall still counted as post-publication critique as long as it was visible to the journal's typical readership.

(c) *Peer-initiated*. It had to be possible for independent researchers to make unsolicited submissions; commissioned articles and/or editorials did not count as post-publication critique.

(d) *Critical discourse*. Post-publication critique had to allow for critical content. Exclusively positive or neutral content (e.g., news or 'spotlight' articles) did not count as post-publication critique.

(e) *Related to specific research articles previously published in the journal*. The target of post-publication critique had to be specific research already published in the same journal, rather than research published elsewhere, or articles about general scientific topics or general

742 methodological issues. Systematic reviews and meta-analyses did not count as post-
743 publication critique.

Supplementary Information L. Definition of scientific disciplines.

The 22 scientific disciplines were defined by Clarivate Essential Science Indicators (<https://perma.cc/MD4V-A5X5>). We did not include the discipline of Arts and Humanities. The discipline definitions are reproduced here verbatim.

Agricultural Sciences

Agricultural Sciences covers journals in general agriculture, agricultural chemistry and engineering, agronomy, dairy science, and animal science as it relates to agricultural needs, as well as food science and nutrition. Topics covered include tillage research and soil science; agroforestry; horticulture; crop protection and science; pest control and weed science; agrochemistry; phytochemistry; agricultural biochemistry; food chemistry; cereal chemistry; carbohydrate and lipid research; food composition, additives, and contaminants; food microbiology and technology; agricultural engineering and processing; meat and dairy science; animal breeding; animal genetics, nutrition, and production; poultry science; nutrition and metabolism; and nutritional biochemistry. Clinical nutrition also maps here. Agricultural economics maps to *Economics & Business*.

Biology & Biochemistry

Biology & Biochemistry covers a broad range of general topics. These include structure and chemistry of biological molecules; molecular, cellular, and clinical studies of the endocrine system (but does not include clinical endocrinology); regulation of cell, organ, and system functions by hormones; experimental research in general biology and biological systems; anatomy; physiology; cytology; pathology; morphology; proteomics; histochemistry; biophysics; regulation of biological functions at the whole organism level; exploitation of living organisms or their components; industrial microbiology; pollution remediation;

767 industrial chemicals and enzymes; biosensors; bioelectronics; pesticide development; food,
768 flavor, and fragrance industry applications; and waste treatment. Computational biology and
769 life-science-related microscopy journals also map here.

770 *Chemistry*

771 The Chemistry category covers a broad spectrum of topics within the chemical sciences,
772 including analytical chemistry, inorganic and nuclear chemistry, organic chemistry, physical
773 chemistry, crystallography, electrochemistry, chemical methods and structures, natural and
774 laboratory syntheses, and isolation and analysis of clinically significant molecules. This
775 category also covers instrumentation and spectroscopy journals. Miscellaneous and applied
776 chemistry journals also map here.

777 Polymer science journals not largely related to Materials Science map here; otherwise, they
778 map to *Materials Science*. Chemical engineering journals also map here, provided they deal
779 exclusively with chemical engineering—if they deal with multiple forms of engineering, they
780 map to *Engineering*.

781 *Clinical Medicine*

782 The Clinical Medicine category covers journals dealing with a wide range of medical and
783 biomedical topics. These include anesthesia and critical care medicine, cardiovascular
784 medicine and cardiology, dentistry, dermatology, general and internal medicine,
785 endocrinology, environmental medicine, gastroenterology, gynecology, hepatology,
786 hematology, legal medicine, nephrology, nuclear medicine, nursing, obstetrics and
787 reproductive medicine, oncology, ophthalmology, otolaryngology, pediatrics, radiology,
788 respiratory medicine and pulmonology, rheumatology, surgery (including neurosurgery), and
789 urology.

