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Retracted Publications in Indian Science: Reasons and Institutions

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ABSTRACT

The study analyzes repeated offenders of scientific misconduct among authors affiliated with Indian institutions. To do so, we searched the SCOPUS database for retraction notices of articles written or co-written by such authors. Broad categories of reasons for retractions, institutions, and the types of retracted publications were discussed. Most retractions (12.5% out of 239 retractions analysed) were from authors affiliated with S.V. University. The main reasons behind retractions were ethical misconduct (139, 58.2%) and scientific distortion (43, 18%). About one in ten authors who have at least one article retracted had more than one retracted publication.

Introduction

Retraction is used by journal publishers and editors to withdraw a publication from among the journal's publications, a process undertaken for a variety of reasons. Among them, plagiarism stands out as the most significant one [Rubbo et al. 2019, Chauvin et al. 2019, Elango et al. 2019], but it is not the only one. Others include ethical issues, data-related concerns, and problems with informed consent [Kocyigit et al., 2023]. Another significant reason is the compromised (including fake) peer review processes [Vuong et al., 2020].

According to many authors, the increase in retractions in the scientific community reflects the severe disease that has been spreading all over the scientific world [Aspura et al. 2018, Lei and Zhang 2018, Moradi and Janavi 2018, Elango et al. 2019]. Fanelli [2013], however, offers a different perspective: This increase is actually a positive sign for science, as it results from the improved skills of researchers and journal editors in identifying fraudulent publications. Most likely, the truth is in between—more and more authors choose to be unfair, and more and more of them are caught doing so. We should also normalize this increase by the number of publications: A great increase in retractions is accompanied by a great increase in publications. Considering these three aspects, retractions reflect the changing science world: more researchers, more pressure to publish, more publications, and more misconduct; but also more awareness and more skills in detecting fraud.

As we demonstrated in our recent paper [Elango et al., 2019], Indian science has not been exempt from the misconduct problem. Among the 239 retractions we studied, most were by journals, two-thirds were issued between 2011 and 2018, and almost half were due to plagiarism. In this paper, we present a different

perspective on the phenomenon: from the authors' viewpoint. To err is human, so should the scientific community discredit a colleague who has made a mistake? This issue and this question depend on a particular situation and its various aspects, perhaps the most important being the severity of the misconduct. A serious one should not be forgotten; a light one—maybe? One face of scientific misconduct—a moral one—is cheating peers, the whole scientific community, and society. But another face is wasting public money invested in research (<http://sciencenordic.com/scientific-misconduct-bigger-problem-we-think>). So, even a minor misconduct can seldom be taken lightly; for instance, stealing a chocolate candy is still stealing, and purposefully breaking someone's bike is still damaging someone's property. Hence, no single instance of scientific misconduct should be swept under the rug ("He's young, he has to learn such things", "She's such a promising researcher that we should not publish her for such a small thing", and so on) but should be carefully investigated. We do not mean that everyone who has misbehaved that way must be punished—but that every case should be fairly investigated. What's more, the more experienced a scientist, the more we should expect from him or her: What might be forgotten in the case of a researcher just starting a career should often be considered a serious misbehavior in the case of an experienced scientist.

Indian science has been undergoing significant development in recent decades. It was ranked 8th in R&D funding among the forty countries based on 2014 R&D funding statistics [Resnik et al. 2015]. However, India lacks a national policy for research misconduct, like the US's Office of Research Integrity [Juyal et al. 2015]. But there is an independent Indian body of scientists—the Society of Scientific Values—whose

primary goal is upholding ethics among the Indian scientific community [Jayaraman 2011]. Hesselmann et al. [2017] estimated that ten authors were responsible for 20% of retractions in the Retraction Watch database. This suggests that some authors choose misconduct as a path to their career in science: It did not just happen, it was not just a mistake, and it was not just a misunderstanding—it was a calculated decision.

We are not aware of any research dedicated to repetitive misconduct in science. Nevertheless, while analyzing various aspects of retractions, Steen [2011] as well as Fang, Steen & Cadavevall [2012] did find multiple offenders. This paper is the first attempt to analyze the phenomenon of multiple offenders in scientific literature, and we do it in an Indian context.

