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Institutional Dealing with Scientific Misconduct

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Abstract

Since recent studies have shown that scientific misconduct is anything but a rare phenomenon, and given the harmful effects of such misconduct both for science itself and for the society at large, it is obvious that violations of integrity norms in scientific research should be taken seriously. The promotion of a culture of scientific integrity and the furthering of responsible research by their employees deserve a high priority within universities and research institutes. Proper disciplinary actions and preventive measures should be based on an analysis of the possible motives and causes underlying such misbehaviour. In this article three categories of causal factors are distinguished: Deceit as an individual vice, an existing culture of sloppiness and irresponsibility within certain disciplines or institutes, and the pernicious influence of today's research climate with its pressure for production and the 'metrification' of performance and output. Suggestions for dealing with cases of misconduct, resulting from these three distinct views, are presented and discussed.

1. Introduction*,1,2,3,4,5

Before the 90's of the last century the subject 'violations of scientific norms' did not get serious and systematic attention. Till then the world of scientists was rather closed and defensive on the issue of scientific misconduct. Of course, once in a while cases of misbehaviour reached the press, but these were seen as atypical anecdotes. Suggestions that these cases were only the tip of a much larger iceberg were put aside as exaggerations of a rapacious press. It was claimed that self-regulation and the system of peer review was able to keep matters under control.

Moreover, scientific institutions (universities, research institutes, funding agencies, scientific journals) were inclined to draw a veil over such cases of misconduct. Universities were reluctant to hang out dirty laundry, funding agencies hated to admit that allocated funds were being misused, scientific journals disliked retractions. They were all afraid of reputational damage and were, consequently, reluctant to allow full and transparent disclosure of cases of scientific misbehaviour.

In the meantime things have changed. In the first place, more systematic evidence has become available on scientific misconduct, suggesting that the earlier optimistic assumptions and reassuring statements were incorrect. Surveys of AAAS and BMJ, and investigations[6,7,8,9,10,11,12,13] and others show that we deal with a substantial and structural

* Much of what is discussed in this paper is founded on experience and committee work in which the author has been involved.

problem in present day science that needs serious attention. If Steneck's conclusion at the second world conference on research integrity in Singapore (2011) that at least 1% of the sponsored research suffers from violations of norms of research integrity is correct, we speak of some 1500 cases per annum in the US, and some 1000 cases in Europe. At present almost every country where a reasonable amount of research is carried out has its notorious cases of misconduct. There is even a ranking of mega-impostors, headed by the Japanese anaesthetist Yoshitaka with 172 and the American surgeon Dipak Das with 145 fraudulent publications. I have to confess that with 69 fraudulent publications my fellow-countryman the social psychologist Diederik Stapel is also on the list.

This increasing attention to research misconduct is not without reason. As I stated earlier,[14,15] its effects are very harmful. First and for all for science itself: It leads to fallacious insights and may create deceptive leads for other scientists. It is also harmful for individuals and the general society: fraudulent research may result in bad policy measures, deficient instruments or unsafe medical drugs. A third harmful consequence is that trust in science will be subverted. Cases of scientific fraud disclosed in the public press will result in loss of trust in science as a valuable source of information and a dependable basis for decision making.

In the meantime many universities and research institutes have developed a Code of Conduct or Guidelines for scientific integrity, often guided by the inspiring publication of the US National Academies of Sciences 'On being a scientist'.[16] Moreover, in quite some countries National Academies of Sciences or National Science Foundations, often in cooperation with the Association of Universities have composed a national Ethical Code of Conduct.

2. Internationalization

It is further widely realised that the norms for responsible research and the rules for good practice cannot be confined to national scientific communities. Recently international scientific collaboration has grown substantially. National boundaries never were limitations to scientific collaboration, but during the last few decades internationalisation of research has assumed considerable proportions, stimulated among others by many international funding bodies (such as the Framework Programmes of the European Union). It has become clear that the requirements of research integrity apply equally strongly in such international collaborative research, and that common agreement on norms, rules and standards within the collaborating parties is a prerequisite for the fostering of responsible international research and for the proper dealing with possible cases of misconduct. In other words, international agreement on and harmonisation of codes and procedures deserve high priority.

