

**The Number Bias: How Numbers
Lead and Mislead Us
Sanne Blauw; Sceptre: London**

**Science Fictions: Exposing Fraud,
Bias, Negligence and Hype in
Science
Stuart Ritchie; Penguin: London**

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These two texts, both published in hardback in late 2020, in their own ways make significant contributions to our understanding of contemporary statistical practices. Beginning with Blauw, her book refers to the limits of quantification. For example, after interviewing an illiterate Bolivian domestic worker, Juanita, Blauw writes: “there was no number to express her life spent living in a tent...Much of what she told me could not be counted, but did count” (4-5). Commenting on the reified power of numbers in the early 21st century, the author asks “Should we not put a stop to the dominance of numbers”? Blauw points out that “numbers determine how the world works...numbers rule your life” (5-6). Alas, rather than explaining how capitalist social relations fetishise numbers, she reverts to the oft-repeated claim that “numbers are innocent” (6) or neutral. Nevertheless, Blauw’s discussion of the connections between race and intelligence, as measured by IQ tests, is persuasive. Like most statisticians, however, she is either unaware of, or unwilling to refer to, the dubious origins of the discipline, i.e. Galton’s racist agenda. With reference to numerical targets, Blauw discusses both the various means by which A&E waiting times are ‘reduced’ along with the power of credit scores over people’s lives. Similarly, showing some knowledge of the lives of African American workers, she writes of targets for local government income. Amongst the results of which are heavy fines issued by police officers for minor motoring offences. Unable

to pay these fines a disproportionate number of black workers end up in the world's largest prison system. The book ends on an upbeat, suggesting ways to reduce the fetishising power of numbers by, for instance, not marking students' work with a grade, but rather qualitative feedback: "numbers in our lives is not a given, but something we can resist" (134).

The second text, well written and argued by Ritchie, covers some of the same ground as Blauw, i.e. sampling techniques, but does so in much more depth. Seemingly unaware of the socio-economic power of numbers, Ritchie confines himself to the malpractice that, he argues, is a commonplace amongst statisticians, scientists and others. He begins by referring to those academic papers that are not replicated before or after publication, whilst accepting that some samples cannot be repeated. Ritchie points out that, when replicated, of "100 studies from three top psychology journals" only 39 were successfully replicated (31). The author argues further that of the papers that were replicated in other studies "almost all...had exaggerated the size of their effects" (ibid). Moving onto fraudulent practices, Ritchie mentions invented data sets, fake images, misrepresentation of results and more. Linked to this is the problem of publication bias, whereby several samples are taken and only one supports the hypothesis; keen to get papers published, the non-supporting samples with high p-values are forgotten. In one piece of research cited by Ritchie, "Approximately 65 per cent" (104) of 2,000 psychologists admitted to p-hacking of various kinds, including omitting data points. He found similar practices were common in biomedical science and economics. Moving on to negligence, Ritchie reports that anything from a mere typo to all manner of serious mistakes are, again, all too common in published papers. Hyping of results is Ritchie's next port of call, reporting that this is not just a problem with press reporting of results but also the researchers themselves. One of the most worrying aspects of all this, reports Ritchie, is that all too often previously published papers with lots of citations and glowing reviews are subsequently found to have been in breach of one or more of the above. However, what about the ones that are also in breach that, so far, have not been detected?

In order to explain all of this, Ritchie is highly critical of the ways in which journals, including the most prestigious ones in their respective fields, function. Normally, part of a stable of journals run by a profit

orientated publisher, they encourage papers which capture headlines and their referees often do not adequately investigate novel claims. There are also growing numbers of journals who for reasons of money making, or propaganda, publish almost anything sent to them, often for a fee. Ritchie reports that in 2013 alone in all scientific disciplines around 2.4 million papers were published. Some scientists and statisticians are very ambitious and others are keen to 'prove' their pet theories, as a result of which corners are often cut. Similarly, universities push their employees to publish in order to secure grants and obtain job security. One weakness with Ritchie's text is that he does not discuss what happens inside the private sector where profits are the overriding consideration; though he does make passing references to conflicts of interest. The government funding system is another target for Ritchie, with researchers spending inordinate amounts of time filling in grant application forms.

Finally, Ritchie makes a number of recommendations to improve this troubling state of affairs. He calls for naming and shaming of all those found guilty of misconduct, including investigations conducted by independent bodies. He advocates the widespread use of algorithms to check statistical practices, plagiarism and other malpractice. All results, rather than just those with low p-values, to be published. More use of Bayesian techniques and an end to the use of p-values as a measure of statistical significance. Detailed preregistering of research projects and freely available preprints. A far more open and democratic approach to research, which he calls Open Science, with more scrutiny of ongoing projects by both specialists and lay people. Free public availability of all papers to taxpayers. Whether Ritchie's recommendations go far enough, or whether we need more fundamental change might be a subject for further discussion in *Radical Statistics*.