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Review

'Tortured phrases' impact the integrity of the environmental literature

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Abstract

In environmental science, it is necessary to accurately describe processes, methods and phenomena using established technical terms and jargon. Any significant deviation from such terms might leave readers and peers confused, while confusion can lead to misinterpretations, opening up the possibility of errors. During peer review and prior to publication in a peer-reviewed environmental journal, it is thus incumbent upon editors and peer reviewers, and to a lesser extent copy editors, to verify that terminology in a scientific paper is accurate. In this brief communication, 61 papers with cases of 'tortured phrases', which are terms that have – for some reason – come to replace established jargon, are described in indexed environmental literature, frequently in indexed journals that are generally associated with reputable publishers. Of the 61 papers, 13 have been retracted, suggesting an erosion of the papers' integrity. Awareness of this phenomenon and these cases allows editors and peer reviewers of environmental journals to be more careful when screening and vetting submitted papers, but should also serve as a lesson for authors to be more careful when writing their papers, avoiding the temptation to automatically incorporate text that online text thesauruses may provide, or to use non-standard terms.

Key words: errors; established jargon; ethics; misconduct; retractions; scientific communication and error.
Abbreviations: AI, artificial intelligence; RWD, Retraction Watch Database.

Introduction

It is not easy to find dedicated texts that focus on the integrity of the environmental literature, and the topic as a dedicated science does not seem to have yet been developed. However, a solid body of literature exists for the public and political sciences, and to set the stage for this paper's findings, some core concepts are noted that can be applied when debating the integrity of the environmental literature, from a very specific prism. At the core of the concept of integrity lies trust, while core practices supported by proactive involvement allow integrity to be practiced in an ambience that fosters a culture of ethical behavior where accountability and consequences prevail (Huberts 2018; Robinson et al. 2018). These tenets can be transposed to academic publishing, where a series of moral and ethical values have been put into place in which authors are expected to abide while editors and publishers are expected to enforce such principles to ensure that a harmonious ecosystem of knowledge results.

When any element of this fragile chain is disrupted, either through error or purposefully, it can have a ripple effect on other literature, through the culture of citation (Teixeira da Silva 2024a). If one considers a retraction as a marker of the violation of integrity, either of individuals or the system, then retractions can also serve to provide commentary on the integrity of the literature. This tenet will be applied throughout this brief communication, as applies to the environmental literature. Although the total volume of literature in the environmental sciences is unclear, to date (15 September 2024), the Retraction Watch database (RWD; http://retractiondatabase.org/RetractionSearch.aspx?) reveals 2123 retracted papers in the environmental sciences. This paper takes a look at one aspect of the integrity of the environmental literature, 'tortured phrases', as an integrity primer.

'Tortured phrases': linguistic specificity is linked to scientific specificity

The selection of words and terms to describe scientific findings impacts not only the clarity of the message, but also its veracity (Kueffer, Larson 2014). Whereas metaphorical descriptions can enrich a text (Olson et al. 2019), the inaccurate description of technical terms or jargon can have quite the opposite effect, namely to induce confusion in the mind of readers. Consequently, authors who might cite such work could dilute the scientific impact of that information. 'Tortured phrases', a phenomenon that describes how technical terms or jargon can be misrepresented through the use of text, some of which might be synonymized (Cabanac et al. 2021), may arise from the use of artificial intelligence (AI)-driven paraphrasing tools (Roe, Perkins 2022) during translation or reverse translation, or the use

of online thesauruses, as a strategy to avoid plagiarism. Collectively, these underhanded and opaque strategies that introduce 'tortured phrases' may ultimately reduce the impact and specificity of peer-reviewed scientific literature (Teixeira da Silva 2022), as well as non-peer-reviewed texts, or even preprints (Teixeira da Silva 2023a). Discerning correct technical terms or jargon during the peer review process is precisely one of the tasks that is expected of peer reviewers and editors, and to a lesser extent – but no less importantly – copy editors, prior to publication. Consequently, if they are detected at the post-publication stage, ideally they should be corrected as they represent an error of scientific facts.