The international scientific community awoke to the realization of the urgency of this international approach. Three World Conferences on Research Integrity have taken place: in Lisbon in 2007, in Singapore in 2010 (resulting in the '*Singapore Statement'* defining 4 principles and 14 responsibilities) and in Montreal in 2013 (resulting in the '*Montreal Statement*' defining 20 responsibilities on research integrity in cross-boundary research collaborations). The fourth is planned for 2015 in Rio, Brazil. Scientific journals have founded a Committee on Publication Ethics (*COPE*) that published a *Code of Conduct and best practice guidelines for journal editors* (in 1999 and in 2011). The Global Science Forum of the *OECD* organised a conference in Tokyo, Japan, in 2007, and produced *Recommendations on Facilitating International Research Misconduct Investigations* in 2009.

The InterAcademy Panel (IAP, the World Association of National Academies of Sciences) published a substantial report on *Responsible Conduct in the Global Research Enterprise* in 2012. In 2013 the Global Research Council (a world organisation of national funding organisations) reached an agreement on the central importance of responsible research, and published a '*Statement of 7 Principles for Research Integrity'*. Likewise UNESCO and ICSU (International Council of Science) raised their voice on this issue at various occasions and in their policy statements.

In Europe, All European Academies (ALLEA) and the European Science Foundation (ESF) were of the opinion that the best way to international harmonization of integrity standards would be to start with the intermediate level and, in their case, focus in first instance on the European scientific community. This has resulted in a European wide accepted '*European Code of Conduct for Research integrity'*.[17]

The European Code of Conduct was developed by a working group of All European Academies (ALLEA) and the European Science Foundation (ESF), which I had the honour to chair.[18] Like most codes this Code of Conduct is not intended to have a legal character. It is not a body of law, but rather a canon for self-regulation. It is the own responsibility of the scientific community to formulate the principles of and norms for scientific and scholarly research, to define the criteria for proper research conduct, and to set its own house in order whenever scientific integrity is threatened.

3. Motives and Causes

A discussion of proper institutional responses to cases of scientific misconduct should reason from possible motives and causes of such behaviour. So the question is: why do people breach integrity norms in research? Answers given in the literature vary with different accents on the 'nature – nurture' dimension. Some see in the swindler a '*bad apple*'. Deceit is seen as an individual misdemeanour and the deceiver is the one to be blamed. Others point to a culture of sloppiness and irresponsibility that may prevail in certain disciplines or research groups (*'bad barrel'*). In our investigation of the misconduct of Stapel* we have also pointed to the climate of sloppiness, lack of methodological rigour and insufficient discipline within social psychology in general.[19] We have been criticized for this,[20] but had good arguments to refute this reproach.[21] Then again others put their finger on external corrupting forces or the perverting present-day research climate with its emphasis on output and deadlines and the compelling dependence on grants and sponsors (*'bad barrel maker'*).[22]

Let us make one thing clear: There is no question about individual responsibility for misbehaviour in research. Given identical tempting circumstances one scientist lapses into deceit and hundreds of others do not. On the other hand there are, as said, external conditions that may make misconduct 'understandable'. Of course, understanding does not imply that violations of the norms of integrity can be tolerated or excused.

What sparks and fuels misbehaviour in science? The following types of causal factors can be distinguished:

- Opposition, condemnation or prohibition of powerful persons or institutions. The well-known and obvious examples such as the row between the Catholic Church and Galileo,

* I was chairman of one of the three committees that investigated Stapel's fraudulent research practices.

the concession of the biologist Lysenko to the misplaced ideas of Stalin, the implacable rejection of Darwin's evolution theory by fundamentalist Christian or Muslim religious leaders come to our mind. But there are also more subtle repressions by the powerful. Each country or discipline has its examples of research supervisors who are displeased with the research direction or outcomes of young researchers that contradict the prevailing school of thought or their own ideas or hypotheses, and thwart their further investigation.

