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Commentary Article

Impact of Publication Retractions on Researcher and Journal Metrics: A Call for New Evaluation Formulas

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Abstract

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Abstract

The integrity of scientific research is crucial for advancing knowledge, and the retraction of articles has emerged as a vital mechanism for upholding this integrity. However, the implications of retracted articles on researcher evaluations-particularly concerning academic scores, H-index calculations, and journal impact factors-remain contentious. This commentary offers a comprehensive overview of how article retractions should be assessed concerning researcher and journal metrics. By synthesizing existing literature, the researcher highlighted the need for improved research evaluation practices and proposed recommendations to mitigate the adverse effects of retractions on these metrics. In addition, the researcher emphasizes the importance of transparency, contextual evaluation, and institutional policies to ensure fair academic assessments. Additionally, the present commentary discusses the underlying causes of retractions, their frequency, and the potential consequences for researchers whose work has been retracted. Finally, the researcher invited mathematicians, statisticians, ethicists, and researchers from various disciplines to develop new formulas and metrics considering retractions' consequences.

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Introduction

The scientific community heavily relies on metrics to assess research output and impact. Metrics such as citation counts and the H-index are commonly used to evaluate individual researchers' contributions to their fields. There has been a notable

increase in article retractions in recent years due to research misconduct, plagiarism, methodological errors, and ethical violations. This rising incidence of retractions poses significant challenges to existing evaluation systems. While retractions are essential for



maintaining scientific integrity, they complicate the assessment of researchers' contributions. Retracted articles can adversely affect metrics like academic scores, H-index, and journal impact factors, leading to potential misrepresentations of a researcher's productivity and impact. As the number of retracted articles continues to grow, understanding their impact on researcher and journal metrics becomes increasingly essential. This commentary aims to explore the effects of article retractions on researcher and journal metrics while suggesting strategies to address these challenges within academia (1, 2).

Definition and Purpose of Retractions

Retractions are formal withdrawals of published articles, typically issued by journals, when significant flaws are identified that undermine the validity of the research. The primary purpose of retractions is to correct the scientific record and prevent disseminating misleading information (3).

Reasons for Retraction

As the number of retracted papers continues to rise, understanding the underlying reasons for these retractions becomes increasingly important. Retractions can be broadly categorized into two main types: those resulting from honest errors and those stemming from misconduct, including fraud (4).

Honest errors occur when researchers identify significant mistakes in their work after publication. These mistakes may include miscalculations, experimental errors, or incorrect interpretations of data. Authors may self-retract their papers to uphold scientific integrity and transparency in such cases. The academic community generally views this type of retraction more favorably, as it demonstrates the authors' commitment to correcting the scientific record and learning from their mistakes (4).

In contrast, many retractions are attributed to intentional misconduct. The rise in misconduct-related retractions is alarming, as it affects the reputations of individual researchers and undermines public trust in scientific research. Typical forms of misconduct include (4):

- Data Fabrication: Manipulating research data to

misrepresent results.

- Plagiarism: Presenting another's work or ideas as one's own without proper attribution.

- Duplicate Publication: Submitting the same research findings to multiple journals without disclosure.

- Authorship Issues: Incorrectly attributing authorship or failing to acknowledge contributions from other researchers.

Trends in Retraction Rates

Recent studies indicate increased retraction rates across various disciplines, with biomedical fields experiencing the highest rates over the past two decades. This trend raises concerns about the reliability of scientific literature and prompts questions about the factors contributing to retractions, including pressures to publish and inadequate peer review processes. Contributing factors include enhanced scrutiny of research practices, improved reporting mechanisms, and a growing emphasis on research integrity. Consequently, the landscape of academic publishing is evolving, necessitating reevaluating how retractions affect researcher assessments (5).

Impact of Retractions on Researcher Metrics

Citation Counts

One of the most immediate effects of an article's retraction is its impact on citation counts. When an article is retracted, citations associated with that work may be removed from databases such as Scopus and Web of Science. This can lead to a sudden decrease in a researcher's citation metrics, often used to evaluate academic performance. Consequently, researchers may experience a decline in their perceived productivity and impact (6).