Building on the work of Elango et al. [2019], this research sheds light on scientific misconduct in Indian science, specifically examining the individuals who engage in it. In particular, we will analyze whether there are multiple offenders of scientific misconduct among Indian authors; and if so, we will analyze their publication behavior in terms of retracted publications. In so doing, we will use the same data set of Indian retractions we analyzed in our previous publication [Elango et al. 2019]. Restricting our analysis to this very data set will make the two sister studies one large analysis. Knowledge of multiple offenders in science is important for us to understand this unpleasant side of research. From vast research, we know that unethical behavior is more common than we would like to admit, but the main disease of science is caused by those for whom unethical practices are the main or the only way to pursue their academic careers. Therefore, the knowledge such research can provide can significantly extend our knowledge on unethical behavior in science.

To analyze repeated offenders, we have chosen the following relevant parameters: broad categories of reasons for retraction, repeated offenders, recidivist groups, institutions hiring repeated offenders. Further, this study aims to answer the following questions: (1) Are the majority of retraction notices due to misconduct? (2) Are multiple offenders junior researchers? (3) Are most retraction notices issued to research from higher educational institutions?

Methods

Data

The data were drawn from the SCOPUS database. On 3 August 2018, we downloaded the data for the keyword (“retract*”) search in titles and limited the country affiliation to “India”. A total of 239 retraction notices issued between 2005 and 3 August 2018 for Indian

authored or co-authored publications were considered for this study. We described all the details of data collection in our previous article [Elango et al. 2019].

Analysis

In our earlier paper [Elango et al. 2019], we categorized the reasons for the retractions into 10 groups. In this study, however, we do not need so many of them: We prefer more general groups. So, we will use the following four broad categories [Bar-Ilan & Halevi 2018]:

- (i) Ethical Misconduct: plagiarism (including self-plagiarism), authorship disputes, duplicate publication, copyright issues, inappropriate citations, and fake review processes.
- (ii) Scientific Distortion: fake data, errors/mistakes, experiments not conducted, etc.
- (iii) Others: reasons that do not fit any of the two categories above, such as contrary statements, similar research work already published.
- (iv) Unknown: no reason provided.

The research covered a whole group of studies, meaning that we analyzed all the articles from the data source we used. Therefore, the only statistical methods we needed to use were basic summary statistics.

Results

Most retraction notices we analyzed were due to ethical misconduct (58.2%) (Table 1). Only 18% of the retractions were due to scientific distortion, such as the manipulation of data and images, while 5% were due to other reasons, such as administrative errors, experiments not conducted, and similar work already published. For the remaining nearly one-fifth of the retractions, we could not detect the reason. Almost 60% of retractions were due to misconduct, and it clearly shows the prevalence of misconduct among Indian scientists.

Table 1 – Broad Category of Reasons for Retraction

Broad category of reasons	No. of retractions	Share among 239 retractions
Ethical misconduct	139	58.2
Scientific distortion	43	18.0
Others	12	5.0
Unknown	45	18.8
Total	239	100

A total of 878 Indian authorships were responsible for the 239 retracted publications with 742 unique authors. Among the 878 authorships, there were 742 unique authors who affiliated to 296 different institutions both in India and abroad. In total, authors from 50 foreign institutions were involved in 38 (15.9%) retracted publications.

Table 2 provides the information about the number of retractions per author. Nearly 10% of the authors have more than one retracted publication, accounting for a quarter of the authorships. Moreover, almost 10% of the authors had two or more retracted publications.

There are different types of academic institutions in India. For example, the primary objective of colleges is to teach in their respective areas, such as science, engineering, and pharmacy. Universities have two main aims: to conduct research in the frontier areas of the arts, sciences, humanities, and technology; and to impart advanced knowledge in these fields. Institutes of national importance offer world-class education in the fields of science, engineering, and technology. Not regulated by any higher education regulating body, such as UGC, AICTE, or MCI, institutes of national importance are fully autonomous and come under the Ministry of Human Resource Development, the Government of India.

