

## Opening Up: Replication Crisis...or Opportunities and Challenges?

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Welcome to your second class on open science in I-O psych! Today, I'll discuss key questions: What are questionable research practices? What do replication failures in areas adjacent to I-O psychology mean for our field? What do we want open science to be about? I do not promise to offer full answers to these questions here. Still, my hope is that my sensemaking (a) taps into some dissatisfaction with the status quo and (b) leaves you wanting to make meaningful changes in the right direction—however small.

To get things started, I'd like to share details from an ongoing conversation with a fellow junior social scientist at my home institution concerning the replication crisis. At the beginning of the semester, like most universities, we held a convocation, giving the faculty a chance to catch up with one another after the long winter break. There, a conversation sprung up with a colleague in the College of Business Administration—an economist—about the replication crisis and the need for open science. He recently picked up Susannah Cahalan's *The Great Pretender* (Cahalan, 2019), which chronicles an investigation into a well-known study in psychology published in the eminent journal *Science*: David Rosenhan's "On Being Sane in Insane Places." This study into what has become known as pseudopatients highlighted how eight psychologically healthy individuals feigned mental illness in order to be admitted to a psychiatric facility. Once admitted, these pseudopatients revealed they were actually sane. Subsequently, none were allowed to leave, according to Rosenhan. Rather, as Rosenhan reported, the claims were seen through the lens of mental illness, which was then used to justify their retention. Rosenhan's work was pivotal; it influenced the third edition of the *Diagnostic and Statistical Manual for Mental Disorders*. Cahalan's book reveals details about Rosenhan's methods, some of which might fall under the broad umbrella term of "questionable research practices" (QRPs), that ultimately call into question his contribution.

### What Are "Questionable Research Practices" (QRPs)?

QRPs are often subtle practices such as excluding data or changing analytical strategies until desired results are achieved and failing to report these activities (John et al., 2012). QRPs can involve analyzing one's data in a multitude of ways until you can have a clean and coherent story to tell using conventional statistical criteria (e.g., a  $p$  value less than .05; indices that indicate acceptable model-data fit in structural equation models). QRPs can also include dropping observations (e.g., outliers), dropping conditions that did not work out in an experiment, post-hoc inclusion or exclusion of control variables, switching outcome measures, dropping unsupported hypotheses, and stopping data collection once a  $p$  value less than .05 has been attained. These practices are also commonly referred to as  $p$ -hacking, data dredging, researcher degrees of freedom, traversing the garden of forking paths, or going on fishing expeditions (Gelman & Loken, 2013; Wicherts et al., 2016). Essentially, exploratory data analysis—useful for hypothesis generation—is recast as confirmatory, violating a fundamental distinction crucial to scientific advancement (Kerr, 1998).

Highlighting  $p$ -hacking in our own literature, O'Boyle and colleagues (2019) examined the prevalence of outcome reporting bias in moderated multiple regression (MMR) analyses, which are popular approaches often paired with small effect sizes and insufficient statistical power to detect these effects (e.g., Murphy & Russell, 2016). In examining the distribution of  $p$  values from published MMR analysis, there was a substantial spike in values just below the .05 threshold, suggesting that  $p$ -hacking or more