Cases of 'tortured phrases' in environmental literature

This brief communication introduces readers and environmental researchers to a small selection of 'tortured phrases' that appear in environmental literature, including terms that are not strictly related to environmental science, but that may appear in journals specific to this field of study (Table 1). A systematic methodology was not employed to detect the cases listed in Table 1. Rather, cases were informally captured from the PubPeer website over time, primarily in 2023 and 2024, by chronologically screening entries related to environmental sciences, based on the title alone, and confirmed with the Problematic Paper Screener, focusing mainly on cases related to CO_2 emission. For each case, aspects like DOI, journal title, publisher, country affiliations of authors, and select cases of 'tortured phrases' were noted. Only papers published in indexed journals were included, i.e., conference papers, theses, book chapters and other documents, even if they had a DOI, were excluded. Consequently, Table 1 is not a comprehensive list of 'tortured phrases' that exist in environmental literature, nor is it a comprehensive representation (review) of all literature that contains them.

Given that this is not a complete data set, it would be inappropriate to rely on quantitative findings. Nonetheless, as a mere curiosity, the following can be observed from the 61 case studies in Table 1. Just under half (26/61, or 43%) are open access papers, which get more scrutiny at PubPeer because they allow for open post-publication screening of papers, as well as public verification of any claims made at PubPeer (Maddi et al. 2024). Thirteen of the papers, or 21%, have been retracted to date.

Discussion and conclusion

Environmental researchers that publish are likely familiar with aspects of their own research, as well as the publication process, that may be prone to the induction or introduction of errors. This letter focuses exclusively on a linguistic-related phenomenon, 'tortured phrases', to highlight how researchers who, as one example of a reason for their existence, may be tempted to employ paraphrasing tools, leading to the inadvertent introduction of erroneous terms into their research papers, ultimately obscuring the scientific message. For example, 'tortured phrases' may result in inaccurate acronym definitions, e.g., for CRISPR (Teixeira da Silva 2024b), or, rather than stating "heavy metals" or "sulfuric acid", researchers might employ the 'tortured phrases' "substantial metals" or "sulfuric corrosive" (Teixeira da Silva 2024c).

If those papers are published in influential journals, and are widely cited, one derivative risk is that citing authors might assume 'tortured phrases' to be the accurate terms, even when they are not, and employ them. In other words, absent strict corrective measures, there is a risk of 'tortured phrases' present in environmental literature (Table 1) being propagated downstream into citing literature. Some cases may reflect the undeclared use of AI software or translation services, which should be acknowledged in the paper's acknowledgement section (Teixeira da Silva et al. 2024). In some cases, as evidenced in Table 1, the consequences of inadequate peer review and editorial oversight can damage a journal and publisher's reputation, for example, Springer Nature's *Environmental Science and Pollution Research* (Magazinov 2023; Orrall 2024). In nine of the 13 retracted papers (indicated by red asterisks, *), at least one author explicitly disagreed with the retraction. This high level of disagreement points to some potential procedural problem with the retraction process (Teixeira da Silva 2023b).

During the first years (2020 and 2021) of the COVID-19 pandemic, a sharp increase in the number of retractions related to the environmental sciences was observed between 2020 and 2021, according to the RWD, attributed to a mass retraction of papers from Springer Nature's Arabian Journal of Geosciences (Yeo-Teh, Tang 2022). An updated (15 September 2024) examination of retractions in the environmental sciences reveals that 60, 185, 104, 336, and 142 (projected at 170 to 180 for the whole year) retractions were recorded in 2020, 2021, 2022, 2023 and 2024, respectively. This suggests, using this metric alone, that a sharp increase in retractions in 2023 reveals a decrease in integrity in this body of literature. However, since the RWD does not differentiate 'tortured phrases' as a specific reason for retraction – most likely because retraction notices might not have employed this terminology – it is currently difficult to appreciate the level of influence of 'tortured phrases' on the integrity of the environmental literature, specifically from the prism of retractions. This paper draws the attention of readers to the phenomenon of 'tortured phrases' in the environmental literature, tying that phenomenon with the possible use of AI and online paraphrasing tools to reduce the detection of plagiarized text. The responsibility of detection, not only of AI-derived text but also of 'tortured phrases', now weighs heavier on the shoulders of journals' editors and publishers. The role of

