

## Opening Up: How Do I Conduct Peer Review With Open Science in Mind?

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The meteoric rise of the open science movement within social sciences has changed the way researchers conduct their research across a wide range of disciplines. A number of prominent journals have introduced new open-science-driven guidelines, which serve to enhance the reproducibility, replicability, and integrity of scientific publications.

Before any paper is accepted for publication, however, it must undergo peer review: a long-standing feature of scientific practice (Peters & Ceci, 1982) and widely believed to serve as quality control (Armstrong, 1997; Goldbeck-Wood, 1999; Horrobin, 1990). Scientific journals often consult subject matter experts to serve as reviewers for papers submitted for publication in their journals. Indeed, reviewers often act as “gatekeepers” for scientific publications. Although there is a considerable amount of guidance on how to conduct thorough and rigorous reviews, reviewers and editors are now faced with a new challenge: conducting peer reviews with open science in mind.

In this post, we will discuss the role of peer review in an open science era and how reviewers can actively contribute to the open science agenda. With this entry of “Opening Up,” we’ll highlight some interesting data regarding the peer review process, call attention to suggestions from leaders in the open science movement for improving peer review, and point out resources that you can utilize to become a stronger peer reviewer. We’ve also gathered and consolidated some recommendations and tools that have emerged since the open science movement took off. Hopefully, when you have finished reading this entry, you will have some new ideas to take with you as you review more scholarly work.

### **A Selective Review of Research on Peer Reviewing and the Peer Review Process**

Peer review is expensive, prompting questions regarding cost effectiveness as well as discussion regarding alternative forms of peer review (Nosek & Bar-Anan, 2012). One estimate of the total annual value of volunteer peer review services in terms of time spent reviewing scholarly work was more than \$2.5 billion globally (Research Information Network, 2008). Furthermore, reviewers who spend considerable time providing high-quality reviews may place themselves at a disadvantage, as such time could be allocated toward advancing their own research agenda (see Macdonald & Kam, 2007; Tourish & Craig, 2018).

How well does peer review identify significant issues with a manuscript? There is plenty of evidence that even diligent reviewers miss key issues with a manuscript (e.g., misreported  $p$  values; see Cortina et al., 2017; Crede & Harms, 2019; Schroter et al., 2008; Wicherts et al., 2011). Among reviewers, inter-rater consistency is often low (Bornmann & Daniel, 2010; Marsh & Ball, 1989; Peters & Ceci, 1982; Petty et al., 1999), introducing a substantial amount of chance into the publication process (see Whitehurst, 1984). Of course low inter-rater reliability can be a feature rather than a bug of the peer review process. Given the complexity of the phenomena that we often study, a small number of experts seem unlikely to have all of the information necessary to evaluate every component in an article (Nosek & Bar-Anan, 2012). Associate editors may assign reviewers from multiple sides of an issue in order to get both perspectives or bring in reviewers with complementary expertise (e.g., methods experts, content experts).<sup>1</sup> So