H-Index

The h-index, developed by Jorge E. Hirsch in 2005, is a widely recognized metric that attempts to measure both a researcher's productivity (number of publications) and citation impact (number of citations). The h-index can be calculated using various resources, including ISI Web of Science,

Scopus, Google Scholar, and Microsoft Academic Search. However, the h-index value may differ across these platforms due to variations in the indexed content (7).

If a researcher has published articles that have been retracted, depending on the database used (e.g., Scopus, Web of Science), those articles may still be included in the h-index calculations. However, citations from retracted articles can be misleading and may not accurately reflect the researcher's true impact. As citations from retracted articles are removed, a researcher's h-index may decrease, potentially influencing hiring decisions, grant funding opportunities, and overall academic reputation (7, 8).

It is essential to differentiate between works retracted due to honest errors and those withdrawn due to ethical violations or misconduct. A single retraction might not negatively impact a researcher's overall integrity or contributions, but multiple retractions could significantly decrease perceived impact (7, 8).

Institutions and evaluators should implement mechanisms that allow researchers to disclose retracted works to ensure fair evaluations. This practice fosters accountability and provides a clearer picture of a researcher's academic footprint. Researchers should include retracted articles in their CVs or profiles, and some platforms allow for the indication of retracted works, offering a more accurate representation of a researcher's contributions. Evaluators should consider adopting modified h-index calculations that exclude retracted articles or provide annotations to contextualize the reasons for retraction (7, 8).

Academic Reputation

Beyond numerical metrics, article retractions can profoundly affect a researcher's academic reputation. A retraction often generates media attention and can lead to public scrutiny of the researcher's integrity. This reputational damage may hinder collaboration opportunities and negatively impact future funding applications. The stigma associated with retractions can persist long after the event, affecting a researcher's career trajectory (9).

Implications of Journal Impact Factor

The Journal Impact Factor (JIF) is a widely recognized metric that reflects the average number of citations to articles published in a journal. While it serves as a proxy for the journal's prestige and influence, its implications extend into the realm of article retraction. Understanding how the JIF correlates with retraction rates can provide valuable insights into scientific publishing dynamics and research integrity (10, 11).

The impact factor of a journal is another critical metric that retractions can affect. High retraction rates can lower a journal's impact factor, subsequently impacting its reputation and perceived quality. Journals addressing issues leading to retractions should be commended for their commitment to research integrity rather than penalized for isolated incidents. A nuanced approach is necessary to evaluate the impact of retractions on journal metrics. Evaluators should consider the reasons behind retractions—whether due to misconduct or honest errors—and assess whether these are systemic issues within a specific journal or isolated occurrences (10, 11).

Despite the expectation that retractions would lead to decreased citations, evidence suggests that retracted articles continue to receive citations even after being retracted. Articles from first-quartile journals often show a decrease in citations immediately following retraction but frequently rebound later, indicating a complex relationship between JIF and citation behavior post-retraction (10, 11).

The relationship between the Journal Impact Factor and article retraction is multifaceted. High-impact journals are more likely to experience higher retraction rates due to increased visibility and scrutiny. However, this correlation does not necessarily imply causation; instead, it reflects broader issues within the scientific publishing landscape, such as pressures for publication and the prevalence of misconduct. The ongoing citation of retracted articles further complicates this dynamic, underscoring the need for improved mechanisms to prevent the citation of unreliable research. As the scientific community continues to navigate these

challenges, understanding the implications of JIF on article integrity remains crucial for maintaining trust in scholarly communication (12).

Recommendations for Mitigating Negative Effects

Several recommendations can be made to address the challenges posed by article retractions on researcher and journal metrics (13, 14):

- **Improved Transparency:** Journals should enhance transparency regarding their retraction processes and clearly communicate the reasons for retractions to prevent misunderstandings. Researchers should also disclose any retracted articles in their professional profiles and CVs. This transparency fosters accountability and provides a clearer picture of their contributions.

