

How to prevent academic misconduct in scientific journals?

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ABSTRACT

Scientific and technological journals are essential for disseminating academic research and play a crucial role in upholding research integrity and combating misconduct. Recent progress in China's research integrity framework and governance systems has heightened the focus on the responsibilities of these journals within that system. This paper examines strategies for journals to prevent academic misconduct in the current environment. It proposes practical measures to help editors identify, prevent, and address integrity violations. These recommendations offer fresh perspectives and actionable approaches for strengthening research integrity within scientific publishing.

Keywords: scientific and technological journals; academic misconduct; research integrity construction

The rapid advancement of China's research capabilities has led to a significant increase in published papers, yet academic misconduct remains a severe problem, with persistently high retraction rates that damage the academic atmosphere and hinder scientific innovation ^[1]. Scientific journals are essential platforms for disseminating research and supporting innovation ^[2], and they also function as critical checkpoints for safeguarding research integrity. Establishing a comprehensive integrity system within these journals and strengthening gatekeeping throughout the publishing process are therefore vital measures for integrity construction ^[3]. In response, national departments have issued multiple guiding documents to accelerate integrity building in scientific publishing, assigning journals greater responsibility within top-level policy design. Journals have subsequently undertaken extensive research and practice on their publishing fronts, achieving positive results in misconduct prevention that demonstrate their unique advantages. Nevertheless, the development of a research integrity system in China's scientific journals is still exploratory, with awareness and progress varying considerably across the field. This paper reviews the paths and preventive measures for addressing academic misconduct in journals under this new situation, providing perspectives for advancing the construction of their integrity systems.

1 Definition and Types of Academic Misconduct

Academic misconduct encompasses actions that contravene the established norms of the scientific community within research and scholarly activities ^[4]. This phenomenon spans numerous fields, including medicine, biology, management, computer science, economics, mathematics, and chemistry. Its primary manifestations are fabrication, plagiarism, falsification, duplicate submission or publication, improper authorship, and violations of research ethics. These behaviors are explicitly classified and defined in the industry standard CY/T 174–2019, "Academic Publishing Standards: Definition of Journal Academic Misconduct," issued by the National Press and Publication Administration.

2 Evolutionary Trends of Academic Misconduct Types

While traditional academic misconduct has long involved textual plagiarism, piracy, and falsification, recent years have seen the emergence of more technically sophisticated and covert forms. These new manifestations include "text laundering," image fabrication or manipulation, data falsification, and artificial intelligence (AI)-generated papers. This evolution has given rise to the phenomenon of implicit academic misconduct, characterized by high technicality and concealment. Han Lei et al ^[5] define implicit academic misconduct as violations undetectable by plagiarism software, encompassing deeper fabrication and falsification in text, data, and figures, along with improper authorship, image fraud, duplicate submission, and ethical breaches.

Research indicates that within Chinese biomedical papers, the most prevalent form of misconduct shifted from plagiarism during 2010–2014 to data fabrication in 2015–2019, marking a transition from overt textual copying to deeply concealed fraud ^[6]. Some studies ^[7,8] have shown that further confirm that difficult-to-identify misconduct, such as data and image fabrication, has become increasingly frequent and covert.

Detecting covert academic misconduct presents a significant challenge, as reliance on standard detection software alone is often insufficient. This limitation substantially increases the difficulty of prevention for scientific journals. To address this emerging challenge, journals must heighten their vigilance and prioritize research integrity. They should promptly establish robust integrity frameworks and strengthen multi-channel collaborative prevention mechanisms.

3 Paths for Preventing Academic Misconduct in Scientific and Technological Journal Editorial Departments

3.1 Establishing and Improving the Research Integrity System for Scientific and Technological Journals

First, scientific and technical journals should establish robust research integrity management systems that standardize the review process and procedures for handling papers involving misconduct. These systems must define criteria for identifying misconduct, along with formal investigation protocols and appropriate disciplinary measures ^[9]. Furthermore, editorial offices should explicitly delineate responsibilities for each role and stage of the publishing workflow. This approach enhances the standardization, professionalism, and fairness of integrity oversight throughout all stages of publication.

Second, standards for handling different forms of academic misconduct during the publishing process must be strengthened. By drawing on established domestic and international research integrity policies, clear specifications should be developed for text similarity, data integrity, image manipulation, reference citations, funding acknowledgments, authorship, conflicts of interest, and copyright transfer, alongside disciplinary measures including author blacklisting. Particular attention should be paid to formulating comprehensive review procedures for the novel and covert forms of misconduct that have recently emerged. These measures will establish a foundation for effectively addressing papers that involve academic misconduct.

