1 **Evolving the correction of the literature: manuscript versioning, error amendment, and retract and**

2 **replace**

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8 **Abstract**

9 Academic publishing is undergoing a highly transformative process, and many rules and value systems that

10 were in place for years are being challenged in unprecedented forms leading to the evolution of novel ways

11 of dealing with new pressures. One of the most important aspects of an integrated and valid academic

12 literature is the ability to screen publications for errors during peer review to weed out mistakes, fraud and

13 inconsistencies, such that the final published product represents a product that has value, intellectually, and

14 otherwise. It is difficult to claim the existence of perfect manuscripts. The level of errors that exist in a

15 manuscript will depend on the rigor of the research group, as well as the peer review that screened that paper.

16 When errors slip through into a final published paper, either through honest error or misconduct, and are not

17 detected during peer review and editorial screening, but are spotted during post-publication peer review, an

18 opportunity is created to set the record straight, and correct it. To date, the most common forms of correcting

19 the literature have been errata, corrigenda, expressions of concern, and retractions. Despite this range of

20 corrective measures, which represent artificially created corrals around pockets of imperfect literature,

21   certain cases do not quite fit this mold, and new suggested measures for correcting the literature have been

22   proposed, including manuscript versioning, amendments, partial retractions and retract and replace. A

23   discussion of the evolving correction of the literature is provided, as are perspectives of the risks and benefits

24   of such new measures to improve the literature.

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26   **Key words:** amendment; corrigendum; erratum; errors; open science; peer review; preprint; replacement;

27   retractions

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29   **The published literature is imperfect**

30   It would be impossible to claim that the literature is perfect. Such a claim is unreal because academics

31   around the world exercise different standards of research, because editorial independence allows editors to

32   exercise their right to screen and interpret what is valid from what is invalid at their discretion and using their

33   desired screening methods, thereby making what is acceptable in one journal unacceptable in another, and

34   because certain publishers and publishing models have objectives that are not always seen to be in favor of

35   the integrity of the academic literature, but rather favoring their business model[1]. As a result, the published

36   global academic literature contains information ranging widely from nearly perfect and accurate to erroneous

37   and potentially full of misconduct and/or false information. It is a collective conscience that drives individual

38   academics or groups to seek ways to create a more "perfect" literature that is as free of error as is humanly

39   possible, science's so-called self-corrective process, and to correct those errors when they are discovered.

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[1] https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science

40   However, the current predominant publishing system relies on two potentially false fundamental

41   premises: a) that trust exists between all parties (authors, peer reviewers, editors, publishers) (Pentz, 2012);

42   b) that all these publishing-related parties are striving for the same ideal state of the published literature.

43   Most seasoned academics who have been researching and publishing for several decades will know, from

44   experience, that the literature is imperfect, and with some extreme cases of highly imperfect studies, several

45   of which remain uncorrected. Knowing this leads to an understanding that these two fundamental principles

46   of academic publishing have failed, to some extent, leaving an unquantifiable amount of literature flawed

47   and as-yet uncorrected. Claims were made over a decade ago that most research findings are likely to be

48   false, in essence warning that there is some probability of error in most biomedical papers (Ioannidis, 2005).

49   If in fact those claims are true, that would indicate that the vast majority of these errors have yet to be

50   discovered, and corrected. Recognition of these facts has only begun to evolve in the past few years, and

51   extreme events in the post-publication peer review (PPPR) movement (Teixeira da Silva, 2015a) have started

52   to lead some academics into believing that the current corrective measures that have been in place for

53   decades, or perhaps longer, are no longer applicable or robust enough to deal with the effective correction of

54   the literature. A new age of correction, including self-correction, was born in academic publishing, but it has

55   evolved suddenly, quickly and fairly aggressively, possibly faster than the current system can handle such

56   change, leading to considerable changes in rules, regulations, and even the publishing model, all within the

57   space of just a few years, including an attempt at the industry-wide implementation of ORCID[2] (Teixeira da

58   Silva, 2017a) to try and reduce the level of fraud caused by a widening "fake" movement (Teixeira da Silva,

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[2] https://orcid.org/

59   2017b). However, this militarization of the publishing system, with endless checks and balances (Teixeira da

