

The many sins of modern science

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What are the basic principles and rules of academic research? Academic research is primarily driven by curiosity, by the need to determine relationships between observations and the desire to develop models that can be used to understand and predict phenomena of the world in which we live. Irrespective of one's intentions, one is easily fooled by flawed observations, missing, confounding variables or incorrect assumptions. For this reason, any model or theory that is proposed must be justified and tested against data that are both tangible and publicly available. Only in this way may other scientists check the validity of a proposed model or theory without having to repeat the original work. Academic research is a continuous process of refinement. Every generation of researchers stands to some extent on the shoulders of those who have gone before. It is in this way that we advance our knowledge and understanding of the world. This basic tenant of academic endeavour in turn defines the fundamental requirements for effective research: clarity of presentation, reproducibility of data, testing of assumptions, search for additional variables, and the acknowledgement of both the ideas and the data used in the research but generated by others. The challenge is that these basic principles of high quality scientific research are increasingly in conflict with the mounting pressure placed on academic scientists to compete for grant money and to publish work continuously, in particular in so-called high-impact journals where sensationalism and potential media impact is often given more weight than scientific rigour. This in turn leads to inappropriate measures of success, which only serve to undermine the intrinsic value of scientific endeavour. The different types of violations of academic principles in scientific research will be discussed.

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The seven sins in academic behavior in the natural sciences,
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