Is scientific misconduct a bigger problem than we think?

Scientific misconduct might be a bigger problem than many scientists think, according to a recent report by Science Europe—the EU association representing the interests of European researchers and research funding organisations.

Official numbers are likely underestimating the true extent of academic fraud, suggests the report.

And while the total number of fraud cases only represent a fraction of total scientific output, it is still a serious problem that requires attention, says Science Europe.

“In the last 20 years some high-profile international cases of [scientific] misconduct have come to the fore and these illustrate the damage that misconduct inflicts on research, researchers, institutions, and society,” they write.

Furthermore, scientific misconduct represents another serious problem: it is a waste of public money invested in the research.

What is research misconduct?

But what exactly constitutes scientific misconduct? There are no internationally accepted definitions of scientific misconduct—often more broadly referred to as research misconduct. The closest to this, comes from the The Office of Research Integrity in the US and the Global Science Forum of The Organisation for Economic Co-operation and Development (OECD).

According to them, scientific misconduct occurs when scientists fabricate their data, falsify their results, or plagiarise from other scientists. These three activities are often simply referred to as FFP (see Fact Box) and are classified as serious forms of misconduct that can damage the reputation of science and scientists, or distort the field as a whole.

Most countries broadly define misconduct around the principles of FFP. But only a few countries have adopted them into a legally binding definition.

Denmark is one such country, and they have recently updated their definition to bring it in line with the US. Sweden has no fixed definition, but they are now considering it, as part of a more general inquiry into research misconduct, announced last year.

How many scientists commit misconduct?
The perception among many scientists is that cases of severe misconduct are relatively rare when held up against the sheer amount of scientific output. But evidence suggests that it may be a bigger problem than many scientists think, writes Science Europe, citing an analysis of surveys [9] among scientists from different fields.

In the study, one per cent of scientists surveyed admitted to fabricating or falsifying their own data at least once in their career.

But this rose to 34 per cent if it includes other, less serious misdemeanours, which are often referred to as Questionable Research Practices or QRP (See Fact Box).

These include offences such as poor research design or poor data management, deliberately excluding scientists from the authorship list of scientific publications, or the misuse of research funds. Such misdemeanours are certainly frowned upon but they are generally not considered to fundamentally damage the reputation of any single scientist or field of research.

But when scientists were asked to comment on their colleagues, these numbers increased. Up to 14 per cent reported that their colleagues had fabricated or falsified data, and up to 72 per cent were said to have participated in QRP.

This certainly sounds like a lot, but the study author, Daniele Fanelli from the Meta Research Innovation Center, Stanford University, USA, urges caution before reading too much into these figures.

“I wouldn’t over-dramatise the problem,” writes Fanelli in an email to ScienceNordic.

The study uses anonymous surveys and so we cannot say for sure that it reflects the scientists’ real behaviour, stresses Fanelli, adding that the one per cent figure for serious forms of misconduct has been confirmed by other studies.

“So it seems a plausible ball-park figure of the average rate of falsified or plagiarised studies,” he says.

Is one per cent fraud a lot?

When it comes to these more serious forms of misconduct, is a one per cent rate of fraud a lot?

“It certainly calls for intervention,” writes Fanelli. “Nonetheless, I suspect that a one per cent rate of fraud compares very well to what you would obtain from surveying most other human activities, such as finance, politics, or even religion.”

Professor Jens Oddershede from the University of Southern Denmark, who recently chaired a national report on research misconduct in Denmark broadly agrees.

He acknowledges some of the famous cases in Denmark in recent years that his report addresses by recommending the implementation of a new definition of misconduct and extra checks in the way the universities report on their investigations. But he urges academics to not allow such cases and new regulations distract them from their daily working life.

 “[Scientific misconduct] is not something we should fear,” he says. “We shouldn’t think about this all the time, it should just be in the background. It shouldn’t impede researchers from doing what they want to do,” he says.

Science Europe think that there are reasons to be concerned, even if the majority of allegations of scientific
misconduct seem to consist of the less serious QRP. If levels of QRP are at the higher end of these estimates, then they could still “damage the reputation of researchers and the research community, and ultimately societies’ trust in research,” they say.

Who investigates research misconduct?

When it comes to investigating misconduct, the first line of defence is often the internal ethics committees at the universities.

A 2015 report by The Danish Agency for Science, Technology and Innovation found that out of 15 nations surveyed, all but one (Luxemburg) required universities to investigate new allegations of misconduct.

All of the surveyed countries except Ireland had some form of national committee or multiple committees that are largely independent of the universities and to which universities can refer serious cases of misconduct.

But of these, only committees in Denmark, Norway, Poland, and the USA operate within legally binding definitions of research misconduct. And only committees in Denmark, Poland, Croatia, and Norway, can step in and investigate a case without it having to be referred to them by a university first.

Jens Oddershede refers to the Danish system as a system of “checks and balances.”

“We give responsibilities to the universities, but we also make sure that we know what’s going on in individual universities. So the committees can take action themselves,” says Oddershede.

Many misconduct cases fall on the borderline between QRP and FFP--especially when it comes to plagiarism. It is a sliding scale ranging from scientists, who do not adequately attribute the influence of other people’s ideas or previous work, and all the way up to full-blown plagiarism of an entire paper or thesis.

“It’s just common sense”

When it comes to avoiding misconduct, at either end of the scale, Oddershede’s advice is simple.

“It’s just common sense,” he says.

“In science, do what you would do when you’re at home and dealing with friends, family and neighbours,” he says. “Don’t steal anyone else’s work, don't copy their work without getting permission. That’s all there is to it.”

Oddershede advises universities to ensure that their graduate students know exactly what behaviour might be considered as questionable practice or even misconduct.

And he’s not alone. Many countries around the world agree that addressing misconduct starts by educating researchers at all levels.

A spokesperson from The Norwegian National Research Ethics Committees told ScienceNordic that Norway will try to pass new legislation this summer to obligate universities to educate and train their employees and students in research ethics. While Finland issued guidelines in 2012, to help standardise teaching of research ethics taught to graduate students of Finnish universities.
Fact box

What is research misconduct?
“Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results”
*OECD, Global Science Forum, 2007.*

There are two levels of misconduct:
1. FFP counts as serious misconduct that can distort the research record.
2. QRP are less serious, but can still damage the reputation of researchers and the research community, and ultimately societies’ trust in research

*Source: OECD, Global Science Forum.*

**Side story**

**FFP: Serious Misconduct**

**Fabrication of data** (F): making up results and recording or reporting them.

**Falsification of data** (F): manipulating research, materials, equipment, or processes; changing or omitting data or results such that the research is not accurately represented in the research record.

**Plagiarism** (P): the appropriation of another person’s ideas, processes, results, or words without giving due credit, including those obtained through confidential review of others’ research proposals and manuscripts.


**QRP: Questionable Research Practices**

**Research practice misconduct:** poor research design; using inappropriate (harmful or dangerous) research methods; experimental, analytical or computational errors.

**Data-related misconduct:** not preserving primary data; poor data management and/or storage; withholding data from the research community.

**Publication-related misconduct:** claiming undeserved authorship; denying authorship to contributors; artificially proliferating publications; failure to correct the publication record.

**Personal misconduct:** Inadequate leadership/mentoring of next generation of researchers and scholars; inappropriate personal behaviour, and harassment; insensitivity to social or cultural norms.

**Financial and other misconduct:**
Peer review abuse, non-disclosure of a conflict of interest, misrepresentation of credentials; misuse of research funds for unauthorized purchase or for personal gain.


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