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Registered Reports: A new publishing initiative at Cortex

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Richard Feynman once famously warned his students that “*the first principle [of science] is that you must not fool yourself, and you are the easiest person to fool.*” Despite a proud history of discovery, some aspects of our publishing culture betray a collective failure to heed Feynman’s lesson. The life sciences in general, and psychology / cognitive neuroscience in particular, suffer from publication bias (Faneli, 2010; Rosenthal, 1979; Thornton and Lee, 2000), insufficient statistical power (Chase and Chase, 1976; Tressoldi, 2012), poor replicability (Pashler and Wagenmakers, 2012), undisclosed analytic flexibility (Bakker et al., 2012; Masicampo and Lalande, 2012; Simmons et al., 2011; Wagenmakers, 2007) and a lack of data transparency (Ioannidis, 2005). As a community, we have come to value findings that are novel and eye-catching over those that are true, incentivising a host of questionable practices that twist the evidence to suit the narrative. Predictably, many researchers admit (anonymously) to selectively reporting experiments that produce desirable outcomes (67%), *p* value fishing (72%), or failing to report all dependent variables in an experiment (78%) (John et al., 2012; and see Neuroskeptic, 2012).

These problems stem from the simple fact that editorial decisions are often based on the *results* – the one aspect of objective enquiry that authors should never be pressured to control. Indeed, we teach our science undergraduates that predictions and analyses should be formulated and planned before data are collected, thereby ensuring that the observer is independent of the observation. Yet when these students proceed to graduate level they encounter the unedifying reality that many researchers – even unconsciously – will cherry pick analyses to reveal publishable effects or revise their hypotheses to ‘predict’ unexpected findings (John et al., 2012).

How can we fix these problems? At *Cortex* we believe that an important part of the solution is to provide authors with a publishing option that neutralises bad incentives, permitting the publication of null results and encouraging replication attempts. This is why we will soon be introducing an additional format of empirical article called a *Registered Report*. In contrast to the existing publication options at *Cortex*, which will remain unchanged, the cornerstone of *Registered Reports* is that a substantial part of each submission will be reviewed prior to data collection. Initial manuscripts will be submitted before a study has been undertaken and will include a slimline introduction, hypotheses, experimental procedures, analysis pipeline, a statistical power analysis, and pilot data where applicable. An initial round of editorial selection will triage the most promising studies for in-depth peer review. Following peer review, the article will then either be rejected or accepted in principle for publication. Once *in*

principle acceptance (IPA) has been obtained, the authors will proceed to conduct the study, adhering exactly to their peer-reviewed procedures. When the study is complete the authors will submit their finalised manuscript for re-review and will publicly share their raw data and laboratory log. Pending quality checks and a sensible interpretation of the findings, the manuscript will be published – and, crucially, independently of what the results show.

The *Registered Reports* format has several attractive characteristics. First, it will be immune to publication bias because the decision to accept or reject manuscripts will be based on the significance of the research question and validity of the methods, never on whether results are novel or statistically significant. Second, by requiring authors to adhere to a preapproved methodology and analysis pipeline, it will instantly prevent a host of questionable but common practices that promote false discoveries, including *p* value fishing, creative outlier exclusion, and selective reporting of analyses. Third, by requiring an *a priori* power analysis, including a minimum power level of 90%, false negatives will be greatly reduced compared with standard empirical reports (Fiedler et al., 2012). We believe these criteria will help give *Registered Reports* the highest ‘truth value’ of any available scientific publication (Nosek et al., 2012) and will be especially suitable for much-needed replication studies.

Not all modes of scientific investigation will be compatible with the *Registered Reports* initiative, and we will be maintaining all of our existing publishing options (Della Sala and Grafman, 2013). However, for most types of studies, *Registered Reports* will not outlaw serendipity or hinder legitimate scientific flexibility. Authors will be welcome to include *post hoc* analyses that were not mentioned in pre-registered submissions. Such analyses will simply be distinguished from those that were planned in advance, and authors will not be able to revise their hypotheses to predict unexpected outcomes.

In the coming months we will formulate detailed author and reviewer guidelines for *Registered Reports*. We look forward to launching this exciting new platform and welcome contributions to the discussion from our readers and the broader scientific community.

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