Quality in Higher Education

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cqhe20

Research fraud: a long-term problem exacerbated by the clamour for research grants

Lee Harvey

To cite this article: Lee Harvey (2020) Research fraud: a long-term problem exacerbated by the clamour for research grants, Quality in Higher Education, 26:3, 243-261, DOI: 10.1080/13538322.2020.1820126

To link to this article: https://doi.org/10.1080/13538322.2020.1820126

Published online: 28 Oct 2020.

QUALITY IN HIGHER EDUCATION
2020, VOL. 26, NO. 3, 243–261
https://doi.org/10.1080/13538322.2020.1820126

Routledge
Taylor & Francis Group

EDITORIAL

Research fraud: a long-term problem exacerbated by the clamour for research grants

Lee Harvey

ABSTRACT
This account explores the form and extent of research fraud, the time it takes to investigate these frauds and the inadequacy of university investigations. There also appears to be reluctance to communicate details about fraudulent papers to the scientific community. The sensationalist reporting of fraud is explored. Underlying the analysis is the question as to whether the structure of rewards in higher education encourages research fraud. The analysis addresses the structure of rewards in higher education and the impact that has on researchers, creating the potential for the normalisation of research fraud.

Introduction

Surprisingly few of the contributions to *Quality in Higher Education* discuss the quality of academic research. This extended editorial addresses one aspect of research quality: research fraud.

Research fraud is fabrication, falsification or deception in performing or reporting research results. Research fraud deceives employers, funders, the research publishers and readership (and ultimately the general public) by attempting to publish research that is misleading, has been fabricated in some way, has not even been conducted in the first place or has already been published elsewhere.

In a world of 'fake news', where politicians set the tone by perpetuating lies, it might be no surprise that research is faked too. What is heartening is that the vast majority of research is fundamentally honest and, although corners may be cut, the intention is to add to knowledge not deceive the scientific readership or grant providers.

This account examines the nature of research fraud and cites examples of its various manifestations and implications. It raises questions about the extent of fraud, the length of time it takes to uncover instances, the reluctance of institutions to act, the sensationalism of some reporting of high-profile cases and the inability of some fraudsters to acknowledge their actions. Underlying the analysis is the question as to whether the clamour for research grants and the consequent

CONTACT Lee Harvey leecolinharvey@gmail.com

structure of rewards in higher education has encouraged research fraud and whether this is a recent and growing problem.

The examples used are not new evidence but a selection of well-known cases that appear in various lists of research fraud cases, such as Retraction Watch, OnlineUniversities' '10 Greatest Cases of Fraud in University Research', ListVerse's 'Top 10 Scientific Frauds and Hoaxes', Wikipedia's 'List of scientific misconduct incidents', Vocal's 'Most Deceptive Scientific Frauds', Explorable's 'Some Famous Science Frauds' as well as on-line searches for recent cases of fraud that illuminate the underlying argument. Their inclusion is to illustrate not just the types of fraud but the underlying issues of the extent of fraud, the time it takes to reveal it, the reluctance to address it and how the structure of research funding promulgates fraud.

Grant Steen (2011a) analysed article retractions and suggested that it demonstrated that research fraud has indeed increased in recent years. In a subsequent paper, Steen (2011b) suggested that apparent increase in incidence of research fraud in medicine is leading to increased harm to patients. Yudhijit Bhattacharjee (2013), suggested that scientific fraud has a range of manifestations, some of which go unchallenged, 'on a continuum of dishonest behaviors that extend from the cherry-picking of data to fit a chosen hypothesis … to outright fabrication'.

Fabrication

Research fraud is not a new phenomenon, it has a long history arguably it has existed since the dawn of science (Hersen and Miller, 1992). Indeed, there have been many scientific frauds. The most extreme form is research that has been entirely fabricated. Piltdown Man is one of the more famous cases: a human skull combined with an orangutan's jaw and the teeth of a chimp, found in a gravel pit at Piltdown in England by Charles Dawson in 1912, touted as the discovery of the so-called 'missing link' in the evolution of hominids from apes, it confounded evolutionary biologists for 40 years before being exposed as a forgery in 1953.

A notorious case was that of Dutch psychologist Diederik Stapel who admitted to faking data and making up entire experiments that were published in a substantial number of articles. He published research indicating that eating meat made people selfish and less social, a study supposedly showing that advertisements for perfume, mascara and other beauty-enhancing products made women feel inadequate and a study in *Science*, which gained a lot of media attention but ultimately proved his undoing, about an experiment done at the Utrecht train station showing that a messy rubbish-filled environment accentuated racist tendencies in individuals. Unable to substantiate his data he confessed and was ultimately dismissed from the University of Tilburg.

Another case of fabricated data was the work of Hwang Woo Suk. The once highly regarded stem-cell South Korean researcher published an article in 2005

stating that human stem cells had been extracted from cloned embryos. A colleague of Hwang's revealed that the human cloning discoveries had been fabricated and Hwang was dismissed from Seoul National University in March 2006 and three years later found guilty of embezzling research funds (Craine, 2019).

Marc Hauser, a Harvard University psychologist, also fabricated and falsified data and made false statements about experimental methods in six federally funded studies. He resigned in 2011 after a three-year internal investigation found him solely responsible for eight instances of scientific research misconduct. Harvard University officials confirmed the reports but did not provide further details. The university's silence left researchers studying animal cognition wondering which of Hauser's hundreds of published studies might be tainted. Finally, in September 2012, the Office of Research Integrity of the U.S. Department of Health and Human Services identified six instances in which Hauser engaged in research misconduct in research funded by the National Institutes of Health (Carpenter, 2012).

Karolinska Institute's lack of action in the case of Paolo Macchiarini is another recent example. 'The whistleblowers had discovered that in six published papers, Macchiarini falsified data, lied about the condition of patients and circumvented ethical approvals. As a result, multiple patients suffered and died' (Herold, 2018). Karolinska Institute's reaction following its belated acknowledgement was to turn on the whistleblowers. 'When the institution at last owned up to the scandal, it vindictively found Karl Henrik-Grinnemo, one of the whistleblowers, guilty of scientific misconduct as well. It also designated two other whistleblowers as "blameworthy" for their roles as co-authors of the papers on which Macchiarini was the lead author' (Herold, 2018).