790 Clinical pharmacology as it relates to clinical trials maps here; otherwise pharmacology
791 topics map to *Pharmacology & Toxicology*. All nutrition topics map to *Agricultural Sciences*.
792 Ethics journals solely devoted to medical ethics map here. Journals dealing with the clinical
793 aspects of substance abuse are classified here; those dealing with the social aspects map
794 to *Social Sciences, General*.

795 *Computer Science*

796 Computer Science encompasses computer hardware and architecture, computer software,
797 software engineering and design, computer graphics, programming languages, theoretical
798 computing, computing methodologies, interdisciplinary computer applications, artificial
799 intelligence theory, information systems and information technology, telecommunications,
800 communications via various devices and systems, and acquisition, processing, storage,
801 management, and dissemination of information. Bioinformatics journals also map here.

802 *Economics & Business*

803 The Economics & Business category includes journals which cover theoretical, political,
804 agricultural, and developmental economics, as well as business, finance, management,
805 organizational science, strategic planning and decision-making methods, and industrial
806 relations and labor matters.

807 *Engineering*

808 Engineering includes publications covering a number of engineering disciplines, including
809 aerospace engineering, mechanical engineering, electrical and electronics engineering,
810 nuclear energy, civil engineering (which also encompasses water resources and supply and
811 transportation and municipal engineering), the effects of humans on the environment and

controls to minimize environmental degradation, applied artificial intelligence, robotics and automatic control, engineering mathematics (which encompasses mathematical modeling, optimization techniques, and statistical methods in engineering systems), energy and fuels, operations research, engineering management, construction and building technology, and the development, manufacture, and application of instruments.

Chemical engineering journals also related to other areas of engineering map here; otherwise they map to *Chemistry*.

Environment & Ecology

Environment/Ecology covers interrelated disciplines on pure and applied ecology, ecological modeling and engineering, ecotoxicology, evolutionary ecology, environmental contamination and toxicology, environmental health, environmental monitoring and management, environmental technology, environmental geology, water resources research, climate change, limnology, and biodiversity conservation. Natural history journals are also covered here. Environmental *Studies* subjects map to *Social Sciences*.

Geosciences

The Geosciences category covers a broad range of journals related to physical studies of the Earth. These include geology, geochemistry, geophysics, geotechnics, economic geology, petrochemistry, mineralogy, meteorology and atmospheric sciences, hydrology, oceanography, petroleum geology, volcanology, seismology, climatology, paleontology, remote sensing, geodesy, and geological, petroleum, and mining engineering.

832 *Immunology*

833 The category of Immunology incorporates journals containing cellular and molecular studies
834 in immunology; clinical research in immunopathology; infectious diseases; autoimmunity
835 and allergy; host-pathogen interactions in infectious diseases; and experimental therapeutic
836 applications of immunomodulating agents.

837 *Materials Science*

838 The Materials Science category deals with journals covering the admixtures of matter or the
839 basic materials from which products are constructed. These include ceramics, paper and
840 wood products, textiles, composites, coatings and films, biomaterials, metals and alloys,
841 metallurgy, superconductors and semiconductors, ferroelectrics, dielectrics, and the
842 application of chemistry to materials design and testing. Polymer journals largely related to
843 Materials Science map here; otherwise they map to *Chemistry*.

844 *Mathematics*

845 The Mathematics category comprises journals dealing with pure and applied mathematics as
846 well as statistics and probability.

847 *Microbiology*

848 The Microbiology category contains journals dealing with biology and biochemistry of
849 protozoa and microorganisms (bacterial, viral, and parasitic), medical implications of the
850 subsets of these organisms known to cause diseases, and the biotechnology applications of
851 microorganisms for basic science or clinical use. Fungi journals are not mapped to this
852 category, but rather to *Plant & Animal Science*.