- A second possible factor is the pressure caused by the merciless competition for funds. Positive and preferably spectacular outcomes further opportunities for further financial support. And since funds from sponsored and contract research are becoming an ever growing proportion of the budget of many university departments or research institutes the danger of unjustly 'avoiding the hand that feeds you' becomes immanent.
- Thirdly, there is the present reward and career system for scientists. Secure staff positions, tenure appointments, promotions, fellowships or memberships of prestigious associations or organisations (academies, editorial boards, advisory boards) are more and more dependent on research results, publications, citation indices, H-index and other quantitative measures. It is at this point that IAC/IAP warns: "research institutions need to embrace incentives that deter irresponsible actions" and "too much emphasis on such metrics can be misleading and can distort incentive systems in research in harmful ways."[23]
- Finally we mention the researcher's own ambition, vanity, desire for recognition and fame, and the prospect for personal gain. Here we deal with a personal characteristic of some researchers. There is nothing wrong with stimulating ambition, but unhealthy and dysfunctional craving for scientific honour and fame can result in infringements of the norms.

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4. Institutional Reactions

All institutes which are involved in the research enterprise (universities and research institutes, funding agencies, academies of sciences and science journals) should feel obliged to respond to the disclosure of cases of misbehaviour in research, of course each one of them in conformity with its role and responsibilities. Elsewhere,[24] I have discussed the possible responses for the various actors, and in this article I like to focus more extensively on the universities and research institutes that employ the misbehaving researchers. After all, the primary responsibility for creating and maintaining an environment that fosters responsible conduct and good practices, and, consequently, for the handling of cases of misconduct lies in

the hands of the employer of the researcher: the university or the research institute. They have to create a climate in which the fundamental values of research are practiced and violations thereof are countered. They have to take actions to investigate allegations and suspected cases, and to pass proper sentences where such allegations or suspicions come true.

Suitable responses to violations of research integrity depend, of course, on the nature of the misconduct. The most serious violations are *fabrication* (making up results and recording or reporting them) and *falsifying results* (manipulating research processes or deliberately changing or omitting data). These two are capital sins. A third type of misconduct is *plagiarism*, the appropriation of another person's ideas, research results or words/figures/tables without giving appropriate credit. Plagiarism seems to be of a different order since it is thought to be injurious only to fellow scientists and does not affect the integrity of the research record. Still plagiarism is rightly classified as a violation of the ethos of science because - next to doing injustice to fellow scientists - it is harmful for the academic reward system and for science as such.[25] The European Code of Conduct also classified *improper dealing* with such violations (attempts to cover up, reprisals to whistle-blowers, violations of due process) as misconduct. A fifth category of unacceptable violations are *minor misdemeanours*, such as some biased 'adjustment' of data, favourably 'adapting' a figure, omitting or changing one or two unwelcome observations, summarising incorrectly, cutting a corner here and there…. It should be made clear that here we also deal with unacceptable misconduct. It is falsification *in statu nascendi,* and may lead to more serious infringements if it is not corrected.

Responses have to depend further on the seriousness of the misconduct. Extensive fabrication of data by a senior researcher should be treated differently from a masters student copying pieces from Wikipedia or Internet without proper reference. Culpability of an accused researcher should be based on preponderance of evidence. It should be pointedly stipulated that misconduct does not include honest errors or differences in opinion. The level of intent, the consequences of the misconduct, and other aggravating or mitigating factors should be taken into account, and 'it has to be shown that the misconduct was committed intentionally, knowingly, or recklessly'.[26]

5. Dealing with Cases of Misconduct

As said before, the primary responsibility for investigating and handling serious cases of misconduct lies in the hands of the leadership of the institute (university or research institute) where the accused or suspected researcher works. In the following I describe in my view an exemplary procedure.

