

Review of: "Intersections of Statistical and Substantive Significance Under a True and False Null Hypothesis"

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Potential competing interests: No potential competing interests to declare.

The goal of this paper is to help students, applied researchers, and science writers grasp the importance of statistical significance in scientific inference and decision-making, especially when dealing with small sample sizes (less than 1,000) and uncertainty. The author aims for the empirical sampling distributions presented in the paper to aid in a proper understanding and appreciation of statistical significance. By simulating independent samples and analyzing the distribution of p-values from two-tailed t-tests and Cohen's d effect sizes, the author employs visual aids such as histograms, bar graphs, and crosstabs to clarify the relationship between statistical significance and effect size. Additionally, the paper illustrates that statistically significant p-values from independent samples t-tests are valuable for accurately identifying standardized mean differences, preventing misinterpretation of effect sizes as small, medium, or large in small samples.

Below is a list of suggestions to improve the paper:

- The quality of the presentation of various mathematical expressions needs to be improved (see, for example, pages 3, 4, 20, and 24). For example, the differences between sample means are not well presented in the PDF file.
- Page 2, line 15: "effect....regardless" should be replaced by "effect... regardless".
- Page 2, line 19: "Benjamini, 2021" should be replaced by "Benjamini et al., 2021".
- Page 2, line -8: Clarify whether it is Greenland et al. (2019) or Greenland et al. (2016).
- Page 3, lines 1-3: Please rewrite or explain the sentence "Sampling distributions are not about people but are theoretical distributions with infinitely many random, summary statistics that follow a predictable form".
- Page 3, line 5: Close the quotation marks starting with "Furthermore: "Any experiment may be regarded as".
- Page 4, line 6: "0." should be replaced by "0" (the period moves to after the quotation marks).
- Page 4: It is stated that the "The process was replicated [...] four equal sample sizes per group (n = 15, 64, 500, 1000) creating four analysis data sets". Nevertheless, under true H0, the results for sample sizes n = 15, 64, 500 are shown, while under H0 false, only results for samples of size n = 64 are presented. Can the authors summarize the results of the remaining cases using a single crosstab? For example, with information similar to tables 1 to 4, but presenting only the absolute frequencies.
- Page 11, line 6: Please rewrite or explain the sentence "The population of Cohens D = 0.00".
- Page 20, line 3: "was" should be replaced by "is now".
- Page 24, line 3: "was" should be replaced by "is".
- References Moore et al., 2021 (pages 2-3) is not in the references list.