60   Silva, 2016a) is fraying authors' rights (Al-Khatib and Teixeira da Silva, 2017a).

61   Some of the most prominent changes include whistle-blowing, with PubPeer[3] leading the way, public

62   shaming by Retraction Watch[4] to expose cases of misconduct, errors and retractions, and the expansion of

63   the concept of journal clubs, including via online channels, to expose errors and fraud and expand the debate

64   on these issues with the ultimate objective of correcting the literature (Teixeira da Silva et al., 2017). The

65   effect of these changes are augmented by social media sites that allow error, and scandal, to reach an

66   unlimited audience within a very short space of time, causing, in negative cases, devastating and irreparable

67   consequences, and the fatal termination of legends, sometimes within months (Teixeira da Silva et al., 2016),

68   tearing down decades of career-building developed on a publication base of sand. This entire evolving PPPR

69   is not without its biases, and there are many vested interests in creating new publishing models that can

70   render already published as well as newly published literature as free of error as possible. In the case of

71   for-profit publishers, a clean image and error-free literature represents a product with increased market value,

72   whether that be a pay-per-view or pay-per-download article, or a journal subscription. Similarly, for

73   academic journals published by purely academic societies, such literature represents a journal and society

74   with integrity, that can be trusted, thereby attracting new membership, or maintaining a regular stable of

75   members. Therefore, except for unscholarly and/or "predatory" publishers, whose objectives are largely not

76   academic, or whose objectives are overly commercial, the correction of the literature is in the interests of all

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3   https://www.pubpeer.com/

4   http://retractionwatch.com/

77   parties involved.

78   However, the increase in retractions, as is being documented to some extent at Retraction Watch, and

79   observed across some of the most powerful and profitable mainstream publishers, indicates that failure in

80   peer review and the current publishing model has been widespread (Teixeira da Silva and Dobránszki,

81   2015a; Teixeira da Silva, 2016b), causing reputational damage to authors, editors, journals and publishers

82   alike. Reducing the risk of erroneous literature would involve measures that should be implemented long

83   before the publication process during the development of an academic prior to the publication of their first

84   paper, such as rigorous reproducibility testing, the valorization of work based on its content and not on the

85   venue where it has been published, as well as a host of other measures and checks and balances that lie

86   beyond the scope of this paper, but some of which were discussed more extensively recently (Teixeira da

87   Silva and Shaughnessy, 2017). This paper assumes that such preventive measures were not taken, leading to

88   the publication of erroneous literature.

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90   **Current models to correct erroneous or fraudulent literature**

91   An ideal literature would be error-free. However, since this is not possible, and is also likely not realistic

92   because authors make errors, because the peer review system is limited to screening by a very limited set of

93   eyes – when it is in fact conducted at all – that are not financially compensated for their professional activity

94   (Teixeira da Silva and Katavić, 2016), and because productivity and growth are not always compatible with

95   high quality, it requires astute readers and proactive PPPR participants to step forward to present these errors.

96   Even when evidence is presented, however, there is tremendous resistance to correcting the literature, even

97   among member journals and publishers that claim to follow COPE (Committee on Publication Ethics)

98   editorial- and publishing-related ethical guidelines, which is reflective of an organization that has been

99   serving the interests of the for-profit publishing industry but has now been met with challenges it had not

100   anticipated, revealing COPE's limitations, weaknesses and lack of accountability (Teixeira da Silva, 2017c).

101   This imbalance between what requires correction and what has not been corrected, either because of a lack of

102   transparency, a lapse in editorial or publisher responsibility, legal impasses, and a wealth of other factors,

103   makes it clearly apparent that it is currently much easier to publish than to correct the literature (Teixeira da

104   Silva, 2017d).

105   It is not helpful that retracted papers continue to be cited, indicating that the downstream processes

106   within academic publishing that are meant to circumvent such situations, i.e., the citation of invalid literature,

107   are failing, or are not robust enough to detect, and prevent the citation of, retracted literature (Teixeira da

108   Silva and Bornemann-Cimenti, 2017; Teixeira da Silva and Dobránszki, 2017a, 2017b, 2017c). It is therefore

109   not surprising to note that: a) the wording used to define four main categories of literature correction policies,

110   namely retractions, expressions of concern (EoCs), errata and corrigenda in almost 90% of 15 leading

111   science, technology and medicine (STM) publishers differ from the definitions provided by COPE; b) as