We classified the Indian academic institutions involved in the retracted publications according to their type (Table 3). The most frequent type was college: In 77 out of 239 (32%) retractions, at least one author was affiliated to a college. However, since in India there are almost forty thousand colleges, those 77 constitute only 0.2% of them. In this context, universities and institutes of national importance were more frequent (Table 3). Authors from Indian academic institutions are involved in majority of the retractions.

Table 2 – The number of retractions per author.

No. of retractions	No. of authors	Total authorship	Share among authors	Share among authorships
11	1	11	0.1	1.3
9	1	9	0.1	1.0
8	1	8	0.1	0.9
6	1	6	0.1	0.7
5	4	20	0.5	2.3
4	1	4	0.1	0.5
3	17	51	2.3	5.8
2	53	106	7.1	12.1
1	663	663	89.4	75.5
Total	742	878	100%	100%

Table 3 – Repeated misconduct in authors affiliated to various types of Indian institutions.

Type	No. of institutions involved in 239 retractions	Total no. of such institutions in India [#]	Share among institutions involved in the retractions
Academic	188		
College	77	39071	0.2
Private University	3	305	1.0
State University	53	385	13.7
Central University	10	46	21.7
Deemed University—Private	17	80	21.2
Deemed University—Govt. Aided	1	10	10.0
Institute of National Importance	27	127	21.2
Others	58		
CSIR Laboratories	12	38	31.5
ICAR Institutes	9	102	8.8
Research Institutes	4		
Corporates like Microsoft	6		

[#] The data come from the AISHE (2018-19), All India Survey on Higher Education, established by the Indian government to conduct annual surveys on higher education (<http://aishe.nic.in/aishe/viewDocument.action?documentId=263>).

Table 4 – Top Indian institutions involved in the retractions studied.

Affiliation	Country	Type of affiliation	No. of retractions	Share in 239 retractions
S.V. University	India	State University	12	5.0
Indian Institute of Technology Delhi	India	Institute of National Importance	7	2.9
Bhabha Atomic Research Centre	India	Research Organization	6	2.5
University of Delhi	India	Central University	6	2.5
Indian Institute of Technology Dhanbad	India	Institute of National Importance	5	2.1
Kalasalingam University	India	Deemed University—Private	4	1.7
Annamalai University	India	State University	4	1.7
Banaras Hindu University	India	Central University	4	1.7
Bharathidasan University	India	State University	4	1.7

Table 4 lists the institutes for which we detected at least four retracted publications. There are three state universities, two are institutes of national importance, and two are central universities. Among these institutions, the Bhabha Atomic Research Centre, the University of Delhi, and Banaras Hindu University are among the top Indian institutions in terms of highly cited papers [Elango & Ho 2017]. The Indian Institute of Technology Delhi is among the leading institutions of Indian highly cited papers in the field of computer science [Gupta & Dhawan 2017] and materials science [Gupta, Dhawan & Gupta 2015].

Discussion and conclusion

In terms of intentions, scientific misconduct has two main faces. Most of the time, it is either planned “in cold blood” or committed because of a lack of knowledge or awareness. Sometimes, it can be something in between, like the first attempt to abuse the weaknesses of the publication system, or determination to use an unsuccessful experiment (accompanied by thoughts like “So much work for nothing? I won’t let it go that easy!”).

When misconduct occurs due to a lack of awareness, the community can play a role in helping to prevent it. This situation is quite often, actually. Mason [2009] stresses poor awareness among scientists, especially non-native English ones, on how to correctly use other people’s work. Since scientific research is the appreciation and continuation of the current state of knowledge, he claims, avoiding plagiarism is not an easy job. Horback and Halfman [2019] provided guidance for journal editors and publishers on how to improve the ability of their review processes to detect forms of problematic research, particularly image manipulation (so-called “imagipulation”, Kozak 2009) or issues related to authorship. The problem, however, lies not in the lack of knowledge in the community, but in the lack of knowledge among its particular members, young researchers in particular.

