

Why the replication crisis is your problem too

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Scholars, as opposed to scientists, do normally not conduct their own empirical studies. But their work often cites, and thus relies on, others' published empirical results. In the social and behavioral sciences as elsewhere, moreover, the main strategy to generate these results has remained null-hypothesis significance testing (NHST). But recent attempts broadly failed to replicate even allegedly well-established empirical results, thus giving rise to an ongoing "replication crisis" or "confidence crisis." The crisis entails that NHST's error-rates are generally too large; otherwise many more such effects should have replicated. This makes trusting and citing even results that top-tier journals publish a genuine difficulty. As a way of overcoming the crisis, we advocate the research program strategy (RPS) as superior to both NHST and Bayesian hypothesis-testing (BHT). RPS integrates Frequentist elements of Neyman Pearson test-theory (NPTT) with elements of BHT. RPS's six methodological steps lead from a statistical discovery against a random model to a statistically verified hypothesis. Computer-simulations show that RPS-results retain far fewer errors, and thus deserve far greater trust, than standard NHST- or BHT-results. We also supply an online tool to estimate the expectable error-rates of already published results. A background in descriptive or inferential statistics is helpful, but not necessary to profit from this talk, which is based, among others, on these publications:

Witte, E.H., and Zenker, F. (2017b). From discovery to justification. Outline of an ideal research program in empirical psychology. *Frontiers in Psychology*, 8, 1847 (ISSN 1664-1078).
<https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01847/full>

Krefeld-Schwalb, A; Witte, E.H., and Zenker, F. (2018). Hypothesis-testing demands trustworthy data—a simulation approach to statistical inference advocating the research program strategy. *Frontiers in Psychology*, 9, 460 (ISSN 1664-1078).
<https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00460/full>

Witte, E.H., and Zenker, F. (2018). Data replication matters, replicated hypothesis-corroboration counts. (Commentary on "Making Replication Mainstream" by Rolf A. Zwaan, Alexander Etz, Richard E., Lucas, and M. Brent Donnellan). *Behavioral and Brain Sciences*, 41, e120 (ISSN: 0140-525X). <https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/data-replication-matters-to-an-underpowered-study-but-replicated-hypothesis-corroboration-counts/90E7D8EFF04C42E0857CAA943DCBBBAC>