112   much as 61% deviation in both the wording and meaning of policies between these STM publishers exists

113   (Teixeira da Silva and Dobránszki, 2017a). It can therefore be concluded that as it currently stands, the

114   correction of the literature is ineffective because: a) there is variation in the will, desire and effort to correct

115   erroneous literature by authors, editors, journals and publishers, even among STM publishers that are COPE

116   members; b) the policies and notices that had, to a large extent, been drafted by COPE and then applied by

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117   leading STM publishers, were incomplete and insufficiently robust to deal with many of the challenges

118   related to the age of whistle-blowing (PubPeer) and public shaming (Retraction Watch) that started in

119   2010-2012, then strengthened and became mainstream in 2015-2017. What became evident was that any

120   association with these sites, and with correcting the literature, was, to some extent, an automatic association

121   with bad science, fraud, or misconduct, even if in fact plain or innocent errors had been made.

122   Close examination of the parties behind this name-and-shame trend and campaign behind exposing

123   fraud, misconduct, errors and faults in the published literature will lead to a close link to the John Arnold

124   "war on bad science"[5]. Thus, willfully, or by association, there is a negative stigma associated with

125   correcting the literature. Proponents of the STM publishing industry, alarmed by this trend, and shaken by

126   the reputational damage it has been causing in just a few years to their publishing models, but unable to

127   effectively reign in fraud and misconduct, despite all of the new measures being put into place described in

128   the section above, have scrambled to find effective solutions to soften the tone related to correction of the

129   literature. Part of this realization has to do with controlling reputational damage, attempting to minimize the

130   publishing crisis[6], and making correction of the literature a politically correct – and thus marketing-friendly –

131   process, rather than an aggressive affront to all parties involved in the creation and publication of erroneous

132   literature. It is within this highly volatile environment that the new models discussed next, emerged.

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134   **Experimental publishing models, partial retractions and mega-corrections**

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[5] https://www.wired.com/2017/01/john-arnold-waging-war-on-bad-science/

[6] http://www.wiu.edu/libraries/news/2000s/2009/scholarlyPublishingInCrisis.php

135   One of the reasons for an associations with the Retraction Watch – PubPeer – LJAF alliance involves the

136   lack of reproducibility associated with flawed literature. Although solving the reproducibility crisis is beyond

137   the scope of this paper, it is worth noting that some measures in academic publishing evolved to try and deal

138   with issues related to reproducibility, improved accountability, and openness of the publishing process. The

139   first is PPPR publishing, in essence blogs, which would give free reign to any academic to launch their own

140   "journal" that is independently controlled, although excessive self-published journals or blogs could

141   potentially drive publishing into a chaotic state since there would be the lack of central regulatory bodies to

142   oversee quality. Currently, a fairly centralized anonymous PPPR platform exists, PubPeer, but it is

143   self-moderated, while a signed PPPR platform is available, PubMed Commons[7]. Publons[8] serves as a hybrid

144   PPPR platform, either with anonymous or signed comments on published literature. To deal with the issue of

145   reproducibility, and thus theoretically reduce the need to correct the literature, would also involve the need to

146   publish negative results (Teixeira da Silva, 2015b), which are currently not given importance by most

147   mainstream STM journals, either because they are not glitzy enough or due to journal page restrictions, even

148   though negative results form an important aspect of the bulk of most biomedical research studies.

149   In cases where multiple corrections are made to a manuscript, in some cases more than a dozen, but not

150   enough to merit a retraction because the main findings supposedly remain intact, the publisher may opt to

151   issue a mega-correction[9]. However, the subjective nature of editorial independence and differences between

152   individual characterization about what constitutes a large or a mega-correction, impedes the wide,

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[7] https://www.ncbi.nlm.nih.gov/pubmedcommons

[8] https://publons.com/home/

[9] http://retractionwatch.com/category/by-reason-for-retraction/mega-corrections/

153   standardized or effective use of this category of correction. This ambiguous form of correcting the literature

154   also opens up amphibious, flexible and odd rules, such as the "acceptable" level of plagiarism before it

155   should be considered for retraction[10]. This flexibility in the interpretation of rules to correct the literature

156   could lead to ambiguities as to the best course of action or how best to correct the literature when issuing a