Table 1. The presence of 'tortured phrases' in select environmental and ecological literature[1]. Abbreviation: OA, open access

Year	DOI OA and retracted status	*Source (journal)*	Publisher	'Tortured phrase(s)' (most likely or expected term or jargon)[2]	Affiliations (country/ countries)
2024	10.1016/j.jscs.2023.101774 OA	*Journal of Saudi Chemical Society*	Elsevier	circulatory framework (blood system); focal sensory system (central nervous system); malignant growth (cancer); sun powered cells (solar-powered cells); watery concentrate (aqueous extract)	India, Pakistan, Turkey
2023	10.1016/j.biortech.2023.128679	*Bioresource Technology*	Elsevier	biodegradable rubbish (biodegradable waste); food scrap (food waste); tree trimming (pruning); vegetable fibres (plant fiber)	Canada, China, India, South Korea, Zambia
2023	10.1007/s10661-022-10561-3	*Environmental Monitoring and Assessment*	Springer Nature	affectability and particularity (sensitivity and specificity); bogus negative (false negative); bogus up-sides (false positive); disarray grid / network (confusion matrix); enactment work (validation function); genuine negative (true negative); genuine up-sides (true positive); loads and predispositions (weights and biases); plant ailments (plant diseases); profound learning (deep learning); sigmoid capacity (sigmoid function); slope plunge (gradient descent)	India
2023	10.1007/s11356-022-24418-2 *	*Environmental Science and Pollution Research*	Springer Nature	high-thickness polyethylene (high density polyethylene); heat move (heat transfer); sun powered cells (solar-powered cells); warm radiation (heat radiation)	India
2023	10.1007/s11356-023-30552-2	*Environmental Science and Pollution Research*	Springer Nature	ecological debasement (environmental degradation); GHG discharge / emanation (GHG emission); monetary development (economic development); ozone depleting substance outflows (greenhouse gas emissions); ozone harming substance (ozone-depleting substance); recognizable proof (identification)	Bangladesh, Indonesia, Malaysia
2023	10.1007/s11356-023-29605-3	*Environmental Science and Pollution Research*	Springer Nature	carbon dioxide emanation / secretions (CO_2 emission); carbon secretion / emanation of carbon (CO_2 emission); energy ingesting (energy consumption); greenhouse gas emanation (greenhouse gas emission)	China, Uzbekistan
2023	10.1007/s11356-022-20024-4 *	*Environmental Science and Pollution Research*	Springer Nature	ascorbic corrosive (ascorbic acid); prescient capacity (predictive ability)	India
2023	10.1007/s11356-021-18351-z OA * [3]	*Environmental Science and Pollution Research*	Springer Nature	mechanical unrest (industrial revolution); observational examination (observational study; sunlight-based energy (solar energy)	China
2023	10.1007/s11356-023-28366-3 *	*Environmental Science and Pollution Research*	Springer Nature	CO_2 emanation / carbon secretion (CO_2 emission)	China, Ghana
2023	10.1016/j.heliyon.2023.e14635 OA	*Heliyon*	Elsevier	energy/electricity ingesting (energy/electricity consumption)	China, Pakistan, Saudi Arabia
2023	10.1016/j.heliyon.2023.e15450 OA **	*Heliyon*	Elsevier	heat movement (heat transfer); sulphuric corrosive (sulphuric acid); weighty metals (heavy metals)	Malaysia
2023	10.1016/j.heliyon.2023.e13825 OA	*Heliyon*	Elsevier	substantial metal venomousness (heavy metal toxicity)	Iran, India, Russia, South Africa, USA
2023	10.1016/j.heliyon.2023.e17912 OA	*Heliyon*	Elsevier	breeze energy (wind energy); carbon discharge / secretion (carbon emission)	Nigeria