Third, the procedures for investigating and handling pre-publication academic misconduct require refinement, particularly by strengthening the research integrity controls within the "three-tier review" process. Beyond the strict implementation of the "three-tier review and three-round

proofreading" and peer review systems, it is essential to clarify the review responsibilities for potential misconduct at each stage. The capacity of editors and reviewers across all three tiers to identify academic misconduct must be enhanced through improved verification skills. This dual focus on awareness and technical proficiency will bolster the gatekeeping function of the review process. Consequently, these measures will increase the detection of problematic manuscripts prior to publication.

Fourth, a robust system for retracting flawed papers post-publication must be implemented. When published articles are found to involve academic misconduct, they should be retracted promptly. Retraction notices must appear in the relevant print journals, and indexing databases should be contacted to label these papers as "retracted." The reasons for each retraction should also be made publicly available ^[3].

3.2 Strengthening Disciplinary Measures Against Pre- and Post-Publication Academic Misconduct Authors

When scientific and technological journals identify papers containing academic misconduct, they frequently respond by merely rejecting or retracting the manuscripts. This approach typically fails to impose sufficiently severe disciplinary measures on the responsible authors. Consequently, it provides an inadequate deterrent and makes the recurrence of similar misconduct highly likely.

For manuscripts identified as containing academic misconduct prior to publication, disciplinary actions against the authors should be applied promptly and with increased severity, thereby shifting the deterrent function to the pre-publication stage and avoiding the costs associated with post-publication retraction. Beyond outright rejection, measures such as placing

problematic manuscripts and their authors on blacklists should be considered to prevent rejected papers from being submitted and published elsewhere^[10]. Han Lei et al^[5] implemented a comprehensive approach for authors found to have committed misconduct during peer review, employing inquiry, warning, disciplinary, and expression of concern strategies; this strengthened the disciplinary impact on authors through measures including education, formal warnings, and inclusion on research integrity blacklists. Furthermore, scientific journals can publicize instances of misconduct via their widely accessed official websites, WeChat public accounts, or other media platforms, publishing detailed accounts of the incidents and the corresponding corrective actions. By also imposing submission restrictions on the involved research teams for a defined period, these measures can serve as an effective warning to potential offenders.

Scientific and technological journals must also adhere to the responsibilities outlined in national research integrity policies, effectively execute their obligations to report and investigate misconduct, actively cooperate in joint investigations with relevant bodies, and provide technical support and reliable evidence for funding agencies and author institutions to determine academic misconduct^[3].

Furthermore, scientific and technical journals should actively explore the creation of a research integrity consortium. Such an initiative would involve forming multi-tiered alliances with other scholarly societies and peer publications in the field. A shared database of researchers found to have committed academic dishonesty could be established. This would promote the exchange of information on misconduct cases among editorial offices across the discipline. Consequently, it would aid in the identification and prevention of author misconduct

3.3 Strengthening Research Integrity Education for Editorial Teams

To enhance the capacity of journal editors to promptly address incidents of academic misconduct, scientific and technological journals must first cultivate a stronger awareness of misconduct prevention among their editorial staff, integrating the gatekeeping role into the core of editorial and publishing workflows with greater priority in time and resource allocation ^[11]. Second, journals should reinforce research integrity training for editors, encouraging their active participation in scholarly publishing exchanges to stay abreast of evolving integrity standards and emerging detection technologies. Furthermore, well-resourced journals may consider recruiting and training specialized personnel for image analysis, creating dedicated roles for verifying data integrity to effectively identify deeply concealed misconduct such as image manipulation ^[12].

3.4 Proactively Conducting Research Integrity Education for Researchers

Current research integrity education in China suffers from limited content and formats, contributing to the prevalence of academic misconduct. Scientific journals, with their theoretical expertise, practical experience, and platforms like websites and WeChat public accounts, possess inherent advantages for such education, including access to real-world cases. These journals should proactively develop multi-platform, diverse educational models for the academic community, including on-site and online lectures, salon discussions, print media campaigns, and dedicated research integrity hotlines ^[13]. They can utilize their official websites and WeChat accounts to regularly update submission guidelines, copyright agreements, and author instructions, while also publishing relevant research integrity laws and regulations to help authors understand journal standards and consciously regulate their submission practices ^[11]. Furthermore, journals should organize research integrity lectures at universities and research

institutes, with a particular focus on early- and mid-career researchers. By leveraging platforms like WeChat public accounts and Douyin (TikTok) and employing rich case studies, they can use short videos to effectively disseminate the concepts, policies, and requirements of research integrity.

