

A reason why not to ban Null Hypothesis Significance Tests

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Abstract

It is shown that an interval estimate for a contrast between means can be straightforwardly computed, given only the observed contrast and the associated t or F test statistic (or equivalently the corresponding p -value). This interval can be seen as a *frequentist* confidence interval, as a standard *Bayesian* credibility interval, or as a *fiducial interval*.

This gives Null Hypothesis Significance Tests (NHST) users the possibility of an easy transition towards more appropriate statistical practices. Conceptual links between NHST and interval estimates are outlined.

Introduction

Many recent papers have stressed on the necessity of changes in reporting experimental results. A more and more widespread opinion is that inferential procedures that provide genuine information about the size of effects must be used in addition or in place of Null Hypothesis Significance Tests (NHST). So, in psychology, this has been recently made official by the American Psychological Association Task Force on Statistical Inference. The Task Force has proposed guidelines for revising the statistical section of the American Psychological Association Manual. Following these guidelines, "interval estimates should be given for any effect sizes involving principal outcomes" (Wilkinson *et al.*, 1999).

Therefore a salutary project should be to equip NSHT users with tools that should facilitate a smooth transition towards interval estimates. In this perspective a surprisingly simple and virtually ignored result is the easiness to get an interval estimate for a difference between two means (and more generally for a contrast between means) from the associated t or F test.