Another fraudster at Harvard, Karen Ruggiero, a psychologist, fabricated data on gender and discrimination resulting in two research publications being retracted (Murray, 2002). Jens Förster a social psychologist who worked at the Ruhr-Universität Bochum and at the University of Amsterdam fabricated data reported in published papers. An investigating committee in 2015 identified, in Förster's work, data that were 'practically impossible' (van Kolfschooten, 2015) and displayed 'the evidence for low scientific veracity of the publication to be "strong"' (McCook, 2017).

Rusi Taleyarkhan, a nuclear engineer at Purdue University in the United States, was found by a university committee in 2008 to have falsified his research on 'tabletop' nuclear fission, published in *Science* in 2002. Seven months later it exonerated him before being forced by a U.S. House of Representatives subcommittee, a year and a half further on, to re-examine the issue, as federal grant money was being used. The subcommittee issued a report criticising Purdue's inquiry as secretive and inadequate and a federal investigation was threatened if the university did not take a fresh look at the controversy. Purdue finally stripped

Taleyarkhan of his professorship although allowing him to remain at the university (*San Francisco Chronicle*, 2008).

So, the international list goes on, there are many more cases of fabrication covering all branches of science.

What stands out is the overly long time it takes to investigate these frauds and the inadequacy of university investigations, as well as the reluctance by journals and institutions to face up to the fraud perpetrated against them. There is also some ambiguity, not helped by inadequate communication from official quarters, over which papers have been affected, with the number of retractions seemingly to be fewer than the number of research papers flagged up as problematic. In some cases, it seems these blatantly fraudulent researchers continue to obtain grants.

Not doing the study

Rather than fabricate data, another form of fraud is to take the research grant but not do the research. Caroline Barwood was charged with fraud and attempted fraud after an investigation by Queensland's Crime and Corruption Commission into allegations she had obtained research grants dishonestly. Several papers co-authored by Barwood were retracted when no evidence could be found that the study had ever been conducted. A Brisbane District Court found her guilty of falsifying Parkinson's disease research to obtain hundreds of thousands of dollars in funding (*Brisbane Times*, 2016).

Yoshihiro Sato published research in the field of bone fractures. It involved very large and improbable trials undertaken in short periods of time. Disastrously, meta-analyses had included Sato's work, resulting in wrong conclusion. Furthermore 'To follow up on studies they did not know were faked, researchers carried out new trials that enrolled thousands of real patients' (Kupferschmidt, 2018).

There are a lot of other cases of not doing the research on which published articles are supposedly based. For example, Mart Bax, former professor of political anthropology at the Vrije Universiteit, Netherlands, had never published 61 of the papers listed on his CV. Denis de Jesus Lima Guerra was dismissed from the Federal University of Mato Grosso for what was regarded as the biggest scientific fraud in Brazil. He and his co-authors were accused, in 2011, of forging nuclear magnetic resonance data used in eleven articles that were subsequently retracted (Silva, 2014).

Fraud has many layers and is not always easy to spot; especially when the fraudulent activity is an absence of activity. Even when uncovered, the fraud may avoid sanction, being otherwise described as 'questionable scholarship'. William Becker and Suzanne Becker (2011) wrote: 'an Australian [in fact English] higher education student-satisfaction guru . . . asserted that his research showed what encourages university students to learn effectively [admitted that] the

paper which was listed as the source for his regression of the deep approach index on the good teaching index … had never been written'.

Altered data

More often, fraud involves adjustments to data to fulfil the desired results, rather than complete fabrication. Another fraud that took more than a decade to expose was the damaging work of Andrew Wakefield, a physician who, in 1998, published a study in the *Lancet* that showed a connection between autism and the measles-mumps-rubella vaccine. This resulted in parents refusing the vaccine for their children and subsequent widespread outbreaks of measles and mumps in Europe and the United States. An investigation in 2010 revealed that Wakefield and colleagues had altered facts about the subjects in their study (Healio, 2012).

Plant biologist Oliver Voinnet was suspended in 2015 for two years from the *Centre national de la recherche scientifique* due to multiple cases of data manipulation that resulted in 21 corrections, seven retractions, and two investigations. The Swiss National Science Foundation also withdrew his funding and banned him for three years (McCook, 2016).

A detailed investigation concluded that Michael LaCour's paper in *Science*, later retracted, about gay equality was 'irregular' (Broockman *et al*., 2015, p. 1) 'the dataset was not collected as described' and that irregularities included 'baseline outcome data that is statistically indistinguishable from a national survey and over-time changes that are unusually small and indistinguishable from perfectly normally distributed noise'.

Brian Wansink, while a professor of food studies at Cornell University, Ithaca New York, was found to have misreported research data, going back years. He used problematic statistical techniques and failed to document and preserve research results. Forty research articles were deemed problematic, eighteen retracted, seven expression of concern and fifteen corrected (Rosenberg & Wong, 2018).

It cost Partners HealthCare System and one of its hospitals, Brigham and Women's Hospital, 10 USD million to resolve allegations, which the hospital brought to light, that their stem cell research laboratory run by Piero Anversa fraudulently obtained grant funding from the National Institutes of Health. A four-year study revealed that 31 published studies should be retracted because 'the work of the laboratory included improper protocols, invalid and inaccurately characterized cardiac stem cells, reckless or deliberately misleading record-keeping, and discrepancies and/or fabrication of data and images included in applications and publications' (Department of Justice, 2017).

There are many more examples that range across all disciplines and many countries. These, though, are just examples of the ones that have come to light. Such exposé takes a long time. It took, for example, a year for LaCour's single

paper to be revealed as 'irregular'. How many more research articles in reputable journals are the result of adjustments to suit the research aim?

While not deliberately altering data, a widespread issue is the use of statistical analyses without any consideration of the scale of the data. A major problem is the use of parametric statistics with Likert-type attitude scales. Once the data is transformed from 'Strongly disagree', 'Disagree' 'Neutral', 'Agree' and 'Strongly agree' to numbers 1–5, the meaning of the numbers is lost and a clearly ordinal scale is treated as interval or even ratio with the application of parametric tests such as analysis of variance. Hardly ever, when such tests are applied, even to interval scale data, is any consideration made of whether the population distributions comply with the underlying assumptions of the test or, indeed, whether the necessary random sample has even been remotely attempted let alone attained.

