



EDITOR'S NOTE

Managing Bias in Research

We are all subject to bias. This is not a revelation, but it is also something not to be ignored.

We are all influenced by our history and experience and by the history and experience of those communicating with us. Much has been written on how bias creeps into our lives. The research community often focuses on obvious forms of bias that can influence results. These include selection bias, often exemplified by factors that might influence the nature of subjects volunteering for an experiment; reporting bias, described as selective revealing or suppression of information; and recall bias, reflecting incomplete accuracy or incompleteness of recollections.

The reality, though, is that implicit (unconscious) bias runs far deeper than the obvious. Selection bias also applies to the choice of questions being studied. Reporting and recall bias can be magnified by the questions asked, how they are asked, and by a variety of social pressures that can influence open communication on almost any topic.

Careful study design can address some forms of bias, such as survival/censoring bias, when the loss of subjects through the course of an experiment can result in a finishing group that is not representative of the starting group or the population. It can also address observer-expectancy bias, in which a researcher's cognitive bias causes the researcher to subconsciously influence the participants in an experiment. Decisions on research funding to accept can reduce the issue of sponsorship bias, the tendency to support the interests of a study's financial sponsor. The problem is that every time we pat ourselves on the back for our efforts, we can miss a host of more subtle, and sometimes not subtle, factors that can affect subjects, researchers, and the consumers of research findings.

Anchoring bias describes the tendency to depend too heavily on an initial piece of information when making decisions or interpreting findings. In-group bias describes the tendency to favor the interpretations, opinions, or analyses of members of one's group over those of persons outside the group. Confirmation bias describes the tendency to give greater weight to findings that confirm our existing beliefs. Such elements can play a substantial role, particularly in research groups that work in some degree of isolation from other researchers.

The inventory of biases continues with those that some might dismiss as products of nonscientific minds, but

which can still exert influence. Self-serving bias describes the tendency to attribute successes to internal factors and failures to external factors. Attribution bias refers to systematic errors made when people evaluate or try to find reasons for their own and others' behavior. Fundamental attribution bias describes the tendency to explain behavior based on internal factors and to underestimate the influence of external factors.

The cataloging of biases and descriptive labels could carry on, but the point is that we are awash in them. It is important to control them to the highest degree practicable, but it is also critical to understand that we are never free of them. It is the latter reality that should drive restraint in scientific writing, leaving open the possibility that we are wrong in what we think we are seeing. Practically, it is essential to recognize that no research effort is perfect, that no research finding is inviolate, and that we will rarely discover real truth in our lifetimes.

A good example of restraint in scientific writing is the free admission of the limitations of work. In some cases, a clear description of limitations can be the most valuable part of a report. Text on limitations can provide context for interpretations, directions for future research, and demonstrate objective thinking.

Many authors handle the limitations section poorly. It is often excluded, possibly through ignorance or ineptitude, but also possibly in fear that admitting to any shortcomings could lead to the work being rejected. In other cases, it is composed of only a partial list of shortcomings, sometimes surprisingly mild ones with major issues absent. Although this may again be the result of ignorance or ineptitude, it can also represent intentional deflection—sleight of hand intended to assuage the doubts of less critical readers, distracting them from bigger problems. Finally, the section can be made disingenuous by the inclusion of text discounting the importance of shortcomings as soon as they are mentioned. There is a fine line here. In some cases, providing context for limitations is important, but in others it can be a misguided attempt to wave away concerns.

Authors need to accept that limitations can be made without apology. If they are so great as to represent fatal flaws, the work should not be published. Anything less severe should simply be fairly stated for the record.

Reviewers and readers need to be acutely aware of the importance of honest limitations text, actively look for it, and judge the work accordingly. If papers are published without adequate limitations, letters should be written to editors, opening the door for authors to add corrections to the literature record in response.

We will never eliminate bias, but we need to do our best to recognize and manage it so it does not compromise our work or credibility. We need to acknowledge

our shortcomings and then do everything possible to make them less important in our efforts. Vigilance and commitment can help us produce and present our best work.

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