3.5 Building an Industry-Wide Defense Line Against Academic Misconduct in Scientific and Technological Journals

The scientific and technological journal industry can foster stronger organizational networks to increase the proactive engagement of journals in upholding research integrity, thereby establishing a collective defense against misconduct. Training sessions and seminars should be convened to educate editors on national integrity policies, the evolution and forms of academic misconduct, techniques for verifying violations and managing retractions, and the use of technical tools to identify AI-generated manuscripts and other emerging threats. Journals should be encouraged to engage in domestic and international exchanges on research integrity to learn from established practices and to develop novel strategies for confronting new forms of misconduct. An evaluation system for research integrity in scientific and technological journals must also be implemented, with formal warnings issued to journals and editors where serious risks of academic misconduct are identified.

4 Effective Measures for Scientific and Technological Journal Editors to Prevent Academic Misconduct

Journal editors are crucial to the publication of scientific research and must uphold their professional commitment as the "gatekeepers of science" ^[11]. In their daily editorial and review work, they should adopt a scientifically responsible approach. This involves employing multiple strategies at each stage of the editorial process to effectively identify manuscripts that may contain academic misconduct.

4.1 Identification of Paper Plagiarism

Current technology for preventing textual academic misconduct is relatively mature, and domestic similarity detection systems can help journal editors identify such issues in manuscripts ^[14]. Because these systems vary in their algorithms for identifying overlapping content and in the databases they employ, it is advisable to use multiple systems in combination and to perform similarity checks twice: first on the original submission and again on the revised manuscript prior to publication ^[15]. Nevertheless, similarity detection systems have inherent limitations; authors may, for instance, lower the reported similarity rate by reordering text, substituting synonyms, converting text to tables or figures, or using cross-language translation, thereby creating false negatives ^[16]. Consequently, identifying plagiarism should not depend solely on a numerical similarity score; instead, detection reports should inform an editor's judgment, which must be combined with domain expertise to reach a final determination ^[15].

4.2 Identification of Image Fabrication

Compared with textual misconduct, academic misconduct involving images is both

increasing in prevalence and more challenging to identify. Such images are primarily generated in two ways: authors may create them using graphing software based on research data, or they may be produced by photographing output from detection equipment ^[8]. For software-generated images, establishing data submission standards that require authors to provide original research data can help verify authenticity. In contrast, misconduct involving captured images, which chiefly manifests as manipulation or plagiarism through cropping, repositioning, copying, pasting, or flipping, is more complex and difficult to prevent ^[10]. Most scientific journals in China currently depend on reviewers or reader reports to uncover such image-related misconduct, an approach that remains insufficient for addressing all potential issues. Employing common image detection software as an auxiliary tool is therefore recommended; examples include the Photoshop plugin Droplets from ORI, iPlagiarism's Owl Image Detection, Wiley's Image Checks, and the online forensics platform Forensically. These tools extract specific image features through proprietary algorithms and typically highlight regions of suspicion visually once analysis is complete ^[12].

4.3 Review of Data Issues

Data fabrication, falsification, and plagiarism constitute the primary forms of data-related misconduct; these acts are often highly covert and typically evade automated detection systems ^[17]. To help verify data authenticity, journals can mandate in their submission declarations that authors provide original research data for editorial and peer review ^[18]. Editors must perform thorough examinations of statistical analyses and results, remaining alert to specific red flags: inconsistencies within the reported data, discrepancies between data and images, questionable sample sizes or selection timeframes, and statistics that violate established principles.

Furthermore, editors should compare successive manuscript revisions and, upon finding unexplained data alterations between versions, require authors to furnish a detailed justification for all changes ^[10].

4.4 Review of Citation Issues

Journal editors can identify potential academic misconduct in manuscripts by verifying the source literature and assessing the relevance of citations to the paper's content. Three specific citation issues require scrutiny: irrelevant citations, where authors cite prominent but unrelated work to appear well-read or to increase the likelihood of publication in a target journal ^[19]; secondary citations, which involve referencing another author's interpretation without consulting the original source; and the avoidance of citation, where a paper uses others' ideas or findings but deliberately omits them from the references to claim undue originality.