157   partial retraction or a mega-correction. The issue of whether to retract an entire paper because one table or

158   one figure has been tampered with lies at the heart of the debate of whether partial retractions[11] have merit,

159   or not. Those in favor of partial retractions claim that it allows readers to ignore only specific faulty or

160   erroneous parts of a paper, while recognizing the remaining parts as valid or reliable. In contrast, those who

161   disagree with partial retractions will argue that if one part has been found to be fraudulent, or false, given the

162   interlinking nature of all parts of a paper, that the entire paper, as a whole, should be retracted because none

163   of it can be relied upon. At the end of September, 2016, after a 10-year experiment and 42 partial retractions,

164   the U.S. National Library of Medicine, which runs MEDLINE/PubMed, announced that it would no longer

165   identify this form of correction, treating them instead as an erratum[12]. It is likely impossible to reconcile both

166   parties (for and against partial retractions), leading some academics and STM industry-related parties to

167   rethink corrections of the literature and propose novel suggestions, as discussed next.

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169   **New and emergent models to correct the literature: outline and potential risks**

170   The new models for correcting the literature that will be discussed in this paper relate primarily to Heckers et

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[10] https://publicationethics.org/case/what-extent-plagiarism-demands-retraction-vs-correction

[11] http://retractionwatch.com/category/partial-retraction/

[12] https://www.nlm.nih.gov/pubs/techbull/so16/so16_partial_retractions_pol_change.html

171   al. (2015), one preprint (Barbour et al., 2017), Hosseini et al. (2017), and ideas put forward recently at the 5th

172   World Conference on Research Integrity by Fanelli et al[13]. Although, in general, preprints should not be cited

173   as they represent incompletely scrutinized documents, in this case, they serve the purpose of advancing the

174   discussion related to how the literature could be more effectively corrected. A brief note is made on preprints

175   as a prelude to the discussion of these new models to correct the literature, and two cases are discussed that

176   set the stage for reform. Preprints represent one tool that is now being aggressively marketed by ASAPbio[14]

177   (see criticisms of ASAPbio here[15]) as a solution to the replication crisis and to speed up the publication of

178   findings, within the wider context of open science, by presenting new or contradictory results, in a crude

179   state, open to public review, screening and criticism, before such work enters the mainstream peer review

180   path. However, as indicated in the next section, there are vested interests and inherent biases in and among

181   the pro-preprint proponents, causing a distortion of the need and importance of preprints, and a realistic

182   potential for their abuse (Teixeira da Silva, 2017e).

183   Two clear cases demonstrate the need for reform in the correction of the literature. The first case relates

184   to Brian Wansink at Cornell University (USA). As part of a wider examination of errors within the

185   psychology literature, which reportedly contains as much as 50% erroneous statistical errors (Nuijten et al.,

186   2016), van der Zee et al. (2017b) closely examined what they had perceived to be a large amount (150 in

187   total) of statistical errors and inconsistencies in four papers emerging from the Cornell Food and Brand Lab.

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http://wcri2017.org/images/documents/1.%20Monday%20May%2029,%202017/1.%20Aula/D.%20Fanelli%20-%20A%20system%20of%20self-retraction%20for%20honest%20error.pdf (the precise authorship is not defined)

14   http://asapbio.org/

15   https://medium.com/@OmnesRes/my-concerns-regarding-the-asapbio-central-service-and-center-for-open-science-5c2f0d2dfca

188   That case, which was quickly dubbed "Pizzagate" by Wansink critics, was initially published as a *PeerJ*

189   preprint (van der Zee et al., 2017a), and quickly spread to the analysis of a wide swathe of the Wansink

190   literature, revealing considerably more errors[16,17], some of which have begun to be corrected, including one

191   retraction[18]. However, one of the original authors of the team that originally analyzed Wansink's papers

192   discovered more errors in the correction of two papers that had issued errata[19], raising doubts about the

193   competence not only of the authors, but also of the journal's editors. This case fortifies the notion that

194   correcting the literature is essential, but that a more flexible system of correction is required, especially if

195   more errors are encountered in the original paper, or in the published erratum.

196   The second case involves the retraction of a retraction in a Wiley journal[20]. In this case, the paper

197   (Namazi and Kulish, 2016) was retracted after Nanyang Technological University (NTU) in Singapore

198   requested the journal to pull it, indicating that proper ethical approval had not been obtained from NTU. The

199   first author refuted this claim, indicating that ethical approval had been obtained from a non-NTU institute.