Plagiarism

Plagiarism is another form of fraud. It occurs when a proposed publication includes substantial sections from other people's work without any citation or acknowledgement of the original source. For example, Mahesh Visvanathan and Gerald Lushington, of the University of Kansas, published three bioinformatics articles, portions of which had been lifted from another scientists' work (Bavley, 2012).

Alex Caton and Grace Watkins (2017) reported how Monica Crowley, the U.S. President's choice as a security advisor for the National Security Council, plagiarised numerous passages in her Ph.D. dissertation. More than a dozen sections of text were copied with little or no change from other scholarly works without proper attribution.

Alexander Spivak, a senior lecturer at the Holton Institute of Technology in Israel, plagiarised the same paper written by researchers at Tel Aviv University on two occasions. Two of his papers on absorbing boundaries were published in the *International Journal of Pure and Applied Mathematics*. The Holton Institute's handling of Spivak's misconduct received harsh criticism. Zeev Schuss, who initially revealed the plagiarism of his work communicated his findings to Spivak's institution but nothing was done until the matter was posted on the blog of an Israeli newspaper *Ha'aretz* (in Hebrew). The Holton Institute finally acted and gave Spivak a year's sabbatical (Ferguson, 2014)!

Mustapha Marrouchi, an English professor at the University of Nevada, Las Vegas, was a serial plagiariser: 23 of his 26 papers contained plagiarised passages. 'For over 20 years, Marrouchi built a career on lifting passages without citation and, even after being called out twice for the behavior, he continued to have a prosperous academic career' (Bailey 2014).

Elias Alsabati also built an academic career on plagiarised papers. While based in Houston, he published 60 papers on cancer research, the majority in 1979 alone. He did not just plagiarise excerpts but whole manuscripts. For example,

three identical review articles published in three different journals were word-for-word copies of a grant application made by another researcher in Philadelphia. Another article was an almost verbatim copy of an article published in Japan two years earlier. Another article in a Japanese journal was taken from a dissertation of a University of Kansas graduate. He even added non-existent co-authors to his papers to give them more credibility (Broad, 1980).

In a nasty twist on being exposed as a plagiarist, Supachai Lorlowhakarn, an official at Thailand's National Innovation Agency, was found guilty of criminal forgery in 2012, for plagiarising 80% of his PhD thesis on asparagus cultivation. He had his PhD degree retracted, was fined and received a six-month suspended jail sentence but was not dismissed from his post (Sharma & Lamubol, 2012). Wyn Ellis, the plagiarised author and whistleblower was subsequently detained for four days by Thai immigration officials in 2015, as a result of an official letter from Lorlowhakarn characterising Ellis as a 'danger to Thai society' (McCook, 2015).

It has been argued that plagiarism is hard to pin down, that different cultures have a different view on plagiarism. When does reference to other work migrate from being good scholarship to being plagiarism? The answer is when authors pretend or imply that the work being reported is their own; when sources are not provided and when verbatim chunks of text from other sources are used in published work without any acknowledgement of the contribution of the original authors. The frightening aspect of the examples above is that academics are able to plagiarise dozens of works over decades of their career without any obvious consequences.

Duplication of publication

Another issue is the simultaneous submission of the same article to more than one journal. Bruno Frey, an economist at the University of Zurich, Switzerland in 2010–11, co-wrote several papers exploring who survived the Titanic disaster. Four of the articles published in different journals were strikingly similar in content. Once discovered, Frey admitted making a mistake, he and his two co-authors 'wanted to reach the broadest possible audience' and in the process he 'lost track', he said, when asked why he did not cross-reference the articles (Shea, 2011).

Much more frequent than duplication of publication is so-called salami slicing of a research project. Many researchers publish several articles from the same piece of research. The pressure to publish has led to a tendency to publish offshoot articles. However, this can, in some cases, result in the same data being used in different articles (with no text similarity) and without any cross-referencing. Such salami slicing 'cannot be easily detected, gives undeserved credit to authors, misleads the scientific community …. [Furthermore] Taking

the same data twice into result calculations can significantly distort the final outcome of meta-analysis' (Smolcic, 2013).

Establishing fraudulent activity

However, identifying and establishing fraudulent activity is complex. The publication process for scientific research relies heavily on peer review but, as Stroebe *et al*. (2012, p. 677) explained, there are concerns about peer review's ability to identify good research. 'It will therefore not come as a major surprise that peer reviewers are also not very successful in uncovering scientific fraud. Even the most reputable journals appear to accept articles that contain glaring inconsistencies overlooked by reviewers'.

The converse of this is that researchers can have their careers blighted by false accusations, especially when sensationalised in the mass media. Two researchers in different jurisdictions, United States of America and Italy, were each accused of fraud, in particular manipulating images using Photoshop. The mass media jump readily onto such accusations, albeit are less inclined to highlight acquittals.

Dipak K. Das of the University of Connecticut, whose work reported health benefits in red wine, was accused of widespread scientific fraud, involving 26 articles published in 11 journals. The investigation of Das's work, which began in January 2009, eventually produced a 60,000-page report claiming Das published research articles were found to contain 145 instances of fabrication and falsification of data (Wade, 2012). Many involved cutting and pasting photographic images from a type of research record known as a Western blot. The investigation and its staggeringly long report took three years but its conclusions were incorrect. A year later when *Resveratrol News* published Dipak Das's obituary it seemed to be a sole voice setting the record straight: 'It is clear that millions of lives have been lost with failure to put into practice many of the discoveries made by Dipak K. Das' (Sardi, 2013).

Similarly, a gastroenterologist and assistant professor Stefano Fiorucci of the University of Perugia was indicted for fraud and embezzlement for manipulating images using Photoshop. Again, the media widely reported the accusations, resulting in four retractions and nine expressions of concern for publications authored by Fiorucci, which turned out to be baseless. Retraction Watch (2016) explained that the Criminal Court of Perugia declared that every accusation against Prof. Fiorucci was false. The ruling (translated) reads: ' … the Court DISCHARGES Stefano Fiorucci from the crimes, he stands accused of in the report, because there is no case to answer'. The court also ordered that any property seized from Fiorucci must be returned.