Continued

Table 1. *Continued*

Year	DOI OA and retracted status	*Source (journal)*	Publisher	'Tortured phrase(s)' (most likely or expected term or jargon)[2]	Affiliations (country/ countries)
2023	10.1016/j.jclepro.2022.135522	*Journal of Cleaner Production*	Elsevier	back-engendering calculation (back-propagation algorithm); choice tree (decision tree); concealed / secret neuron (hidden neuron); direct exchange work (linear transfer function); information mining (data mining); profound learning (deep learning); result / yield layer (output layer); secret / stowed away layer (hidden layer)	Greece, Iraq, Malaysia, Morocco, Nigeria, Philippines, Saudi Arabia, South Korea, Vietnam
2022	10.1007/s13201-021-01562-7 OA	*Applied Water Science*	Springer Nature	Joined together states (United Sates); monetary development (economic development); moo temperature (low temperature)	Iran, UK, United Arab Emirates
2022	10.1016/j.biombioe.2022.106422 [4]	*Biomass and Bioenergy*	Elsevier	half-breed approach (hybrid approach); inactive warmth (latent heat); particle trade (ion exchange); surface region (surface area); tall immaculateness (high purity); vitality thickness (energy density); vitality utilization (energy use)	France, Iran, Thailand
2022	10.1002/bse.3013 OA	*Business Strategy and the Environment*	Wiley	carbon / CO_2 effusion (CO_2 emission) [5]	Finland, Russia, Turkey
2022	10.1016/j.chemosphere.2021.131824	*Chemosphere*	Elsevier	carbon dioxide emanation (CO_2 emission); creation expenses (production costs)	India, South Korea
2022	10.1016/j.chemosphere.2021.133252	*Chemosphere*	Elsevier	acrylic corrosive (acrylic acid); defiled watery arrangement (polluted aqueous solutions / water bodies); surface region (surface area)	China, Mexico, Pakistan
2022	10.1007/s11356-022-19456-9 OA *	*Environmental Science and Pollution Research*	Springer Nature	CO_2 effluent / effusion / emanation / exudate / secretion (CO_2 emission)	Bangladesh, China, Ghana
2022	10.1007/s11356-022-20094-4 OA *	*Environmental Science and Pollution Research*	Springer Nature	CO_2 effluent / effusion / emanation / exudate / secretion / emission of carbon (CO_2 emission)	Bangladesh, China, Ghana
2022	10.1007/s11356-022-19994-2 *	*Environmental Science and Pollution Research*	Springer Nature	CO_2 effluent / effusion / emanation / exudate (CO_2 emission)	Ghana
2022	10.1007/s11356-022-21072-6	*Environmental Science and Pollution Research*	Springer Nature	concealed layer (hidden layer); preparation dataset (training dataset); enormous information (big data)	India
2022	10.1080/1331677x.2021.2015613 OA	*Economic Research*	Taylor & Francis	carbon / CO_2 / G.H.G. emanation (CO_2 / GHG emission)	China, Iraq, Pakistan
2022	10.1080/1331677x.2021.2019598 OA	*Economic Research*	Taylor & Francis	energy ingestion (energy consumption)	China, India, Pakistan
2022	10.1080/1331677x.2021.2002708 OA	*Economic Research*	Taylor & Francis	energy ingesting (energy consumption); carbon / CO_2 / GHG emanations (CO_2 / GHG emissions)	China, Pakistan, Turkey
2022	10.3390/en15124490 OA	*Energies*	MDPI	bite the dust / kick the bucket (die); building creation firms (construction firms); dispersion system (supply chain); fluffy AHP (fuzzy AHP); fuzzy rationale (fuzzy logic); gathering of occupiers (group of residents); hereditary (genetic algorithm); vital success factor (critical success factor)	Egypt, Slovakia
2022	10.1007/s10668-021-01716-2 [6]	*Environment, Development and Sustainability*	Springer Nature	carbon emanation (CO_2 emission); course of scale of causal connotations (direction and size of causal relationships); hostile influence (negative effect); land organization (land management)	India, Malaysia, Pakistan
2022	10.1016/j.heliyon.2022.e10357 OA *	*Heliyon*	Elsevier	carbon / CO_2 discharge / secretion / emanation (CO_2 emission); environmental deprivation (environmental degradation); environmental eminence (environmental quality); monetary development (economic development)	Bangladesh