200   The publisher retracted the retraction notice, but the case has yet to be completed. The retraction notice is

201   pay-walled, which is against COPE policies for retractions (Wiley is a COPE member) (Teixeira da Silva,

202   2015c). These two cases highlight how correcting the literature under the current existent structure is clearly

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[16] https://medium.com/@OmnesRes/cornells-alternative-statistics-a8de10e57ff;

https://medium.com/@OmnesRes/cornells-alternative-statistics-part-deux-cdb370a70c74

[17] https://arstechnica.com/science/2017/04/the-peer-reviewed-saga-of-mindless-eating-mindless-research-is-bad-too/

[18] http://retractionwatch.com/2017/07/11/notices-appear-embattled-cornell-food-researcher/;
http://retractionwatch.com/2017/04/10/first-retraction-appears-embattled-food-researcher-brian-wansink/

[19] https://medium.com/@OmnesRes/worst-correction-ever-70c5e126d688;

https://medium.com/@OmnesRes/how-serious-is-this-correction-64920f7df32f

[20] http://retractionwatch.com/2017/06/07/retraction-gets-retracted-first-authors-contract-still-terminated/

203   inefficient and is unable to deal efficiently with complex cases.

204   Barbour et al. (2017) propose referring to all corrections and retractions as "amendments", thereby

205   removing the negative stigma associated with correcting or retracting faulty, erroneous or fraudulent

206   literature. *A priori*, it is important to note that several of those who are putting forward these new models

207   have massive invested interests, financially and otherwise. Barbour, who is the former COPE Chair

208   (2013-2017), and colleagues including Theo Bloom of the BMJ, Jennifer Lin of Crossref, and Elizabeth

209   Moylan of BioMed Central, all industry insiders claiming to represent COPE in this reprint, put forth a

210   system in which amendments that are made would be classified as "insubstantial, substantial, and complete".

211   Although the idea that a paper can be updated real time is not a novel idea – the concept already exists for

212   books and preprints – it is the reasoning behind this new proposal that is alarming and of concern:

213   "researchers continue to refine or extend the work, removing the emotive climate particularly associated with

214   retractions and corrections to published work." Barbour et al. recognize that the COPE Guidelines for

215   retractions, which have been used and implemented by thousands of COPE member journals and publishers,

216   are imperfect: "their consistent implementation has proved more difficult as publishing has evolved." In

217   other words, until July 2017 and possibly beyond, academics have been exposed to an imperfect system that

218   has been imposed by this ethics organization, despite COPE's knowledge of the flaws and imperfections of

219   this system. Errata and corrigenda have always been used to distinguish edits made or suggested by the

220   authors versus those suggested by the editor or publisher, an extremely important distinction because the

221   historical record of a published manuscript should indicate the entity responsible for fault or error. Despite

222   this important distinction, Barbour et al. refer to the difference between errata and corrigenda as "a now

223   meaningless and poorly understood distinction", i.e., COPE is partaking in ideological flip-flopping,

224   claiming the importance of such concepts for years, imposing it on global academia, and then suddenly

225   changing the tune regarding their importance. Such volatile positioning by highly powerful and influential

226   groups such as COPE damages the integrity of the publishing system that academics are expected to respect

227   and abide by. Although social media such as Twitter and blogs can certainly raise awareness and discussion

228   about a published paper (Yeo et al., 2016), in cases where valid criticisms merit corrections, but where

229   corrections are not made, or are not permitted by the journal because of editorial policy (e.g., letters to the

230   editor are not published), then indeed an amendment policy would be required.

231   As a result of vested interests by COPE to continue show-casing new guidelines, even if they contradict

232   older ones, is the biased promotion of new models. The Barbour et al. (2017) preprint was met almost

233   immediately with ridicule by a prominent science watchdog-*cum*-journalist, Leonid Schneider (Teixeira da

234   Silva, 2016d), who claimed that the abolishment of retractions by COPE would allow fraudulent academics

235   to hide their misconduct, or to subtly replace fraudulent data with valid data without the negative stigma

236   associated with a retraction[21], thus escaping the possibility of being punished, academically and/or criminally.