The recent high-profile case of Oona Lönnstedt, from James Cook University, who produced papers on microplastics, acidification, and reef degradation has also fed journalistic imagination not only because of the level of fraud involved but

because of the consequences for whistle blowers. The reporter for *The Australian* blamed the university for taking far too long to undertake an investigation and failing to reinstate the dismissed whistle blower:

> James Cook University is a joke, and if they were serious about showing they care about ethical and rigorous research they would reinstate Ridd immediately and finish the investigation fast. Anything less is "business as usual" at JCU. Fake science. (Lloyd, 2019)

The underlying implication is that the institution is more concerned with attracting grants than the outcomes of the science that has been funded.

This rather disturbing insinuation is considered in more detail below, which explores whether the way higher education research is funded exacerbates the problem of scientific research fraud.

The foregoing has illustrated the extent, forms and nature of research fraud and the way that the media reports high profile cases of fraud. What it suggests, though, is that 'low-level' fraud is not 'exposed' and that the extent of this less spectacular fraudulent activity, such as plagiarism, salami slicing and data adjustment, is perhaps far more widespread than is assumed. The world expects science in all its forms to be scrupulous and it is not in anyone's interest to suggest that the very basis of scientific 'objectivity' is being undermined.

Pressure to attract research funding

Pressure to get research funding is not a new phenomenon in higher education. In their edited book on *Research Fraud in the Behavioural and Biomedical Sciences*, back in 1992, Michael Hersen and David Miller's conclusion pointed out frequent media reporting of research fraud in the biomedical and social sciences. They were concerned that sensationalist reporting might override fundamental issues, and so made what they called a modest proposal on the way forward:

> … we are not convinced that sufficient attention has been accorded to what we believe is the *heart of the problem: the commercialism of academia and its attendant issues*. Thus, in the remainder of this chapter we will direct our attention to such issues, including academia as big business, "publish or perish," publish *positive* results or perish," … and the anti-intellectual climate that is pervading the academic atmosphere. (Hersen & Miller, 1992, p. 229)

They noted the frequency of instances of research fraud in the biomedical and social sciences and argued that although 'it might be tempting to attribute the seemingly alarmingly high number of new cases to intensified academic pressures in our time or to increased vigilance of the scientific community in the 1980s and 1990s' there is a long history of scientific fraud (Hersen & Miller, 1992, p. 225). For Hersen and Miller the issue is not just about unscrupulous researchers but a structural issue. The problem lay in the 'highly commercialized approach to research that has evolved during the past 20 years, and in particular within the past decade'. They imply unsavoury consequences of this big

business approach and the consequent 'market mentality'. They claimed that the 'financial prize often assumes greater import than the project … for which that prize was originally awarded' (Hersen & Miller, 1992, pp. 230–31).

This characterisation certainly has resonances a quarter of a century later. Ferric Fang, editor of *Infection and Immunity*, more recently agreed that there was an increasing hard sell to attract research grants:

> This makes people desperate to sell their research as strongly as possible. I think people are tempted to cut corners to exaggerate the importance of their work … Everything is reported as a major advance. If that were the case, we should be on Mars and have cured cancer by now. (Bavley, 2012)

Atsushi Asai *et al*. (2016) also argued that government policy and evaluation methods for research grants in Japan are compromising ethics and a more multi-faceted approach in medicine and science is needed to balance the personal need to attain grants with the greater good of scientific endeavour.

More recent comments in the United Kingdom in the *Alternative White Paper For Higher Education* (Holmwood *et al*., 2016) criticised the decline in research funding and the consequent 'elaborate system of competition' and maintained that the Research Excellence Framework (REF), 2014 had negative outcomes as universities are coerced into making choices to maximise the return. 'The result is the closure of good departments, the end of research in some subjects and the decline in academic course provision for students'. Furthermore, research becomes 'risk-averse', with a retreat to 'safe' research topics and a disinclination to challenge orthodoxy. 'This has obvious consequences for academic freedom and the future of United Kingdom science and innovation'. This can only get worse in the wake of the COVID pandemic.

Despite the 'big business' aspect of academia, Hersen and Miller (1992, p. 231) warned against simply blaming the scramble for money. Instead, they dissected the 'elements that directly or indirectly are related to academic commercialism'.

Publish or perish

The first of Hersen and Miller's elements is 'publish or perish', which they contended is a credo that is not new and that has been a fundamental indicator of scientific merit for centuries. The English phrase 'publish or perish', first used in the 1928 and subsequently re-emerged in the 1930s, gained prominence in the 1990s and was roundly condemned by Camille Paglia (1991), who considered academics to be obsessed with quantity rather than quality of publication.

For Hersen and Miller, too, numbers of publications seemed to override quality of publication in recognition and promotion criteria. They cited an Institute of Medicine Report (1989, p. 32) that claimed pressure to publish not only resulted in 'repetitive publication, trivial work, and loose authorship' but also tempts 'researchers to engage in serious misconduct to achieve publishable results'.

Neil Herndon (2016, p. 91) has suggested that 'With publication in top-tier journals now requisite for advancement within academia … the pressure to publish has never been greater …. Perhaps unethical research shortcuts are inevitable … .'. A supposition that this account assesses.

Nonetheless, journal classification and citation analysis has not in any way reduced the pressure on publication nor is there evidence of higher quality output. Rather, there has been an upsurge in the number of journals and consequent numbers of scientific papers. In 2006 alone, approximately 1.3 million peer-reviewed scientific articles were published, aided by a large rise in the number of available scientific journals from 16,000 in 2001 to 23,750 by 2006 (Björk *et al*., 2009). This had risen by 2014, to an estimated 2.5 million papers published a year in 28,100 peer-reviewed journals (Boon, 2017). 'There is a ridiculous proliferation of scientific journals of all kind. Every other day we see a new journal cropping up' (Rawat & Meena, 2014, p. 87). In higher education studies alone, there are about 250 journals. Furthermore, this proliferation is resulting in a steady decline in the number of articles being cited in the first five years after publication. The acceptance and appreciation of a publication is frequently gauged by citation index. A study back in 2010 showed that only 45% of the articles published in 4500 top scientific journals are cited within the first five years of publication (Bauerlein, 2010), a figure that appears to be dropping steadily, and only 42% of articles attract more than one citation, of which between 5% and 25% are self-citations by the authors (Reuters, 2011). Self-citation, itself, becoming an increasing problem.

