Scientific misconduct: A mirror of retracting ethos

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Science and ethics have always been considered to be synonymous; after all what could be unethical in the pursuit of knowledge? However, science in today's world is no longer driven by insatiable curiosity; instead it has become an extremely competitive, cutthroat exercise driven by utilitarian aspects. On June 2006 Eric Poehlman became the first scientist to receive a federal sentence for obtaining research grants using fraudulent data. The latest case of misconduct involving Naoki Mori of the University of Ryukyus in Okinawa, who received a 10-year publishing ban from the American Society of Microbiology for manipulating data in a number of his published articles brings to fore the scrounge of scientific misconduct.

Scientific misconduct became a public issue in the United States following the public disclosure of scientific misconduct cases at four major research centers in 1980. Around twelve cases of scientific misconduct were disclosed between 1974-1981 that led to the establishment of the Office of Research Integrity (ORI) to oversee and direct Public Health Service (PHS) research integrity activities (?). The U.S. National Science Foundation defines fabrication, falsification, and plagiarism as instances of research misconduct (Buzzelli 1993). However, the scope of misconduct extends to violation of ethical standards (for human and animal research), ghost writing and misappropriation of authorship in scientific correspondence; although the latter is difficult to establish owing to lack of consistency in defining "authorship" or "substantial contribution" (Bates 2004; Wager 2007).

While scientific misconduct in any form is damaging, the repercussions are widespread when falsified or fabricated data enters the public domain after evading the peer-review system. This is evident from the recent retractions of more than 30 of Naoki Mori's research papers that received a sizeable number of citations. Scientific peer-reviewed journals bear the responsibility for having a critical role in dealing with suspected misconduct and restricting the dissemination of inaccurate or falsified data. Publication of scientific data is governed by The Committee on Publication Ethics (COPE), which provides clear directives on publication standards (?). As per its guidelines, any publication can be retracted if there is clear evidence that the findings are unreliable; which can result due to misconduct (e.g. data fabrication) or honest error (e.g. miscalculation or experimental error) (?). Cases of redundant publications, plagiarism and unethical research practices also warrant retraction by the journal editors. However, most journal editors (with notable exceptions) tend to ignore the elephant in the room and rarely take timely punitive action. This is evident from a 2004 survey which revealed that of the 122 high impact factor biomedical journals, 62% had no retraction policies in place {Atlas, 2004 #6}. Online resources like CrossRef exist where participating publishers can submit metadata about updates, corrigenda, retractions, and other changes in published research papers. However, only few of the leading journal publications participate in such endeavors.

Recently, the journal Nature reported that published retractions had increased tenfold over the past decade (Van Noorden 2007). At the same time, the number of published papers had increased by just 44 percent.

Another report from data obtained through Thomson Reuters indicates a 15-fold jump in the number of retraction notices between 2001 and 2010. In the first six months of 2011 there were 210 retraction notices, suggesting that the numbers are continuing to climb. Retractions are rarely publicized (celebrity cases are a notable exception) and very few databases offer a user-friendly searchable interface. Consequently most retractions remain confined to obscurity and rarely reach the scientific community, which continue to follow and cite retracted work.

In 2010, Ivan Oransky and Adam Marcus launched an online blog, Retraction Watch, to track and post scientific retractions (http://retractionwatch.wordpress.com/). Data from the Retraction Watch website reveals a total of 383 retractions that have been issued by 35 countries since 2010. These included 133 cases from the United States alone, which also accounts for the maximum number of scientific publications globally. Some of the top reasons for retraction include non-reproducibility, image manipulation, plagiarism, duplication and faked data.

Another interesting resource is PMRetract, a web application for monitoring and analyzing retraction notices from the PubMed database. Analysis of the figures for retractions reveals higher rates of withdrawn research papers for top science journals (http://pmretract.heroku.com/). This is consistent with the recent findings of Fang and Casadevall who found that the frequency of retraction varies among journals and shows a strong correlation with the journal impact factor using a novel measure called the "retraction index" (Fang 2011). This can be explained in part by the increased online visibility of research articles, which allows wider access and thereby exposes it to closer examination. What might also true however is that mounting pressure to publish in high impact journals might lead to increased incidences of erroneous or falsified data (Nuñez 2012).

There is enough anecdotal evidence to suggest that international students and research personnel might be tempted to indulge in unfair practices, partly out of ignorance and partly under the pressure to perform. However, what is inexcusable is the lethargy in cracking the whip on scientists accused of such malpractices, who can hardly feign ignorance for their actions. A case in point is Naoki Mori, who after being fired and then rehired by the University of the Ryukyus, recently published a research paper as the senior author.

In the absence of any centralized accountability machinery the perpetrators of such malpractices elude justice. Often it is the whistle blowers who bear the brunt of the administration for reporting the matter, cultivating a culture of insensitivity. The ever-increasing pressure on principal investigators to raise research money through government grants and the intense peer pressure are enough to create a maladaptive behavioral pattern among the susceptible. Needless to say, rewards like big publications, huge grants and an esteemed status in the scientific fraternity are allurements that are difficult to resist. The scientific process is supposed to be self-correcting, with peer reviewing weeding out erroneous conclusions and thus maintaining its sanctity and integrity. However, high profile cases of misconduct in some of the top scientific journals clearly demonstrate that playing on trust and evading detection can override this system and belie the very ethos of science.

In the unrelenting "Publish or Perish" culture that pervades the scientific community today, acts of falsification and misconduct do not always correlate to unethical behavior. In most cases, it is an act of desperation fuelled by the struggle for existence in an increasingly competitive and unequal society.

One thing is certain; that unless certain concrete steps are taken to weed out the problem, the integrity of science and scientists will be under a cloud. The sensitization of students and practitioners of science and technology to ethical values through formal and informal studies needs to be undertaken by the academic institutions. In addition to this, action against those found guilty of unethical practices should be swift and set a strong precedent. Whistleblowing has to be encouraged so as to set a strong deterrent, and at the same time whistle-blowers should be rid of the fear of retribution.

Scientists have a dual role; they have to be accountable to the taxpayers who fund them and at the same time prevent dilution of ethical and moral principles while trying to do so. Through history we have learnt that civilizations and societies have risen to higher levels not through mere technological or mechanical efficiencies, but by practicing sound moral ethical values: this is sine qua non.

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