237   Incidentally, Klaas van Dijk, a Dutch ornithologist, identified dozens if not hundreds of errors, concerns or

238   possible problems with the Barbour et al. (2017) preprint, calling publicly for its retraction in the first quarter

239   of 2017, precisely when the Schneider blog was published. Although the Barbour et al. preprint is already in

240   version 4, the authors have apparently not yet addressed most of these concerns, i.e., while they are

241   advocating that academics make changes to their own manuscripts using their "amendment" policy, they

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[21] https://forbetterscience.com/2017/03/29/cope-the-publishers-trojan-horse-calls-to-abolish-retractions/

242   themselves have failed to correct their own paper. bioRxiv, which is aware of these issues, has also done

243   nothing to encourage the authors to address these errors and concerns, casting concerns about this preprint

244   server. In fact, several serious concerns about bioRxiv already exist[22].

245   In some cases, "pervasive" errors may change the final conclusions, and in such cases Heckers et al.

246   (2015) suggest retracting and replacing the paper with a new version only if the authors are able to address

247   those errors following reanalysis of their study. This model is a reasonable and realistic option for authors for

248   the following reasons and provided that the following cautionary measures are followed: a) it allows authors

249   to correct the literature, and set the record straight; b) it allows the journal and publisher to offer a new and

250   fair opportunity to correct the literature by allowing for a fresh peer review; c) it assigns responsibility for

251   error, both on the authors for creating the errors, as well as the journal and publisher for not detecting them

252   during peer review and editorial quality control; d) the model is only good if the flawed "old" version

253   remains, with a "retracted" stamped across it to indicate that it should not be used, and not simply replaced

254   because replacing would erase a historic version of record. Point d) is extremely important and any editor or

255   journal that attempts to use the "retract and replace" policy to hide misconduct by substituting the original

256   study's files (html, PDF, etc.) with the "latest, correct" version, would be in fact committing publishing

257   misconduct, and possibly fraud, by deliberately concealing the erroneous version of the paper and hiding its

258   true publishing history. Such an action would be as unethical as silent retractions, where publishers hide the

259   existence of a retracted paper, to save their own image, thereby depriving the public of knowledge of serious

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[22] https://medium.com/@OmnesRes/why-biorxiv-cant-be-the-central-service-24530d119c89

260   error, misconduct, and negligent editorial processing (Teixeira da Silva, 2016c). Using a specific case[23] to

261   illustrate their model, the Heckers et al. (2015) suggestion is an excellent model that could serve the

262   academic community well. It certainly would involve a considerable amount of additional work and

263   investment by authors, the journal and publisher, as distinct DOIs (digital object identifiers) and PubMed

264   entries are required, but ultimately with the correction of the literature in mind. Other papers have been

265   "retracted and replaced" in JAMA Network journals as this new model of correcting the literature begins to

266   take hold[24]. Two specifics not covered by Heckers et al. (2015) are: a) in such cases, where an article

267   processing charge (APC) is levied for the "original" paper in an open access model, is this APC refunded, or,

268   alternatively, is no new APC levied for the "retracted and replaced" paper? b) Will the authors and

269   journal/publisher responsibly inform the authors and editors of any papers that have cited the "retracted and

270   replaced" paper to correct their citations to reflect the new version (see link to discussion on downstream

271   literature below)?

272   A similar concept to "retract and replace" introduced by JAMA Network journals was also instituted in

273   2015 by *The Lancet* and *The Lancet Respiratory Medicine* as "retract and republication" (*The Lancet*, 2015;

274   Cagney et al., 2016).

275   There are some cases in which errors exist in a paper as a result of honest error, estimated to be about

276   20% of the retracted literature (Fang et al., 2012). In such cases, when errors are minor, a correction will

277   suffice, but in cases where key or core conclusions are altered, such papers still need to be retracted. It is then

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23   https://www.ncbi.nlm.nih.gov/pubmed/25054836

24   http://retractionwatch.com/2016/06/20/retract-and-replace-jama-may-expand-use-of-this-tool/

278   incumbent upon authors, if they are still actively researching, to reanalyze their data and resubmit and

279   republish their work. However, honest errors that are met with a retraction are still met with negative

280   stigmatization associated with the retraction, in most cases by other researchers who might not know the

281   background of the case, or who might not be sympathetic to the notion of "honest error". One classic case is