Requirements for a proper procedure dealing with a grave accusation or suspicion include a careful and objective investigation, a fair and sufficiently rapid process, and suitable decisions and corrective measures. Fairness of the process is fostered by a clear separation of roles and responsibilities during the three phases of the process:

- After the reception of an allegation or suspicion of fraud this is referred to an integrity officer, confidential agent, or ombudsman (who should not be part of the hierarchy; therefore, not a dean, director or rector), who bears the responsibility to decide whether the accusation is admitted and further action has to be taken. In the first instance this is almost always to call for an independent investigation committee.

- This investigation committee is then appointed by the leadership of the institute, and consists of independent (and preferably one or two external) experts in the field of the accused researcher. This committee has to have access to all necessary information, carry out a thorough investigation, hearing both sides, and reach a conclusion which is offered to the leadership of the institute in the form of an advice on a possible conviction and further actions.
- The decision is then made by the management of the university or institute. Corrective measures and penalties may vary from a formal reprimand or warning, (temporary) refusal of admittance to funding, nullification of academic degrees (if based on fraud), to degradation or dismissal. In cases of fraud the publications (book or article) should always be retracted, preferably with an intimation of the reason. [Note: there should be an opportunity for appeal, usually with an external, national organisation (e.g. Academy of Sciences, National Research Council or National Committee for Research Integrity)].

In cases in which two or more scientists from different universities or institutes collaborate, duplicated investigations should be avoided. Mostly there is a leading person or a group that receives the biggest share of a grant; it would be natural to assign the task of investigation to their institution.

How do suspicions arise? Who can submit allegations?

Informants who can start the ball rolling include:

- Reviewers of grant applications. Improbable claims and reporting unlikely results may raise suspicion.
- Editors and reviewers of scientific journals. Although the peer review system is not ultimately marked out to reveal fraud, nevertheless quite some indications and peculiarities in a submitted article may raise suspicion, including no missing data, no refusals in surveys, statistical defects, undefined samples, or, in general, results that are 'too good to be true'. COPE (the Committee on Publication Ethics of Science Journals) has offered a great number of suggestions for improvement of peer reviewing in this respect.*
- Colleagues as well as subordinates and PHD students. Immediate collaborators are probably the most suitable sources of information. They often see and know in great detail how their colleagues and supervisors operate, and are the first to discern possible irregularities and manipulations of data. It is natural that such informants nurse feelings of diffidence. They may dread accusations of disloyalty and ingratitude with respect to their institute, or even fear harmful repercussions for their future career. It is, therefore, important for the leadership of universities and research institutes to carry through measures of protection of whistle blowers, among others by allowing them to report their suspicion confidentially to the integrity officer, and to impress the necessity of reporting any violations of norms of integrity one may encounter.
- Outsiders. Sometimes complaints and accusations may come from outside: readers, journalists, clients, sponsors and others. Of course, not all of them have to lead to serious

* www.publicationethics.org

follow-up. But some of these allegations may be enough severe and irrefutable for the integrity officer to make further inquiries.

An interesting question is how to deal with anonymous allegations.

Some informants do not trust the precautionary measures to protect whistle blowers and do not want to reveal their identity, even under confidential conditions. They still may submit their complaint or allegation, but anonymously. Can such an anonymous allegation be admitted? In Europe there is no agreement on this matter. Different countries, and even different institutes within the same country have diverging views. My suggestion is the following:

"Effective preventive measures will have to be built upon the causes of and motives for infringements of the norms of integrity."

Let us first and foremost put the case that anonymous allegations are not desirable. Next to the above mentioned fear and diffidence all too often all kinds of unsympathetic motives, such as frustration, disappointment, resentment, jealousy, rivalry and rancour play a role. Therefore, integrity officers or committees would do right to exert themselves to try to identify the informant, if need be under condition of confidentiality.