A widely quoted comment, in 2013, from physicist Peter Higgs, of Higgs-Boson particle fame was that academic publication expectations since the 1990s would have prevented him from making his discoveries.

> It's difficult to imagine how I would ever have enough peace and quiet in the present sort of climate to do what I did in 1964 … Today I wouldn't get an academic job. It's as simple as that. I don't think I would be regarded as productive enough. (Aitkenhead, 2013)

Rawat and Meena (2014, p. 87) questioned the pre-eminence of publication on two fronts. First, they maintained that 'The emphasis on publishing has decreased the value of the resulting scholarship as scholars must spend time scrambling to publish whatever they can manage, rather than spend time developing significant research agenda'. Second, publish-or-perish pressure detracts from 'the time and effort professors can devote to teaching undergraduate and post-graduates', reflecting the overwhelming emphasis universities put on publications, rather than teaching, when recruiting academics.

The other problem, apart from quality and diminution of teaching, Rawat and Meena (2014, pp. 87–9) argued, is that the 'pressure to increase the number of publications has led to unethical practices and waste full [sic] research'. Most of the published research 'are done just to improve the curriculum vitae (CV) of the researcher and they do not find any merit in practical terms'. Publish or perish 'is

now becoming the way of life. It is a race to get more and more publications .... forcing scientists to create publishable research'. This, they say, 'is giving rise to fraudulent researches. Fraud research may corrupt scientific medical literature and ultimately harm our patients'.

More recently, Maarten van Wesel (2016) has reiterated that the pressure on publication is linked to ethical violations and scientific misconduct and Wang Yiwei (2018), writing for Sixth Tone, raised the issue of the pressure on Chinese graduates to publish prior to award of their doctorate and the inevitable fraudulent activity that accompanied this requirement.

Publication of positive results

Hersen and Miller's (1992, p. 233) second issue was the publication of positive results. They noted that:

> The issue of publishing positive results or perishing has received inadequate attention in the literature and it may be significant contributor to the perpetration of research fraud and the perseveration of erroneous data and conclusions in the literature.

The clear and overwhelming bias in journals towards positive results documented by Weisse (1986) had further underreporting consequences that Chalmers (1990, p. 1405) claimed resulted in potential harm to patients because researchers decide not to publish nonconfirmatory data altogether 'or only report portions of the research that substantiate the experimental or clinical hypotheses'.

The fraudster Diederik Stapel, in his confession to Yudhijit Bhattacharjee, suggested that journal editors not only preferred positive results but wanted clear-cut not ambiguous articles.

> In his early years of research—when he supposedly collected real experimental data—Stapel wrote papers laying out complicated and messy relationships between multiple variables. He soon realized that journal editors preferred simplicity. "They are actually telling you: 'Leave out this stuff. Make it simpler,'" Stapel told me. Before long, he was striving to write elegant articles .... (Bhattacharjee, 2013)

Anne-Sophie Jannot *et al.* (2013) showed that there was a bias in citations towards significant studies in medical research and Bram Duyx *et al*. (2017), in the *Journal of Clinical Epidemiology* demonstrated that scientific citations favour positive results. Ana Mlinarić, Martina Horvat and Vesna Šupak Smolčić (2017) claimed that the proportion of positive results published in scientific literature between 1990 and 2007 increased from 70.2% to 85.9%, an average yearly increase of 6%: an effect found across most disciplines and countries, which concurs with Daniele Fanelli (2012).

Mlinarić *et al*. suggested three types of negative results. First, the study is too small and lacks power, findings inconclusively suggest no effect; these should not be published. Second, adequate sample and well-planned study and

findings clearly suggest no effect; this is a genuine case of a negative result and deserves to be published. Third, instead of desired outcome a well-planned study produces the opposite effect entirely; this is not really a negative but simply contradicts the expectation of the researcher and most definitely should be published. They argued that not publishing a 'failed' study can waste other researchers' time and money in needless replication. The lack of publication of negative results distorts meta-analyses, thereby jeopardising their validity (Rothstein 2008; Hart *et al*. 2012; Kicinski, 2014). 'This is potentially harmful as the false positive outcome of meta-analysis misinforms researchers . . . ' (Mlinarić *et al*., 2017, np).

John Antonakis (2017) labelled 'a fixation on statistically significant results' as '*significosis*'. He also raised the impact on meta-analyses:

> The problem of publication bias is ubiquitous and evident across many fields (Pfeiffer, Bertram, & Ioannidis, 2011) making it difficult to reconstruct the distribution of effect sizes. Biased effect sizes are used as foundations for future theory and feed into meta-analyses. Perhaps the effects claimed are real; perhaps they are not. The problem is that because they are statistically significant and published, they become legitimized and part of the research canon, and may be used to guide future research and decide policy.

The focus on positive results and the consequent publication bias has been repeatedly critiqued but little has been done to change the situation. The problem, so graphically illustrated by Stapel's comments, continues to reflect Hersen and Miller's (1992, p. 32) stark warning that researchers are tempted 'to engage in serious misconduct to achieve publishable results'.

Conclusion

Scientific fraud takes many forms from the spectacular deception of fabricated artefacts to unnoticed and extensive plagiarism. Whether it is on the increase as Bavley (2012) claimed, is a moot point because there has surely always been more fraud perpetuated than exposed (Fanelli, 2009). Exposing research is not easy and, despite the review process for journal articles and the possibility of replication, most exposure of dubious practices is the result of revelations by whistleblowers (Stroebe *et al*., 2012).

The reason for fraud is also complicated. The forgoing suggests there is good evidence to suggest that the nature and structure of higher education, not least the pressure to attract research grants and its concomitant requirement to publish extensively, has created the context in which research fraud is perpetuated.