4.5 Review of Authorship Issues

Improper authorship in academic papers presents a significant challenge to research integrity due to its ease of execution and difficulty of detection ^[20]. Cong Min et al ^[21] examined specific forms of misconduct, such as author identity manipulation and the abuse of equal contribution statements, and argued that journal editors must strengthen verification of author identities and contributions. To prevent such misconduct, journals should establish and enforce clear authorship criteria, requiring all listed authors to assume public responsibility for the manuscript and publishing explicit prohibitions against guest, ghost, and gift authorship. Editors can verify author identities by using search engines to confirm academic backgrounds, checking publication databases for consistency in research focus, and comparing authors' established

expertise with the paper's subject matter. Contacting the most senior author directly to confirm their awareness of and agreement to the submission can effectively prevent the unauthorized use of a name. Furthermore, requiring detailed contribution statements from all authors allows editors to distinguish between those warranting authorship and those who should merely be acknowledged, thereby assessing the legitimacy of the author list.

4.6 Identification of Submissions from "Paper Mills"

Papers from "paper mills" exhibit identifiable characteristics that should be flagged during manuscript receipt, review, and revision. These identification methods encompass several key aspects: (1) Multiple submissions within the system share identical login credentials and contact phone numbers ^[22]. (2) The IP address used for submission is inconsistent with the geographical location of the author's institution. (3) The same author submits an unusually high volume of papers within a brief timeframe. (4) Research ostensibly requiring extensive collaboration is attributed to only one or a very few authors ^[14]. (5) The author's institution lacks the advanced equipment and funding typically necessary for the reported work, yet the manuscript presents a rich array of sophisticated experiments and demonstrates considerable technical expertise ^[23]. (6) When contacted by phone, the author cannot coherently explain the rationale or details of the research. (7) The author's stated department bears little relation to the paper's specialized subject matter.

4.7 Review of Funding Acknowledgment Standardization

Some editors neglect to verify the authenticity, relevance, and validity of funding acknowledgments, operating under the belief that relaxing such requirements can improve

journal evaluation metrics; this reflects a comparatively weak awareness of the need for verification ^[24]. Editors should require authors to submit supporting documentation, such as project approval contracts, and should then review the authenticity of the funding, the consistency between the paper's content and the funded project, the project's attribution, and its timeliness to identify any false acknowledgments ^[25]. The listed authors of a paper must include participants from the funding project, and the acknowledged project should be an active one in which an author is involved; projects that have clearly exceeded their completion dates should not be acknowledged. Furthermore, the core elements of the acknowledged project—including its research content, subjects, and methods—must align with the research presented in the paper.

4.8 Identification and Prevention of AI-Generated Manuscripts

The widespread integration of generative artificial intelligence (AIGC) into research has led to a significant number of AI-generated manuscripts being submitted, published, and cited ^[20]. This emerging form of misconduct poses a serious threat to the integrity of academic publishing, necessitating a vigilant editorial response. Editors should employ dedicated AIGC detection tools, such as those offered by CNKI and Wanfang, to screen submissions in line with established guidelines. The peer review process must also be strengthened by engaging experts who can identify anomalous writing patterns, thereby assessing originality and detecting potential plagiarism. Furthermore, journals should mandate that authors transparently disclose any AIGC use, including the specific tools, their versions, and how they were applied.

5 Conclusion

In summary, as a key component of the national research integrity framework, scientific and technological journals bear an essential responsibility. These journals function as both builders and practitioners of integrity systems, educators and guides of academic norms, and whistleblowers and supervisors of misconduct, thereby embedding integrity oversight throughout the entire publishing process. Editors should cultivate a strong sense of ownership, learn to identify patterns of misconduct in submitted manuscripts, master emerging detection tools, and implement multifaceted strategies to safeguard publishing ethics. Nevertheless, the research integrity landscape is expected to remain challenging for the foreseeable future, and progress across the journal industry in this regard has been uneven and often delayed. Scientific and technological journals must therefore accelerate their efforts to strengthen integrity systems, enhance their gatekeeping role against misconduct, and thereby robustly support the advancement of national research integrity.

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Declarations

There is no conflict of interest in this article

Competing interests

The authors declare no competing interests.

Ethical approval

This article does not involve ethical review.