

on the quality of thousands of their published papers. The comments were left on PubPeer — a website for post-publication review that often hosts anonymous allegations of image manipulation. These can lead to retractions and even, according to at least one lawsuit, to an exciting job offer being rescinded.

In the case of the large-scale comments, the posts had been generated by an algorithm that pointed to potential errors in reported *P* values, measures of statistical significance that are too often used to decide whether results are worth publishing. The program, called statcheck, posted analyses of more than 50,000 papers. It sometimes erroneously tagged correct results as potential errors, and it identified many errors that were real but trivial. It also found instances in which *P* values that had been reported as reaching a threshold for statistical significance were actually just shy of it. Although a few authors have posted explanations and corrected results on PubPeer, none of the posts have to *Nature's* knowledge resulted in any formal corrections or retractions.

Some researchers were confused and upset by the mass fact-check; leaders in the psychological community warned that such projects unduly threaten the reputations of individual researchers and even the field. A former head of the Association for Psychological Science in Washington DC wrote a column decrying the use of “uncurated” social media for personal attacks and harassment. A controversial early draft accused research critics of “methodological terrorism”; it was later revised. Another group of researchers launched a petition that called for discussions to stay polite, but also argued that “the freedom to express legitimate criticism must take priority and be protected”.

To be sure, the automated statcheck comments were lacking some useful context, and the algorithm is far from perfect. But much of the negative reaction has less to do with the ins and outs of a simple computer program than with the importance that people place on scientific papers. These are the currency of funding, tenure and prestige, so any challenges come across as threats to careers and reputation.

The implicit assumption that academic papers must adhere to an impossible standard of perfection does science a horrible disservice.

As *Nature* has pointed out before, the scientific paper is a marker on the way to scientific progress, not itself a destination. Scrutiny of papers is therefore to be welcomed, if only to check that the signposts are pointing in the correct direction. New knowledge arrives constantly to correct and displace the old. It is a messy process, full of acrimonious discussions and painful realizations, but necessary. Errors must be rooted out.

The appropriate reaction depends on the nature of the error. Insightful reasoning can lead to incorrect conclusions that still advance science. A 1996 study of a meteorite that had landed in Allan Hills,

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Antarctica, argued that elongated nanometre-scale blobs in the rock were the fossils of alien bacteria. Subsequent abiotic explanations felled each argument in turn. But the study breathed life into the field of astrobiology.

Carelessness and avoidable errors will not have such positive effects. Revelations of typos and biased reasoning should make authors uncomfortable. Before submitting their work, they should take on the responsibility of reexamining manuscripts for simple details and limits to their conclusions, and should invite colleagues to do the same. (Peer review improves the scientific literature both by giving papers more credibility and by forcing authors to do just this.)

Even so, errors will make their way into the literature. Anyone who finds flaws should seek corrections with diplomacy and humility. A gloating sense of ‘gotcha’ does not help to provide constructive criticism; some ill-considered phrases have caused lasting damage. But many scientists use their blogs for credible, restrained, nuanced criticism, often engaging the authors whose works are criticized.

Sharing and discussion of scientific work has changed drastically in a world of blogs, online repositories and Twitter. The fact remains, however, that self-correction is at the heart of science. Critics — curated or not — should be courteous, but criticism itself must be embraced. ■

Serving suggestion

Reducing food waste requires a change in cultural and social factors to shift behaviour.

The United Nations Food and Agriculture Organization and the World Health Organization are meeting this week to discuss the UN Decade of Action on Nutrition. In this issue, we publish two Comment articles that look at some of the problems. On page 30, a group of researchers stresses the importance of nourishing people, not just feeding them. And a piece on page 33 calls for a better approach to quantifying and analysing different aspects of the food-production system.

Between one-fifth and one-third of all food produced goes into the bin. Attention has increased on these post-harvest losses in recent years, and this week the European Commission held what it billed as the first European Union Platform on Food Losses and Food Waste. Launching the event with a speech that will be recognized by any parent who has sat with a child who won't clear their plate, commissioner Vytenis Andriukaitis said: “It is shameful to throw away food in the world where more than eight hundred million people go to bed hungry.”

To help promote responsible development and production of food, the UN global Sustainable Development Goals call for a number of related measures, one of which is to halve waste in the commercial and retail sectors by 2030. It is partly a consumer challenge, because a sizeable chunk of this thrown-away food has been bought and paid for, sometimes at great expense. To many US readers, it will be second nature

to take restaurant leftovers home. That helps to reduce waste, even if some of the contents of the doggy bag end up in, well, the dog.

In countries such as France it's a different story. The government there has been trying to change that, with a new initiative this year that requires restaurants to supply a ‘gourmet bag’ to diners if they ask for one. Not everyone is happy about the idea, and new research offers some pointers why. The results demonstrate, again, the importance of cultural and social factors in shifting behaviour — even in a direction that benefits all concerned.

Writing in the *Journal of Retailing and Consumer Services*, researchers describe interviews with French diners about their attitudes to food waste and taking it home with them (L. Sirieix *et al.* *J. Retail. Consum. Serv.* **34**, 153–158; 2017). They found the now-standard gap between attitudes and behaviour on environmental issues: although three-quarters of respondents thought that doggy bags were a great idea, just one in ten had ever asked for one.

The excuses were many. “It comes from history and French customs,” one said. Another argued that leaving expensive food on the plate showed social status: “Someone who will take home the meal is someone who has less money.” And it was a sign of a downmarket joint: “It will not be well accepted in a fine dining restaurant.”

Diners went further. Asking for leftovers would bring shame. “It's not rude but culturally it's not normal.” And French dishes are just not designed to be eaten that way, they said. It's “too good to be packed” and only acceptable in “a pizzeria”.

One solution, the researchers suggest, is to make the doggy bag desirable: a valuable gift that appeals on more levels than just sustainability. Some high-end restaurants in the United States, they note, package leftovers in a foil swan. That's one possible solution. Another, of course, is simply to serve smaller portions. ■