Indeed, the marketisation of higher education, the scramble for research grants and the ingrained credo of publish or perish has created an ideology in which fraudulent activity is both excused and denied. Some fraudsters, even when uncovered, fail to see anything unethical, unprofessional or criminal in their

activities. Marc Hauser, for example, following his resignation from Harvard supplied a statement in which he did not admit deliberate misconduct but blamed overwork.

> … Although I have fundamental differences with some of the findings in the ORI report, I acknowledge that I made mistakes. I tried to do too much, teaching courses, running a large lab of students, sitting on several editorial boards, directing the Mind, Brain & Behavior Program at Harvard, conducting multiple research collaborations, and writing for the general public. I let important details get away from my control, and as head of the lab, I take responsibility for all errors made within the lab, whether or not I was directly involved. I am saddened that this investigation has caused some to question all of my work, rather than the few papers and unpublished studies in question …. (Carpenter, 2012).

Likewise, Brian Wansink of Cornell University. in an email to the *Washington Post*, claimed the retractions came as 'quite a surprise'. He went on:

> From what my coauthors and I believed, the independent analyses of our data sets confirmed all of our published findings," he said. "What we did not keep over the past 25 years are the original pencil and paper surveys and coding sheets that were used in these papers. That is, once we combined all the data into spreadsheets, we tossed the pencil and paper versions. That might be why they said they couldn't reproduce these from scratch (that is, there was no scratch). As I told my coauthors, I've very proud of all of these papers, and I'm confident they will be replicated by other groups. (Rosenberg & Wong, 2018)

The revenge exacted on Wyn Ellis by Supachai Lorlowhakarn (McCook, 2015) is also indicative of failing to accept any wrongdoing.

Not all research fraudsters are in denial, although most ground their excuses in the structure of higher education that provides the rational for their actions, which as Hersen and Miller (1992) suggested is more than a scramble for research funds.

> Stapel did not deny that his deceit was driven by ambition. But it was more complicated than that, he told me. He insisted that he loved social psychology but had been frustrated by the messiness of experimental data, which rarely led to clear conclusions. His lifelong obsession with elegance and order, he said, led him to concoct sexy results that journals found attractive. "It was a quest for aesthetics, for beauty—instead of the truth," he said. He described his behavior as an addiction that drove him to carry out acts of increasingly daring fraud, like a junkie seeking a bigger and better high …. Several times in our conversation, Stapel alluded to having a fuzzy, postmodernist relationship with the truth, which he agreed served as a convenient fog for his wrongdoings …. (Bhattacharjee, 2013)

These denials and *post hoc* rationalisations are located in a context of extremely slow responses by journals and institutions, having been alerted to potential fraud. *Retraction Watch* noted that, in the case of Bharat Aggarwal who has had 28 papers on the cancer-fighting properties of plants, dating back to 2006, retracted for research misconduct, the American Association for Cancer

Research has been very slow in acting in retracting 10 papers in its journals by Aggarwal.

> "Unfortunately, we have been delayed in correcting the published record, and for this we apologize," writes the publisher of The American Association for Cancer Research (AACR), Christine Rullo, in a note in this month's issue of *Cancer Research*. Rullo doesn't say how long the journals took to handle the retractions .... We recently wrote about long delays at *Cancer Research* involving another researcher, Anil Jaiswal. In that case, after nearly two years, some articles that the University of Maryland at Baltimore, Jaiswal's former employer, had requested be retracted, still weren't. (Retraction Watch, 2018)

Harvard Medical School who undertook the review of Anversa's work 'declined to comment on why it took so long to take action on Dr. Anversa's published work' (Kolata, 2018). In a recent article, David Saunders (2020) described numerous scenarios where institutional leadership failed to take action against research misconduct.

In some cases, as the examples above have shown, the institution does not react at all until forced into action, in other cases years pass before an investigation is concluded and the sanction ranges from the insignificant to the farcical award of a sabbatical! Furthermore, institutions are reluctant to provide details, Harvard, for example, declined to provide detail about Hauser's fraud. In some cases, the institution is all too ready to exonerate the fraudster, as was the case at Purdue University, detailed above. The University of Colorado faced a legal struggle in the case of Ward Churchill, a former professor of ethnic studies. A university committee 'alleged instances of plagiarism, misuse of others' work, falsification and fabrication of authority' (CU Boulder Today, 2006). The University Chancellor recommended Churchill's dismissal to the Board of Regents. However, in 2009, a jury ruled that he had been wrongly dismissed, although the presiding judge declined to reinstate him (Johnson & Seelye, 2009) a decision upheld by the Colorado State Court of Appeals (in 2010), the Colorado Supreme Court (in 2012) and finally The Supreme Court of the United States declined to hear Churchill's further appeal. This litigious route may be why American institutions are reluctant to act decisively. It also reflects the fundamental denial at the heart of fraudulent activity.

Disclosure statement

No potential conflict of interest was reported by the author.

References

Aitkenhead, D., 2013. 'Peter Higgs: I wouldn't be productive enough for today's academic system', *The Guardian*, 6 December.

Antonakis, J., 2017, 'On doing better science: from thrill of discovery to policy implications', *The Leadership Quarterly*, 28(1), pp. 5–21.

Asai, A., Okita, T. & Enzo, A., 2016, 'Conflicting messages concerning current strategies against research misconduct in Japan: a call for ethical spontaneity', *Journal of Medical Ethics,* 42(8), pp. 524–27.

Bailey, J., 2014, 'Top plagiarism scandals of 2014e', *iThenticate: Plagiarism Blog*, 17 December. Available at http://www.ithenticate.com/plagiarism-detection-blog/top-plagiarism-scandals-2014 (accessed 14 June 2020).

Bauerlein, M., Gad-el-Hak, M., Grody, W., McKelvey, B. & Trimble, S., 2010, 'We must stop the avalanche of low-quality research, *The Chronicle of Higher Education*, 13 June. Available at http://www.chronicle.com/article/We-Must-Stop-the-Avalanche-of/65890 (accessed 5 February 2020).

Bavley, A., 2012, 'Case of two KU scientists illustrates growing problem of research fraud', 28 January. Available at http://www.kansascity.com/news/local/article300700/Case-of-two-KU-scientists-illustrates-growing-problem-of-research-fraud.html#storylink=cpy (accessed 20 June 2020).