- **Alternative Metrics:** The academic community should consider developing alternative metrics that consider the context of retractions rather than relying solely on traditional citation-based measures.

- **Contextual Evaluation:** Institutions should establish frameworks that allow for contextual evaluations of retracted articles when assessing academic scores and H-indices. This approach should differentiate between various types of retractions.

Education and Training: Institutions should provide researchers with training on ethical publishing practices and the importance of research integrity to reduce instances of misconduct. Ongoing education on these topics can help prevent issues that lead to retractions.

- **Policy Changes:** Funding agencies and academic institutions should develop policies that recognize the complexities surrounding retractions and incorporate qualitative assessments in addition to quantitative metrics. These policies should emphasize fairness, due process, and the importance of research integrity. Institutions may also create guidelines for reporting and addressing retractions in academic evaluations.

Engagement with Journals: Researchers and institutions should collaborate with journals to understand their retractions policies and how they affect impact factors. This can lead to improved

practices across the publishing landscape.

Recommendations for Evaluation

- **Contextual Analysis:** When assessing a researcher's academic score or H-index, evaluators should consider the reasons behind any retractions. Understanding whether they stem from genuine mistakes or more serious ethical breaches is crucial.

- **Transparency in Reporting:** Researchers should be encouraged to report retracted articles in their CVs and professional profiles. This transparency can help mitigate misunderstandings regarding their academic contributions.

- **Institutional Guidelines:** Academic institutions should establish clear policies regarding how retractions impact evaluations for tenure, promotions, and funding decisions. These guidelines should emphasize fairness and due process.

- **Ongoing Education:** Providing training and resources on research integrity can help prevent issues leading to retractions and foster a culture of accountability within the academic community.

A Call for New Evaluation Formulas

Assessing researchers based on retractions is complex and requires careful consideration of the context and purpose. The academic community should prioritize the development of alternative metrics that consider the context of article retractions rather than relying solely on traditional citation-based metrics and the number of published articles (13, 15).

The involvement of mathematicians, statisticians, ethicists, and researchers from different disciplines will be essential to develop new formulas and metrics that consider the consequences of retractions. These new metrics can exclude retracted or impose penalties and negative points based on the reason for retractions. More realistic assessments can be made by removing retracted articles and their citations from the h-index and impact factor calculations (13, 15).

In addition, a system should be established to comment on retracted articles in publication databases and provide the reasons for the retraction. This will allow evaluators to understand the circumstances of each retraction. A holistic

approach integrating quantitative and qualitative assessment will provide a more accurate appraisal of the scientific performance of researchers, journals, universities, and countries. This approach improves the evaluation process and helps maintain public trust in science by ensuring fairness and transparency, reflecting the true scientific impact (13, 15).

Conclusion

Evaluating researchers in the context of article retractions is a complex issue that requires careful consideration of both context and intent. We can create a more equitable and transparent evaluation process by adopting best practices for assessing the impact of retracted articles on academic scores, H-indices, and journal impact factors. Upholding the integrity of scientific research while accurately reflecting researchers' contributions is essential for advancing knowledge and maintaining public trust in science.

The increasing prevalence of article retractions poses significant challenges for researcher metrics and academic evaluation systems. While citations and H-indices remain essential indicators of scholarly impact, they must be interpreted cautiously in light of potential retractions. By fostering a culture of transparency, education, and alternative assessment methods, the academic community can mitigate the negative consequences of retractions on researchers' careers and uphold the integrity of scientific literature.

A holistic approach that considers quantitative and qualitative metrics will provide a more accurate evaluation of a journal's and a researcher's contributions and integrity. It requires reassessing the impact of retractions on the value of researchers, journals, universities, institutions, and nations.

Declaration

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Conflicts of Interests

The author declares no conflict of interest.

Ethical Statement

This article results from independent research, and the author has observed all ethical issues at all stages of research and publication.

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Authors' contributions

The author takes responsibility for the integrity and accuracy of all issues in this commentary.

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