Continued

Table 1. *Continued*

Year	DOI OA and retracted status	*Source (journal)*	Publisher	'Tortured phrase(s)' (most likely or expected term or jargon)[2]	Affiliations (country/ countries)
2022	10.1108/ijes-12-2021-0084	*International Journal of Emergency Services*	Emerald Publishing Ltd.	carbon / CO_2 / GHG emanations / releases / discharges (CO_2 / GHG emissions)	Bahrain
2022	10.3390/ microorganisms10010051 OA	*Microorganisms*	MDPI	distinguishing / recognizable proof (identification); hereditarily adjusted / changed (genetically modified); most extreme probability (maximum likelihood); resistant framework (immune system); substantial metals (heavy metals)	Bangladesh, Czechia, India, Slovakia
2022	10.1111/opec.12228	*OPEC Energy Review*	Wiley	carbon / CO_2 emanation / discharge / releases (CO_2 emission)	India
2022	10.1016/j.renene.2022.03.142 OA	*Renewable Energy*	Elsevier	carbon / carbon dioxide emanation / emission (CO_2 emission)	Finland, Germany, Turkey
2022	10.3390/w14192945 OA	*Water*	MDPI	distant / far off detecting (remote sensing); distinguishing proof (identification); fluffy logical (fuzzy logic); geographic data framework (geographic information system)	Egypt, Slovakia
2021	10.3390/buildings11110507 OA	*Buildings*	MDPI	AI calculation (machine learning algorithm);carbon emanation (CO_2 emission); cooling framework (cooling system)counterfeit neural system (artificial neural network); hereditary calculation (genetic algorithm); human-made brainpower (artificial intelligence); recognizable proof (identification)	Egypt, Slovakia
2021	10.1177/0144598720980198 OA *	*Energy Exploration & Exploitation*	Sage Publications Ltd.	CO_2 effusion / emanation (CO_2 emission); effusions / emanation of carbon / CO_2 / greenhouse gas (CO_2 / greenhouse gas emission)	China
2021	10.1007/s11356-021-13380-0 *	*Environmental Science and Pollution Research*	Springer Nature	carbon discharge (CO_2 emission); inexhaustible power (renewable energy)	Turkey, UK
2021	10.1007/s11356-021-14425-0 *	*Environmental Science and Pollution Research*	Springer Nature	carbon / carbon dioxide emanation (CO_2 emission); monetary development (economic development)	Turkey, UK
2021	10.1016/j.jclepro.2020.125282	*Journal of Cleaner Production*	Elsevier	carbon / CO_2 emanation / discharge (CO_2 emission)	China, India, Iraq, Malaysia, Pakistan, Vietnam
2021	10.1016/j.renene.2021.05.101	*Renewable Energy*	Elsevier	carbon dioxide emanation (CO_2 emission)	China, Iraq, Malaysia, Pakistan
2021	10.1016/j.rser.2021.111092	*Renewable and Sustainable Energy Reviews*	Elsevier	carbon / CO_2 emanation (CO_2 emission); exchange receptiveness (openness to trade); monetary development (economic development); universal exchange (global trade); vitality utilization (energy use)	Russia, Turkey, UK
2021	10.1016/j.rser.2021.110986	*Renewable and Sustainable Energy Reviews*	Elsevier	ancient rarities (artifacts); attractive reverberation (magnetic resonance); concoction response (chemical reaction); flexibly chain (supply chain) informational collection (dataset); overlap increment (fold change); ozone harming substance (ozone-depleting substance); rhapsody simulation (ensemble simulation); surface region AND surface area (surface area); worldwide temperature alteration (global warming / climate change); X-beam (X-ray)	India
2021	10.1016/j.rser.2021.111420	*Renewable and Sustainable Energy Reviews*	Elsevier	Molly ration (molar ratio);Standard Molly Gourmet (standard molar Gibbs energy)	Iran