Becker, W.E. & Becker, S.R., 2011, 'Potpourri: reflections from husband/wife academic editors', *American Economist*, 56(2), pp. 74–84

Bhattacharjee, Y., 2013, 'The mind of a con man', *New York Times*, 26 April.

Björk, B-C, Roos, A. & Lauri, M., 2009, 'Scientific journal publishing: yearly volume and open access availability', *Information Research*, 14(1). Available at http://www.informationr.net/ir/14-1/paper391.html (accessed 29 June 2020).

Boon, S., 2017. '21st Century science overload', *Canadian Science Publishing*, 7 January. Available at http://blog.cdnsciencepub.com/21st-century-science-overload/ (accessed 29 June 2020).

Brisbane Times, 2016, 'Ex-UQ academic found guilty of fraud', *Brisbane Times*, Available at https://www.brisbanetimes.com.au/national/queensland/exuq-academic-found-guilty-of-fraud-20161024-gs9gcz.html (accessed 29 June 2020).

Broad, W.J., 1980, 'Would-be academician pirates papers', *Science*, 27(4451), pp. 1438–40.

Broad, W.J., 1981, The publication game: getting more for less', *Science*, 211, pp. 1137–9.

Broockman, D., Kalla, J. & Aronow, P., 2015, 'Irregularities in LaCour (2014)', Report 19 May. Available at http://stanford.edu/~dbroock/broockman_kalla_aronow_lg_irregularities.pdf (accessed 29 January 2016).

Carpenter, S., 2012, 'Harvard psychology researcher committed fraud, U.S. investigation concludes', *Science*, 6 September. Available at https://www.sciencemag.org/news/2012/09/harvard-psychology-researcher-committed-fraud-us-investigation-concludes (accessed 29 June 2020).

Caton, A. & Watkins, G., 2017, 'Trump pick Monica Crowley plagiarized parts of her Ph.D. dissertation', *Politico Magazine*, 9 January.

Chalmers, I., 1990, 'Underreporting research is scientific misconduct', *Journal of the American Medical Association*, 263, pp. 1405–08.

Craine, A.G., 2019, 'Hwang Woo-Suk: South Korean scientist', *Encyclopaedia Britannica*. Available at https://www.britannica.com/biography/Hwang-Woo-Suk (accessed 9 January 2020).

CU Boulder Today, 2006, 'Report on Professor Ward Churchill presented to media', 15 May. Available at https://www.colorado.edu/today/2006/05/15/report-professor-ward-churchill-presented-media (accessed 29 June 2020).

Department of Justice, 2017, 'Partners Healthcare and Brigham and Women's Hospital agree to pay $10 million to resolve research fraud allegations. U.S. Attorney's Office District of Massachusetts'. Available at https://www.justice.gov/usao-ma/pr/partners-healthcare-and-brigham-and-women-s-hospital-agree-pay-10-million-resolve (accessed 29 June 2020).

Duyx, B., Urlings, M.J.E, Swaen, G.H.M., Bouter, L.M. & Zeegers. M.P., 2017, 'Scientific citations favor positive results: a systematic review and meta-analysis', *Journal of Clinical Epidemiology*, 88, pp. 92–101.

Fanelli, D., 2009, 'How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data', *PLoS ONE* 4(5), e5738.

Fanelli, D., 2012, 'Negative results are disappearing from most disciplines and countries', *Scientometrics*, 90(3), pp. 891–904.

Ferguson, C., 2014, 'Blatant plagiarism sinks paper (and earns a sabbatical!) for mathematician', *Retraction Watch*, 7 October. Available at http://retractionwatch.com/2014/10/07/blatant-plagiarism-sinks-paper-and-earns-a-sabbatical-for-mathematician/ (accessed 14 May 2019).

Hart, B., Duke, D., Lundh, A. & Bero, L., 2012, 'Effect of reporting bias on meta-analyses of drug trials: reanalysis of meta-analyses', *British Medical Journal*, 344, d7202.

Healio, 2012, 'Wakefield study linking MMR vaccine, autism uncovered as complete fraud', *Healio: Infectious Diseases in Children*, February. Available at https://www.healio.com/pediatrics/vaccine-preventable-diseases/news/print/infectious-diseases-in-children/%7B24b5933b-b212-4b86-b170-d8097c205a64%7D/wakefield-study-linking-mmr-vaccine-autism-uncovered-as-complete-fraud (accessed 29 June 2020).

Herndon, N.C., 2016, 'Editorial: Research fraud and the publish or perish world of academia', *Journal of Marketing Channels*, 23, pp. 91–96.

Herold, E., 2018, 'Researchers behaving badly: known frauds are "the tip of the iceberg", *Leapsmag*, 'News Analysis'. Available at https://leapsmag.com/researchers-behaving-badly-why-scientific-misconduct-may-be-on-the-rise/ (accessed 28 September 2019).

Hersen, M. & Miller, D.J. (Eds.), 1992, 'Future directions: a modest proposal' in Miller, D.J. & Hersen, M. (Eds.), 1992, *Research Fraud in the Behavioural and Biomedical Sciences*, pp. 225–43 (New York, Wiley).

Holmwood, J., Hickey, T., Cohen, R. & Wallis, S., 2016, *The Alternative White Paper For Higher Education: In defence of public higher education: knowledge for a successful society: a response to 'Success as a Knowledge Economy. BIS (2016)'*, May (Convention for Higher Education). Available at https://heconvention2.files.wordpress.com/2016/06/awp1.pdf (accessed 29 June 2020).

Institute of Medicine, 1989, *Report of a Study: The responsible conduct of research in the health sciences* (Washington, DC, National Academy Press).

Jannot A.S., Agoritsas, T., Gayet-Ageron, A. & Perneger, T.V., 2013, 'Citation bias favouring statistically significant studies was present in medical research', *Journal of Clinical Epidemiology*, 66(3), pp. 296–301

Johnson, K. & Seelye, K.Q., 2009, 'Jury says professor was wrongly fired', *New York Times*, 2 April.

Kicinski, M., 2014, 'How does under-reporting of negative and inconclusive results affect the false-positive rate in metaanalysis? A simulation study', *British Medical Journal Open*, 4(8).

