

Dear Science,

Mark Twain once said, "the reports of my death are greatly exaggerated." Right now, it seems the same could be said for you. I used to admire your method and put a great deal of faith in you, but lately you've been a disappointment to many. While I too am disappointed, not all is lost. Many observers are concerned that dishonesty in science signals your doom, but there is hope for you yet.

Recently, scientists have been caught red-handed. For example, in some studies, images have been Photoshopped "stretched, flipped, and cut-and-pasted" all to support the study's claimed conclusions. A famous Harvard professor allegedly moved numbers in a spreadsheet and altered data points to exaggerate her findings. A black market even exists where scientists can buy peer reviews for their studies. By manipulating evidence to wrongly prove a result, scientists have published studies without supporting their data.

The scientific method requires that outcomes be reviewed or replicated to prove hypotheses. Before studies get published in scientific journals, they are reviewed by others in the field. Unfortunately, peer reviewers are unpaid, uncredited, and occasionally even for sale. In addition, the peer review system is non-adversarial" peers have no strong incentive to expose fraud in the studies they review. This is the crisis you now face "the peer review system is broken."

While peer review has many issues, there is a group of people referred to as "science detectives," who seem to more effectively review published studies. One detective, Elisabeth Bik, determined that one in 25 peer-reviewed papers she evaluated since 2014 contained evidence of cheating. Ms. Bik has found thousands of instances of blatant image falsification. She worries that science detectives aren't protected enough and are mistakenly villainized by the scientific community. She notes that science detectives can publish their findings on a site called pubpeer.com.

Another science detective, Sholto David, recently discovered fabricated data in research conducted at the Dana-Farber Cancer Institute. David cares about scientific integrity and pays close attention to expose "sloppy errors." Ironically, a study on dishonesty by Francesca Gino, from Harvard Business School, was deemed dishonest. A group of three science detectives, under the name DataColada, examined Gino's studies and found her work to be falsified.

Science, the very critics who have shed light on fraudulent research leading to self-serving conclusions are not only your harshest critics but may also be your saviors. By exposing misconduct in the scientific process, science detectives are catching problems that peer reviewers should be discovering. This should embarrass scientists and their peer reviewers and discourage future cheating on experiments. You're responsible for global progress and can't give up now. Despite significant criticism, with the help of science detectives, I know you can and will

regain your honorable status.

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