Moreover, there are anonymous allegations that cannot be admitted as long as the accuser does not make him/herself known: think of vague accusations, accusations of misuse of power or sexual intimidation leading to infringements of norms of research integrity, accusations of running off with ideas of the accuser, refusals of deserved co-authorship and the like. For the investigation of such allegations hearing both sides, and therefore acquaintance with the identity of the accuser, is necessary.

But then there are anonymous accusations that are well traceable and testable, and that can be very well investigated on the basis of controllable facts, and therefore should be taken seriously.*,27 A rector of a university would be reproachable if (s)he would not check anonymous, but traceable serious accusations; for instance the assertion that organisations in which an investigation is supposed to have taken place do not exist, or that patient identity numbers in a hospital sample cannot be found, or that substantial parts of the text of a dissertation are identical to exactly marked published texts of other uncited authors.

In short, in most cases anonymous allegations are undesired and should be discouraged. Sometimes anonymity is even prohibitive for admitting a complaint or accusation. But sometimes anonymity is no hindrance for the investigation of an allegation and do the cons of anonymity not counterbalance the pros of bringing to light grave infringements of research integrity norms. In such cases anonymous allegations should not be dismissed.

6. Prevention

Effective preventive measures will have to be built upon the causes of and motives for infringements of the norms of integrity, as discussed in section 3.

* Here I am in agreement with Virginia Barbour, the Chair of the Committee on Publication Ethics (COPE) (publicationethics.org; Jan. 2013) and Cornelis Schuyt, the Chair of the Dutch National Organ for Scientific Integrity (LOWI).

a. Following the 'bad apple' theory the emphasis will be on the individual researcher. Measures should intend to ensure that he or she is kept on the straight path. They include:

- The development and publication of a (national or institutional) Code of Conduct for Research Integrity, in which norms of integrity and rules of good practices are delineated. This Code should be made known to all students and staff. Employed researchers should be asked to sign a statement that they have taken cognizance of the Code and will comply with its norms and standards.
- Impartial, fair and strict mechanisms to investigate suspected or alleged cases of misconduct (as outlined in section 4), followed by appropriate actions against persons found to have breached the norms.
- Underlining staff member's duty to take action in case they observe or suspect serious violations of the rules of responsible research, of course stipulating the protection of whistle blowers from retaliation in their work or further career.
- The regular use of electronic plagiarism detection systems.
- Retraction of fraudulent or severely plagiarised publications, preferably stating its reason.

"It is the development and nurturing of the basic values and norms in science, rather than the risk of being caught and the fear of sanctions that will enable us to fight and prevent misconduct and fraudulent activities."

A caveat is appropriate here. Warnings, detection instruments, threats and sanctions, they are all important and useful. But of essence is the development of a matured scientific conscience and a basic sense of responsibility of the researcher him- or herself. It is the development and nurturing of the basic values and norms in science, rather than the risk of being caught and the fear of sanctions that will enable us to fight and prevent misconduct and fraudulent activities. And the fostering of this scientific conscience should take place through teaching ('responsible research' should be a mandatory subject in courses on experimental design and research methodology), through supervision and mentoring of students and junior staff, and through setting a compelling example in one's own research.

b. The 'bad barrel' theory would lead to preventive measures that would focus on the collegial climate in 'weaker' disciplines. These would include:

- Concerted appeals to stir those disciplines and leaven the staff with the realisation that methodological rigour and procedural reliability are key-stones of responsible research.
- Increasing the alertness and sensitivity of reviewers of proposals, peer reviewers of submitted articles, supervisors and members of evaluation committees of doctoral dissertations, and urging them to be extra critical if results are 'too good to be true', if unlikely high correlations are reported, if samples are insufficiently defined, and the like.

