Article ID: WMC001617 2046-1690

Scientific Misconduct

Corresponding Author:
Dr. Ulysses P Albuquerque,
Professor, Universidade Federal Rural de Pernambuco - Brazil

Submitting Author:
Dr. Ulysses P Albuquerque,
Professor, Universidade Federal Rural de Pernambuco - Brazil

Article ID: WMC001617

Article Type: My opinion

Submitted on:25-Feb-2011, 02:16:20 AM GMT **Published on:** 25-Feb-2011, 10:22:45 PM GMT

Article URL: http://www.webmedcentral.com/article_view/1617

Subject Categories:BIOETHICS

Keywords: Ethic in Science, Plagiarism, Peer-Review Process, Fraud, Falsification, Fabrication

How to cite the article: Albuquerque U P. Scientific Misconduct . WebmedCentral BIOETHICS 2011;2(2):WMC001617

Scientific Misconduct

Author(s): Albuquerque U P

Abstract

Abstract: Plagiarism, fraud and falsification are issues modern scientists must confront. These problems themselves are not novel, but the discussion surrounding them has been revitalized due to recent, widely reported events. In order to keep the discussion of these topics active, and because misconduct is an important educational topic for all scientists, I will briefly discuss the current situation.
Keywords: Ethic in Science; plagiarism; peer-review process..

Introduction

The scandal surrounding the fraudulent publication of stem cell findings has been exhaustively discussed by the press, and the theme of scientific misconduct is now in the spotlight [1]. More than simply revealing that fraud, plagiarism and falsification of data occur, the primary effect of this event was to taint the public image of science. Scientists are commonly perceived as almost infallible, and news surrounding their misconduct, which is often disseminated in an alarmist or sensationalist manner, can contribute to a humanization of science and scientists.

We can wonder what would make a scientist deliberately behave in an unethical manner. Undoubtedly, the pressure to publish has increased in recent years. The well-known aphorism, “publish or perish,” was never so true as it is for modern scientists. It is necessary to publish in order to a) obtain research funds, b) progress professionally, and c) become recognized by peers. Competitiveness could be blamed for misconduct, but this would be a very simplistic argument [2]. In this article, I will examine the issues surrounding misconduct with the aim of contributing to the current debate. I will divide the topic into two questions: First, what are the types of scientific misconduct, and second, how frequent is misconduct?

What are the main types of misconduct?

Several behaviors can be considered scientific misconduct, and plagiarism is perhaps one of the most common transgressions. It is a common phenomenon and frequently committed unconsciously, which can occur when the plagiarist commits a serious ethical infraction while being unaware they are doing so. Chart 1 contains an adapted definition of plagiarism by Lucas [3], which will allow us to better clarify the extent of the problem.

Chart

How common is scientific misconduct?

Several authors have tried to answer this question (see [6]), most frequently using surveys and questionnaires. An obvious limitation of this method is that many people might not be willing to admit misconduct. It is perhaps easier to say that they have heard about misconduct or know somebody who has committed misconduct rather than acknowledging their own faults. Regardless of this limitation, the results of these studies are very interesting. In one of the most recent analyses, Fanelli [7] carried out a study on how frequently scientists fake or create data. The work of Fanelli [7] is the first meta-analysis to analyze several surveys taken on the issue of scientific misconduct. To summarize the findings, it was more common for scientists to admit to having changed data to improve results than to admit to having publishing admittedly falsified data. In addition, a significant number of scientists admitted to having observed misconduct among their peers. On average, 1.97% to 33.7% of scientists admitted to having created, falsified or modified data or to having behaved in a questionable way. Although misconduct is a sensitive subject, as are the techniques used to of evaluate scientists’ conduct, these data show that the problem exists.

Final considerations: is this a new witch-hunt?

Although I believe that educational and restrictive measures are necessary to avoid misconduct, it is necessary to be careful not to create a culture of distrust, to assume all researchers are guilty until the contrary can be proven. First, it is extremely difficult for editors and reviewers to detect certain types of misconduct; second, we cannot punish honest researchers. A lack of reflection and caution can lead to biased revisions and criticisms, based on suspicion rather than facts. Mutual trust is one of the fundamental qualities of professional relationships between scientists. The assumption of misconduct in published data would undoubtedly impact this relationship negatively. Conducting a witch-hunt, that is, reporting and disclosing the gravest cases of

misconduct, can be productive and even necessary, especially when the data of a fraudulent publication impacts public policies. However, I believe many innocent individuals would be consumed in the effort to reveal these serious infractions. Therefore, I believe the best strategy to avoid scientific misconduct would be to educate and orient new scientists to their ethical responsibilities. This would be an educational strategy based on the understanding of science as a product of human intellect and on managing one's career in such a manner that one can tolerate the pressure to publish without resorting to misconduct. Perhaps a better saying would be, "publish without perishing"!