The only means we can use to alleviate the consequences of misconduct committed with intent, without remorse, and with a clear conscience is to catch, retract, and punish. Among the three, catching is the most difficult, but with the development of devoted software, this is getting simpler and more efficient. Retraction should follow every single time when the misconduct is serious, but the community should develop clear recommendations on which offences should be retracted, which do not have to, and which should not be retracted whatsoever. For the moment, journals and publishers seem to be following their own judgment, and since they can differ in these terms, one

publisher may retract a publication that would not be retracted in another. A retraction notice should contain valid and logical reasons for retracting the article. From our study, it follows that this is not always the case: Almost 20% of the retraction notices did not mention the reason.

Furthermore, as mentioned above, retraction should not be used every time something is wrong, especially when the mistake is unintentional and minor, of too little importance to justify retraction. In such instances, whenever possible, a corrigendum or erratum may be issued for such publications. For example, in 2011, Medicinal Research Reviews retracted the article “Tetraoxanes: Synthetic and medicinal chemistry perspective” due to an inappropriate citation of a previously published work. The authors agreed to this retraction. While we do not have sufficient knowledge to decide whether or not this mistake was serious enough to justify retraction, a reason like this suggests an erratum might suffice.

A related issue is journalistic ethics. We know that some journals are *so* predatory that they would unlikely retract *anything* they have published. We suppose that some of them actually assume that most of what they publish results from this or that type of unethical behavior, so they do not care: What really counts is the money. Therefore, perhaps the community requires an independent international body to handle retractions. Such retractions would actually be something different from actual retractions done by the journals themselves. For the moment, the idea seems out of reach, at least for the simple reason that such a body would have a tremendous amount of work to do. It could actually deal with retraction suggestions from the community. Say, someone detects an unethical publication and decides to let the journal know about the problem. The journal does not react. So, the person can submit the case to the body. Another crucial question is: How should such a body cooperate with scientific journals, especially those that simply do not care or even do not wish to be subject to the interests of such a body? That the idea seems unrealistic does not mean it is so, however—it just requires serious thought.

RetractionWatch is a body that currently plays a significant role in the retraction issue in the scientific environment. It informs society about various issues related to retractions, so it serves part of the function we discussed above. As of August 2019, the blog contains 20,820 items on publications with various issues related to scientific fraud (https://en.wikipedia.org/wiki/Retraction_Watch#cite_note-why-7).

Punishing unethical offenders is yet another topic

that we do not cover in this paper. The only thing that must be stressed is that every single instance of unethical behavior should be carefully analyzed from various points of view. Purposeful misconduct should always be punished, although each case should be considered independently, and the punishment should be proportional to the guilt's seriousness. The first purposeful misconduct, especially when committed by a young researcher, should not be treated the same as repeated misconduct.

We have known that the research community is not free of misconduct for quite some time. Everyone has heard of quasi-scientists who became famous based on falsified data, like Andrew Wakefield, Shinichi Fujimura, or Hwang Woo-suk; some developed their whole careers based on repeated misconduct, sometimes from its very beginning to the very end, like Diederik Stapel. As we have shown, there are many more such Andrews and Diederiks, though maybe not that famous—at least not yet. And we are talking only about those who were caught... It is high time for the scientific community to do something about the increasing problem of misconduct. We hope that our research will initiate similar analyses, because we have studied only an Indian drop in the global ocean.

The study deals with Indian science only, so it is obviously limited by its geographical scope. In order to shed more light on the topic, similar studies need to be conducted in broader contexts, focusing on other countries. Equally interesting would be studies dealing with multiple offenders analyzed across different scientific disciplines, as it is likely that in some disciplines the problem can be greater than in others.

Looking at the situation the way we did, we examined only the surface of the problem. While this is the first and necessary step to observe the issue, the next step should be to explore its causes and, eventually, solutions. This study, thus, can be considered one of the first steps in wide-scale research on dealing with multiple offenders in science and ways of solving the problem. Next steps should be taken from various points of view, such as ethical, institutional, educational, and publishing perspectives.

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