Continued

Table 1. *Continued*

Year	DOI OA and retracted status	*Source (journal)*	Publisher	'Tortured phrase(s)' (most likely or expected term or jargon)[2]	Affiliations (country/ countries)
2021	10.1016/j.rser.2021.110837 [7]	*Renewable and Sustainable Energy Reviews*	Elsevier	aromatic steadiness (aromaticity); corruption of polymers (polymer decomposition); enactment energy (activation energy); exterior zone (specific surface area); redeemable potassium (extractible potassium); thermogravimetric examination (thermogravimetric analysis); whole C (total organic carbon)	China, India, Sweden
2021	10.3390/su132111930 OA	*Sustainability*	MDPI	carbon emanations / releases / discharges (CO_2 emission); wind propellers (wind turbines)	Pakistan, UK
2020	10.1007/s11869-020-00869-9	*Air Quality Atmosphere & Health*	Springer Nature	renewable vitality utilization (renewable energy use); universal exchange (global trade); carbon discharge / emanation (CO_2 emission); ecological debasement (environmental degradation)	China, Pakistan
2020	10.1016/j.btre.2020.e00570 OA	*Biotechnology Reports*	Elsevier	CO_2 emanation (CO_2 emission); reverberation frequency (resonance frequency); surface region (surface area); thermogravimetric examination (thermogravimetric analysis)	India
2020	10.1080/23311916.2020.1813237 OA	*Cogent Engineering*	Taylor & Francis	contrarily charged (oppositely charged); electrostatic fascination (electrostatic attraction); substantial metals (heavy metals); utilitarian gatherings (functional groups)	Ethiopia
2020	10.3390/en13092273 OA **	*Energies*	MDPI	atmospheric downfall (atmospheric degradation); carbon discharge / emanations (CO_2 emissions); prospering countries (developing nations); trade barricades (trade barriers)	Indonesia, Lithuania, Malaysia, Poland, Thailand, Vietnam
2020	10.1007/s11356-019-07572-y	*Environmental Science and Pollution Research*	Springer Nature	insusceptible framework (immune system); receptive oxygen species (reactive oxygen species)	Egypt
2020	10.1007/s11356-020-09873-z	*Environmental Science and Pollution Research*	Springer Nature	ozone harming substances (ozone-depleting substances); vitality (energy)	Bangladesh, China
2020	10.1007/s11356-020-07821-5	*Environmental Science and Pollution Research*	Springer Nature	carbon / CO_2 effusion (carbon / CO_2 emission)	Turkey
2019	10.3390/en12193598 OA **	*Energies*	MDPI	carbon / CO_2 / greenhouse emanation (carbon / CO_2 / greenhouse gas emission)	Malaysia, Poland, South Africa, Thailand
2019	10.1002/est2.49	*Energy Storage*	Wiley	vitality source (energy source)	Pakistan
2019	10.1007/s11356-019-04547-x *	*Environmental Science and Pollution Research*	Springer Nature	formic corrosive (formic acid); particle trade (ion exchange); poisonous impacts (toxic effects); progress metal (transition metal); substantial metals (heavy metals); watery arrangement (aqueous solution)	Pakistan
2019	10.1007/s11356-019-04998-2 *	*Environmental Science and Pollution Research* [8]	Springer Nature	substantial metals (heavy metals); electrical gadgets (electronic devices)	Pakistan
2019	10.1007/s10950-019-09827-0	*Journal of Seismology*	Springer Nature	foundation commotion (background noise); pinnacle vitality (peak energy); recognizable proof (identification); recurrence area / range / space (frequency domain); wavelet change (wavelet transformation)	China
2018	10.1016/j.ecoleng.2018.08.004	*Ecological Engineering*	Elsevier	cost operative (cost-effective); hairlike activity (capillary action); oil expulsion / evacuation (oil removal); unpleasant structures (repellent structures)	Egypt