- Emphasizing the necessity to share and discuss findings with colleagues and research group members; data collection and interpretation should never be an isolated, uncontrolled activity of one individual. Supervisors should critically follow all phases of the research endeavour.
- Emphasizing the full responsibility of co-authors for all aspects of the publication, unless explicitly expressed otherwise.
- The requirement for the researcher to deploy a system of data storage and archiving, while maintaining proper accessibility of the data, allowing other researchers to do a control or retest study.

c. The approach emanating from the theory of the *'bad barrel maker'* would focus on resistance to external corrupting forces, be they financial, political or ideological/ religious, or inherent in the science reward system we have drifted into. At stake is here the independence and autonomy of science. If science can no longer define and follow its own laws and criteria and if the freedom to think and communicate is curtailed the essence of science is attacked. Without its independence, impartial and unaffiliated nature science will sooner or later become irrelevant and useless. As already indicated in section 3 we can list three categories of such constraining forces.

- First the political or religious interferences. Above we have already referred to the open or more subtle conflicts between governments, political leaders or dictators and scientists, and to the attempts of religious (Christian and Muslim) leaders to influence and control scientific interpretations and theories. In the West we have the examples of Galileo, Spinoza, Bruno, Voltaire and others. In the Muslim world it started with the influential Abu Hamid al-Ghazali who, contrary to his earlier views,* subordinated scientific cause and effect to divine revelations[28,29] and called thoughts of the rational Muslim scientists Al-Kindi and Ibn-Sina (Avicenna) heretical and suchlike ideas even apostatical (kufr). Other Muslim scientists like Ibn-Sina (Averroes) and, in modern times, Abus Salam and Hoodbhoy have met with similar opposition. In his extended study Bürgel[30] concludes that orthodox Muslim theology – I should say just like orthodox Christian theology – has always tried to dominate rather than to inspire science.†,[31]
- The second problem is the temptation to bend too much to the interests of sponsors or users of the research. It is here that universities that are too much dependent on financial support of sponsors and principals (too much contract research, too much patent oriented research) get in danger. The warning of the former President of Harvard University Derek Bok expressed some 12 years ago in his farewell address that "the intrusion of the market place into the university is eroding fundamental academic values" unfortunately has not lost much of its relevance.

* Expressed in his Revivification of the science of religion.

† In a paper presented at the Islamic World Academy of Sciences, held in Doha, Qatar, 22-24 October, 2011, and published in Eruditio, I have defended the importance of the separation of science and religion. Scientific truths cannot be at odds with the 'truths' as revealed in holy scriptures. I quote: "The Bible, the Torah and the Quran are not historical, geological or biological textbooks. They do not intend to give a scientific explanation of physical or social phenomena. They are imaginative texts that attempt to help people to understand the meaning of life, to guide and inspire them, to provide hope and consolation. (….) Science, on the other hand, is the world of falsifiable knowledge, of logical consistency and of verification and validation. These two worlds cannot be at variance any more than a poem can be at variance with experimental physics." Gould (1999) suggested something similar when he described the worlds of religion and science as two Non Overlapping Magisteria (NOMA).

- Thirdly we should also aspire to alleviate the strong emphasis on quantity of output and number of publications, and to look for alternative, also qualitative, ways to appraise scientists' contributions (see the serious charge against the 'metrification of quality').[32] As said in section 3 it is not unlikely that the 'publish or perish' culture contributed to the prevalence of irresponsible conduct. Breathless craving for 'high scores' may lead to behaviour that crosses the limits of what is permitted.

7. Concluding Remark

For universities and research institutes the discovery and revelation of fraud within their ranks is always painful and embarrassing. Often the recent wide and detailed discussions of fraudulent cases in the press are still experienced as distressing and unwelcome. But the positive side of the attention to and in depth analysis of cases of research misconduct is a sharpened focus on research integrity at all levels of the science community. If this increased attention and publicity would contribute to fostering a prevailing culture of responsible research and robust management methods that ensure awareness and application of high standards, it would be well worth it.

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