853 *Molecular Biology & Genetics*

854 Molecular Biology & Genetics covers all aspects of basic and applied genetics, as well as
855 research that has specific emphasis on cellular functions in eukaryotic systems. These topics
856 include biochemistry in eukaryotic systems; receptor biology; signal transduction; regulation
857 of gene expression; morphogenesis; cell-environment interactions; molecular genetics;
858 developmental genetics; developmental biology; biomedical engineering; mechanisms of
859 mutagenesis; structure, function, and regulation of genetic material; clinical genetics; patterns
860 of inheritance; genetics causes of diseases; and screening for and treatment of genetic
861 diseases. General cell biology journals also map here.

862 *Multidisciplinary*

863 This category includes journals of a broad or general character in the sciences and covers the
864 spectrum of major scientific disciplines. It also includes journals devoted to a
865 multidisciplinary approach to the study of particular regions, ecosystems, or biological
866 systems, as well as interdisciplinary journals designed to illuminate significant connections
867 between fields.

868 *Neuroscience & Behavior*

869 Neuroscience & Behavior includes journals that cover cellular and molecular neuroscience,
870 neuronal development, basic and clinical neurology, psychopharmacology, biobehavioral
871 psychology, molecular psychology, and neuronal function underlying higher cognitive
872 processes. Neurosurgery is not covered in this category, but rather in *Clinical Medicine* with
873 other surgical journals.

874 *Pharmacology & Toxicology*

875 *Pharmacology* covers journals dealing with pharmacology; pharmaceutics, cellular and
876 molecular pharmacology; drug design and metabolism; mechanisms of drug action; drug
877 delivery; natural products and traditional medicines; xenobiotics; medicinal chemistry; and
878 mechanisms of action for clinical therapeutics.
879 *Toxicology* covers journals dealing with molecular and cellular effects of harmful substances,
880 environmental toxicology, occupational exposure, and clinical toxicology.

881 *Physics*

882 Physics includes journals covering articles from all areas of physics and the following
883 subfields: mathematical physics, particle and nuclear physics, physics of fluids and plasmas,
884 quantum physics, theoretical physics, chemical physics, applied physics, condensed matter
885 physics, physics of materials, and optics and acoustics.

886 *Plant & Animal Science*

887 *Plant Science* covers general botany journals as well as non-agricultural plant research,
888 including regional botany, mycology, bryology, plant physiology, forestry, plant pathology,
889 economic botany, aquatic botany and toxicology, marine ecology, plant nutrition,
890 photosynthesis research, experimental botany, and cellular and molecular biology or
891 physiology of plant cells and plant systems.

892 *Animal Science* covers non-agricultural animal science journals. Topics include animal
893 behavior, health, and genetics; veterinary medicine; lab animal science; marine and
894 freshwater biology; fisheries science; aquaculture; entomology; evolutionary biology;
895 wildlife research; and zoology, encompassing primatology, mammalogy, ornithology,
896 herpetology, nematology, and malacology.

897 *Psychiatry & Psychology*

898 All areas of psychiatry and psychology are covered in this category, including applied,
899 biological, clinical, developmental, educational, mathematical, organizational, personal, and
900 social, as well as the diagnosis and treatment of psychiatric disorders.

901 *Social Sciences (General)*

902 The Social Sciences category includes journals which cover communication, environmental
903 studies, library and information sciences, political science, public health and administration,
904 rehabilitation, social work and social policy, sociology, anthropology, law, education,
905 linguistics, tourism and hospitality, and demography. Journals covering the history and
906 philosophy of science also map to this category. Ethics journals are classified here, unless
907 they deal strictly with medical ethics, then they map to *Clinical Medicine*. Journals dealing
908 with the social aspects of substance abuse map here; any with clinical aspects map to *Clinical*
909 *Medicine*.

910 *Space Sciences*

911 The Space Science category covers journals dealing with all areas of astronomy and
912 astrophysics, celestial bodies, and observation and interpretation of radiation from the
913 component parts of the universe.

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916 **Supplementary Information M. Study schematic.**

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918 **Supplementary Figure M1. A schematic illustrating the key features of Study One and Study**

919 **Two and how they relate to one another.**

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