Kolata, G., 2018, 'Harvard calls for retraction of dozens of studies by noted cardiac researcher', *New York Times*, 15 October.

Kupferschmidt, K., 2018, 'Tide of lies: researcher at the center of an epic fraud remains an enigma to those who exposed him', *Science*, 361(6403), pp. 636–41

Lloyd, G., 2019, 'Fake science on fake fish from James Cook Uni? Third World science with First World funding', *JoNova*. Available at http://joannenova.com.au/2019/01/fake-science-on-fake-fish-from-james-cook-uni/ (accessed 29 June 2020).

McCook, A., 2015, 'Whistleblower released after being held for 4 days in Bangkok airport', *Retraction Watch*, 8 September. Available at https://retractionwatch.com/2015/09/08/whistleblower-released-after-being-held-for-4-days-in-bangkok-airport/ (accessed 29 June 2020).

McCook, A., 2016, 'Swiss funding agency cuts off Voinnet, bans him for 3 years', *Retraction Watch*, 26 January. Available at https://web.archive.org/web/20160308222449/http://retractionwatch.com/2016/01/26/swiss-funding-agency-cuts-off-voinnet-bans-him-for-3-years/ (accessed 29 June 2020).

McCook, A., 2017, 'Journal adds concern notice to paper by psychologist Jens Förster', *Retraction Watch*, 29 September. Available at https://retractionwatch.com/2017/09/29/journal-adds-concern-notice-paper-psychologist-jens-forster/ (accessed 29 June 2020).

Mlinarić, A., Horvat, M. & Šupak Smolčić, V., 2017, 'Dealing with the positive publication bias: why you should really publish your negative results', *Biochemia Medica*, 27(3), 030201.

Murray, B., 2002, 'Research fraud needn't happen at all', *Monitor on Psychology*, 33(2), p. 27.

Paglia, C., 1991, 'Junk Bonds and Corporate Raiders: Academe in the Hour of the Wolf: The Constraints of Desire by John Winkler One Hundred Years of Homosexuality by David Halperin', *Arion*, 1(2), pp. 139–212.

Pfeiffer, T., Bertram, L. & Ioannidis, J.P., 2011, 'Quantifying selective reporting and the Proteus phenomenon for multiple datasets with similar bias', *PLoS ONE*, 6(3), e18362.

Rawat, S. & Meena, S., 2014, 'Publish or perish: where are we heading?' *Journal of Research in Medical Sciences*, 19(2), pp. 87–89.

Retraction Watch, 2016, 'Researcher accused of fraud, embezzlement acquitted by Italian court', 6 June. Available at http://retractionwatch.com/2016/06/06/researcher-accused-of-fraud-embezzlement-acquitted-by-italian-court/ (accessed 29 June 2020).

Retraction Watch, 2018, Cancer journals retract 10 papers, flag 8 more, and apologize for the delay'. Available at https://retractionwatch.com/2018/09/04/cancer-journals-retract-10-papers-flag-8-more-and-apologize-for-the-delay/ (accessed 29 June 2020).

Reuters, T., 2011, 'Journal self-citation in the journal citation reports', Available at http://www.thomsonreuters.com/products_services/science/free/essays/journal_self_citation_jcr (accessed 29 June 2020).

Rosenberg, E. & Wong, H., 2018, 'This Ivy League food scientist was a media darling. He just submitted his resignation, the school says', *Washington Post*, 20 September.

Rothstein, H.R., 2008, 'Publication bias as a threat to the validity of meta-analytic results', *Journal Experimental Criminology*, 4(1), pp. 61–81.

San Francisco Chronicle, 2008, 'Purdue reprimands fusion scientist for misconduct', 27 August.

Sardi, B., 2013, 'Epitaph: Dipak K. Das, PhD, renowned red wine pill researcher', *Resveratrol News*, 25 September.

Saunders, D., 2020, 'Each scientist must stand up, at all costs, for the truth', *Times Higher Education*, 9 July.

Sharma, Y. & Lamubol, S., 2012, 'Plagiarism scandal continues after forgery verdict', *University World News*, 26 August.

Shea, C., 2011, 'Economist slammed for 'concurrent publications', *Wall Street Journal*, 13 July.

Silva, P., 2014, 'Autor da maior fraude científica do Brasil é exonerado da UFMT', *Olhar Direto*, 13 February. Available at https://www.olhardireto.com.br/noticias/exibir.asp?id=358847 (accessed 29 June 2020).

Smolcic, V.S., 2013, 'Salami publication: definitions and examples', *Biochemia Medica* 23(3), pp. 237–41.

Steen, R.G., 2011a, 'Retractions in the scientific literature: is the incidence of research fraud increasing?' *Journal of Medical Ethics*, 37(4), pp. 249–53.

Steen, R.G., 2011b, 'Retractions in the medical literature: how many patients are put at risk by flawed research?', *Journal of Medical Ethics*, 37(11) pp. 688–92.

Stroebe, W., Postmes, T. & Spears, R., 2012, 'Scientific misconduct and the myth of self-correction in science', *Perspectives on Psychological Science* 7(6), pp. 670–88

van Kolfschooten, F., 2015, 'Social psychologist relinquishes chair after data manipulation charges' *Science*, 20 April. Available at: https://www.sciencemag.org/news/2015/04/social-psychologist-relinquishes-chair-after-data-manipulation-charges (accessed 29 June 2020).

Wade, N., 2012, 'University suspects fraud by a researcher who studied red wine', *New York Times*, 11 January.

Weisse, A.B., 1986, 'Say it isn't no: positive thinking and the publication of medical research', *Hospital Practice*, March: 23–25.

Wesel, M. van, 2016, 'Evaluation by citation: trends in publication behavior, evaluation criteria, and the strive for high impact publications', *Science and Engineering Ethics*, 22(1), pp. 199–225.

Yiwei, W., 2018, 'Publish or perish: the dark world of Chinese academic publishing', *Sixth Tone*, 2 November. Available at https://www.sixthtone.com/news/1003146/publish-or-perish-the-dark-world-of-chinese-academic-publishing (accessed 20 June 2020).