282   a paper by Mann et al. (2012), which was retracted from *PLOS Computational Biology*, and then republished,

283   after a fresh round of peer review, in the same journal in 2013 (Mann et al., 2013). One criticism of this case

284   is that the article processing fees had to be paid twice, a business model that is unsustainable because it taxes

285   and exploits the authors, or their institutes, both intellectually, and financially (Al-Khatib and Teixeira da

286   Silva, 2017b). A negative chain reaction to retractions may be annulled when authors retract of their own

287   accord (Lu et al., 2013). The concept of authors seeking to retract their own erroneous papers, especially

288   those whose conclusions may be irrevocably changed, prompted the science watchdog Retraction Watch to

289   term the action as "doing the right thing"[25], although Retraction Watch displays extreme subjectivity when

290   deciding which cases qualify for this category. To eliminate this bias, which can still be detrimental to those

291   who are shamed by Retraction Watch for not doing the right thing, "self-retractions" (Pulverer, 2015; Fanelli,

292   2016; Hosseini et al., 2017) could be considered a new category of retraction that has a positive connotation,

293   lauding the authors for seeking to correct the literature out of their own initiative. The problem here is who

294   exactly would be in an unbiased position to ascertain whether authors were "doing the right thing"? Making

295   an erroneous distinction between those that do the right thing from those that do not could amount to libel, or

296   slander, and thus finding a set of individuals who would be competent and unbiased enough to make such an

[25] http://retractionwatch.com/category/by-reason-for-retraction/doing-the-right-thing/

297   assessment would be complicated. The current five categories suggested by Fanelli et al. at the 5th WCRI –

298   these categories are likely to change as their paper is currently under review – to replace retractions where

299   misconduct has not been shown include: a) withdrawal ("this is a peer-reviewed paper in which the authors

300   retract one or more of their previous publications based on presenting detailed new evidence, data,

301   methodologies, results or theoretical arguments that invalidate previously published claims"); b) retired ("a

302   guideline or recommendation article is retired when its content is deemed outdated and its authors are unable

303   to update them"); c) cancelled ("this is a full retraction of a paper due to an editorial, production or

304   publishing mistake. It is, in essence, the retraction equivalent of an erratum"); d) self-retraction ("a short

305   retraction notice signed by all co- authors of the original paper and issued if and only if the co-authors make

306   a joint and unsolicited request of retraction to the journal"); e) removal ("under exceptional circumstances a

307   publication may be entirely removed from the public record if its content presents a serious and substantial

308   risk for society, individuals or the environmental"). As these suggestions currently stand, there are several

309   potential problems. Category a (withdrawal) sounds very much like the JAMA-suggested retract and replace

310   policy, so this new category would be redundant. Similarly redundant would be the "cancelled" category

311   because an erratum already fulfills this function perfectly well, so renaming it would add a layer of confusion

312   for academics. Finally, category e ("removal") is exceptionally vague, and could be ripe for abuse by interest

313   groups seeking to retract work by competing groups. These suggestions must thus be viewed with extreme

314   caution. More importantly, who will be implementing these new categories? The groups or publishers that

315   represent these new categories must be carefully analyzed to ensure that there are no hidden conflicts of

316   interest. It will be interesting to see how many COPE member journals and publishers will adopt these new

317   categories to replace the old COPE-enshrined errata, corrigenda, and retractions, and how they will

318   re-characterize older retractions issued before these new categories are implemented. Once again, academics

319   will be part of an experimental system, serving as guinea-pigs for lobbying and interest groups that are

320   starting to plague academic publishing and gradually restricting authors' rights (Al-Khatib and Teixeira da

321   Silva, 2017a).

322

323   **Other polemic issues and unresolved aspects related to the correction of the literature**

324   Several issues need to be debated urgently before this whole suite of new corrective measures starts to

325   become implemented. The first issue that needs to be thoroughly considered is how to correct the

326   downstream literature that cites literature that has been corrected and/or retracted (Teixeira da Silva, 2015d,

327   2015e). The corrective measures currently in place deal only with the top layer, but not the underlying layer

328   of literature. Whose responsibility is it to correct any literature that has cited corrected or retracted literature?