Acknowledgements

The author thanks Conselho Nacional de Desenvolvimento Científico e Tecnológico-CNPq (the Brazilian Research Council) for a productivity grant.

References

1. Albuquerque, U.P. The tyranny of the impact factor: why do we still want to be subjugated? Rodriguesia 2010, 61, 353-358.
2. Albuquerque, U.P. A qualidade das publicações científicas: considerações de um Editor de área ao final do mandato. Acta Botanica Brasilica 2009, 23, 292-296.
3. Lucas, S.E. The art of public speaking. The McGraw-Hill Companies: New York, USA, 2003. 512p.
4. Long, T.C.; Errami, M.; George, A.C.; Sun, Z.; Gamer, H.R. Responding to possible plagiarism. Science 2009, 323, 1293-1294.
5. Errami, M.; Sun, Z.; Gerge, A.C.; Long, T.C.; Skinner, M.A.; Wren, J.D.; Garner, H.R. Identifying duplicate content using statistically improbable phrases. Bioinformatics 2010, 26, 1453-1457.
6. Marshall, E. Scientific misconduct - How prevalent is fraud? That's a million-dollar question. Science 2000, 290, 1662–1663.
7. Fanelli, D. How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data. PLoS ONE 2009, 4(5), e5738. doi:10.1371/journal.pone.0005738.

Illustrations

Illustration 1

Chart 1. Definition of plagiarism, adapted from Lucas [3]

Global plagiarism – to steal a complete text from a single source and present it as if it were one's own. **Plagiarism in remnants** – to use ideas or languages from two or three sources and present them as one's own. **Incremental plagiarism –** to not give appropriate accreditation to specific parts of a text that were created by another person.

The first and third types of plagiarism listed above are unambiguous infractions, but the second type occurs frequently and is, mistakenly, often viewed as being encouraged. Plagiarism in remnants occurs when a writer, perhaps writing in another style, uses the structure of other texts to present his or her ideas. Many students use this strategy in an inappropriate way and justify their behavior based on the following advice from professors: *"Use the structure of a given work as a reference".* The students interpret this advice as *"Copy the structure"*, when, in fact, the professor is asking them to observe what the author covered in that paragraph or text. A fourth type of plagiarism not mentioned by Lucas [3] is self-plagiarism, which occurs when one copies sections of one's previous publications and republishes them in other journals. This concept applies to the introduction of an article or, more commonly, the *Materials and Methods* section. I have been astonished to learn how some students consider this a natural approach to drafting a manuscript. For example, I once heard a student, in an attempt to defend themselves from a reviewer, affirm innocently, "*Are we not permitted to do that? I have seen several articles from a recognized group in which they publish the exact same introduction."*

I believe that as editors and reviewers, we cannot ignore this phenomenon. I say phenomenon because in each new generation of scientists there is a chance of misconduct occurring, whether out of deceitfulness or unawareness. Recent studies have shown that the severity and frequency of misconduct is underestimated by the scientific community [4, 5]. I believe that the small amount of attention given to the subject of misconduct is, curiously, part of a well-understood psychological phenomenon: denial. Denial is a psychological defense mechanism, and the admission of an uncomfortable fact can put important beliefs at risk (e.g., the integrity of science) and create huge anxiety. Nevertheless, statistics demonstrate the recurrence of misconduct as well the need to address the problem from both a preventative and educational standpoint. Other types of misconduct are described in Chart 2.

Illustration 2

Chart 2. Other types of scientific misconduct.

Creation: The deliberate creation of data or experimental circumstances and situations. In this case, the creative and imaginative researcher creates data or experiments. This type of misconduct is difficult to detect, especially if performed by an experienced scientist.

Falsification: The deliberate distortion or adjustment of data and results. For example, the scientist can omit values from a statistical analysis in order to adjust the result to fit the expected result. This can have serious consequences, especially in medical studies. Falsification is also very difficult to detect, even by experienced reviewers and editors.

Plagiarism: Plagiarism differs from other types of misconduct in that it is a misappropriation of the copyrights of another person. It is now a simple matter to detect plagiarism with the conveniences provided by the internet.

Self-plagiarism: When an individual republishes exactly the same texts, graphics or images of a previous work with the intention of presenting them as novel.

Disclaimer