Continued

Table 1. *Continued*

Year	DOI OA and retracted status	*Source (journal)*	Publisher	'Tortured phrase(s)' (most likely or expected term or jargon)[2]	Affiliations (country/ countries)
2018	10.1080/02522667.2017.1374737	*Journal of Information and Optimization Sciences*	Taylor & Francis	carbon emanation (CO_2 emission); energy attentive (energy efficient); vitality utilization (energy use)	India
2017	10.2175/106143017x15023776270557 OA	*Water Environment Research*	Wiley	arrive utilize (land use); Euclidean separation (Euclidean distance); fluffy deduction / induction (fuzzy deduction / induction); forecast blunder (prediction error); measurably critical (statistically significant); overwhelming metals (heavy metals); prescient model (predictive model); water profundity (water depth)	China, USA
2010	10.3390/su13041844 OA	*Genes*	MDPI	CO_2 emanation (CO_2 emission); ecological corruption (environmental degradation); environmental defilement (environmental degradation); monetary development (economic development)	Germany

[1] Sourced / discovered at PubPeer (via papers' DOIs) and/or confirmed with the Problematic Paper Screener (https://dbrech.irit.fr/pls/apex/f?p=9999:24:::NO:::) in cases where the full text of the papers were not available/accessible.

[2] This is not an exhaustive list of 'tortured phrases' that might exist in these papers; in addition, other errors, concerns or ethical infractions in these papers are not indicated.

[3] In this case, the corresponding author, perhaps quite naively, admitted on PubPeer to have translated the entire manuscript using Baidu, a technical fact that had not been indicated in the original publication. In the corresponding author's opinion, Baidu was responsible for having introduced at least two of the 'tortured phrases'. Source: https://www.pubpeer.com/publications/239708A49290A2413E0D272D782108#7

[4] One of the authors admits to using professional English editing services, which are not acknowledged, which is an ethical impasse in itself (Teixeira da Silva et al. 2024). Source: https://www.pubpeer.com/publications/92B05FD40CCFEED6343C2723D1BB8C#3

[5] In some cases, such as this paper, not all permutations are represented. For example, even though the 'tortured phrases' "carbon / CO_2 effusion" was indicated, other permutations exist, like "effusion(s) of carbon / CO_2".

[6] At PubPeer (https://www.pubpeer.com/publications/3B5657255F48E3DB6E343269B5A880#2), the paper's second author claims that the paper had been professionally proof-read by "EFL editors" and an "editing service provider", but no such service is acknowledged in the paper (see: Teixeira da Silva et al. 2024).

[7] One of the authors admits to using professional English editing services, which are not acknowledged, which is an ethical impasse in itself (Teixeira da Silva et al. 2024). Source: https://www.pubpeer.com/publications/5CBE8C85B3D90305AE52AEDD641220#2.

[8] Submission to this journal was met with the following reason for rejection by the editor-in-chief (Philippe Garrigues): "The journal *ESPR* does not have such article type in place and there are no intentions to create such a column." No feedback on the scientific premise of the letter was provided.

* Retracted; in *Environmental Science and Pollution Research* retraction notices, except for the statement regarding the authors' responses, the first part of all retraction notices published in March 2024 reads the same (boiler-plate reason): "The Publisher has retracted this article in agreement with the Editor-in-Chief. An investigation by the publisher found a number of articles, including this one, with a number of concerns, including but not limited to compromised peer review process, inappropriate or irrelevant references, containing nonstandard phrases or not being in scope of the journal. Based on the investigation's findings the publisher, in consultation with the Editor-in-Chief therefore no longer has confidence in the results and conclusions of this article." The retracted status of all entries was last verified on 16 September 2024.

** Corrigendum that specifically corrects the 'tortured phrases'. The corrected status of all entries was last verified on 16 September 2024.

copy editors in detecting and eliminating 'tortured phrases' might thus be an aspect that journals need to consider (Teixeira da Silva 2024d).

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