329   The responsibility should lie squarely on the shoulders of authors, editors and publishers to issue a notice to

330   readers of papers that have cited erroneous, corrected or retracted papers not to rely on, or cite, such "tainted"

331   literature. In the case that editors of old papers are deceased or cannot be contacted, or are unwilling to

332   participate in the corrective process, or in the case of deceased academics, publishers must be held

333   responsible for correcting the downstream literature, even if in literature published by other publishers

334   (Teixeira da Silva and Dobránszki, 2015b). Currently, this is not happening.

335   The second issue that is not being addressed is the safety of open data (Teixeira da Silva and Dobránszki,

336   2015c, 2015d). As the publishing industry sways towards an OA-only model, more and more papers that

337 form part of an open science model will require that background data be deposited in a public repository, or

338 made available to the public. In some cases, such data sets are massive, and in other cases, they might even

339 be represented as supplementary material on publishers' web-sites. Data-rich files such as Excel are ripe for

340 abuse and data hijacking, but this issue also does not appear to be addressed by the publishing status quo,

341 even though the risks are real. Although a fraudulent academic might not necessarily hijack data from open

342 data files for publication in a top notch indexed journal, they may easily use an open data file to manipulate

343 the data points and generate a paper for publication in a lower level journal that is not indexed, or that is

344 "predatory".

345　　　The third issue pertains to the regulation of the evolving preprint market. Currently, the issue of

346 correcting preprints, and preprint versioning, is limited only to mild edits and corrections. However, the issue

347 of fraud, data manipulation, radical edits caused by incorrect interpretations and other cases that can be

348 argued that merit the retraction of a preprint are all issues that are being skirted by key preprint proponents

349 such as ASAPbio and bioRxiv. Inconsistencies and one-sided decisions made recently by bioRxiv raise red

350 flags about the safety and reliability of preprints, and the measures being taken to shore trust in preprints

351 such as greater editorial scrutiny, or possibly standardized correction and retraction policies, dilutes the

352 concept of preprints because when such measures are taken, they begin to approach a format of a standard or

353 regular academic journal.

354

355 **Conclusions**

356 What was once thought to be a fixed and stable publishing model is now in a highly transformative phase.

357   Greater awareness caused by the existence of the internet, greater exposure to information within published

358   papers caused by the open access movement, and a more conscientious and perhaps rebellious generation of

359   academics that is willing to challenge the status quo among author, editor, journal and publisher ranks, as

360   well as a host of other factors and stresses being imposed on academic publishing (Teixeira da Silva and

361   Shaughnessy, 2017) is causing tectonic shifts in the way in which academics view a published paper. Until

362   just a few years back, errors or fraud were corrected by errata, corrigenda, and retractions. Intermediate

363   forms of alert crept in such as expressions of concern or partial retractions, and slowly the lexicon that was

364   once fixed for correcting the literature began to become more fragmented, specialized, and confusing. The

365   very same ethical entities such as COPE, and many of the leading STM publishers who are COPE members,

366   who were trusted by the academic community to provide a fail-safe and robust system of correcting the

367   literature, failed academia to some extent by not foreseeing the current explosion in whistle-blowing-induced

368   reports of errors and fraud, leading to the very same entities, and their allies, to make some vastly radically

369   different suggestions as to how to correct the literature, such as the abolishment of retractions. While some of

370   the new suggestions have good intentions, such as corrections rather than retractions for authors who "do the

371   right thing", such calls are highly subjective, and unless carefully regulated, will become problematic. The

372   concept of retractions should not be retracted. Rather, the application of retractions and other corrective

373   measures must be standardized more stringently. Similarly, while most of this conversation refers to

374   correcting erroneous or fraudulent literature that will appear henceforth, several aspects still appear to have

375   not been carefully considered by the academic community, or by the publishing status quo.

376

377   **Conflicts of interest**

378   The author has been critical of several of COPE's policies. The author has also openly challenged possible

379   flaws and short-comings of preprints to ASAPbio and bioRxiv. The author was banned in 2015 from all

380   Taylor & Francis / Informa, a COPE member, journals for being critical of many failed and imperfect

381   editorial policies and decisions. The author has been banned from commenting at Retraction Watch, PubPeer

382   and the Leonid Schneider blog for criticizing duplicity, opacity and lack of accountability by these

383   individuals and organizations. The author declares no other conflicts of interest.

384

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