

RESEARCH MISCONDUCT ON THE RISE

By [Brian Chen](#) and [Camille Nebeker](#)

The global scientific community is at a major crossroads. [Research misconduct](#) has reached an all-time high with [2023 reaching a record number of retractions in scientific journals](#). In some ways this is not surprising, since the number of retractions from science and engineering publications, while still relatively small, have been [on a steady rise for the past few decades](#). But the recent jump in retractions may mark an inflection point. Whether 2023 is an outlier year or the start of exponential growth in research misconduct, only time will tell.

As a result, “academic fraud” has reached mainstream media with a two-part series in the [Freakonomics podcast](#) (January 10-19, 2024). If left unchecked, the public’s trust in academic research (as well as our own reliance on trustworthy reporting of science) is in jeopardy.

Research Misconduct vs Research Integrity: A Spectrum

While blatant acts of research misconduct are rare – estimated to be [1-2% of all scientific papers](#) – there is a spectrum of activities spanning “research misconduct” on one extreme and “research integrity” on the other. While research misconduct may be the tip of the iceberg and appears relatively small, [75% of researchers admit to “questionable research practices.”](#) Examples of such practices may include making it difficult for others to access your data or adding co-authors that may not fully meet the criteria for authorship. Thus, the absence of research misconduct is not the same as having research integrity.

What Contributes to Misconduct?

While the “publish or perish” (in high impact journals) mantra of academia is a well-known contributor to misconduct, more subtle, structural drivers also exist. Company or lab culture can significantly influence research integrity or misconduct, as described by the [Editor-in-Chief of Science, who describes three types of cultures that lead to misconduct – pathological, bureaucratic, and generative](#). Pathological culture is where crucial information about potentially damning errors or hazards is hoarded by those in power and often used as a weapon to silence critics. In a bureaucratic culture, emphasis is on policies, rules, and compliance where similar information is either unwelcome or ignored. And a generative culture is one oriented on performance, where potentially damaging information is welcomed and distributed to the right people to act on.

While research misconduct cases, ultimately, fall on individual researchers, opportunities to safeguard against research misconduct exist at many levels. In such fields as ecology, physics, and chemistry, systems tend to equilibrate towards a steady state level under certain conditions. So the rise in the number of retractions in scientific journals may be a reflection of structural drivers that promote competition to the point of misconduct.

Lack of Reproducibility is not Unusual in Science

It’s important to take a moment to come to the defense of scientists. Reproducibility of research findings by independent investigators is considered a hallmark of

science. And, while “questionable research practices” include actions that may affect the interpretation of a research finding, the scientific findings or conclusions of the research may still be valid.

A lack of reproducibility can be quite normal in science, even in the absence of research misconduct. Study design differences (e.g., study population, sample size, measurement methods, timing, and settings), even seemingly small differences, can alter associations and lead to differing results. Sometimes the methods are not described in full detail due to negligence or word limits in journals. Sometimes differences in results are due to sloppy execution of the research protocols, which sounds great on paper, but don’t capture unnoticed details like cross-contamination or mislabeling of reagents. And sometimes random chance just gets in the way. All these things are a normal part of being human and doing science. So we (and the media) should also take the metrics used to assess research integrity with a grain of salt.

That said, there’s no question that research misconduct and “questionable research practices” exist. In fact, the [root causes driving research misconduct](#) have been known for decades. Despite all the progress that has been made to date, the metrics are not moving in the right direction and potentially, moving in the wrong direction at an accelerated pace. Thus, new and more aggressive action is needed.

Share your thoughts on what actions to take on [this link](#), and we’ll share the results on the next issue.