Blending Bayesian and Fisherian Tools to Build Optimal Significance Tests.

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The idea of our work is to have a sample-size-dependent significance level — the test is optimal in the sense of the generalized Neyman-Pearson Lemma. The testing schemes allow any kind of hypothesis, without restrictions on the dimensionalities of the sample, the parameter and the hypotheses spaces. Note that this should include "sharp" hypotheses, which correspond to subsets of lower dimensionality than the full parameter space. These significance tests are compatible with the Likelihood Principle (LP). They can be easier to interpret consistently than tests that are not LP-compliant. The P-value is obtained in the usual way after ordering the sample space by Bayes Factors or maybe by Likelihood Ratios. Clearly, we use numerical methods to handle the high dimension spaces. In other words, our work retains the useful concept of statistical significance and the same operational procedures as currently used hypothesis tests, whether Fisherian (p-values), Neyman-Pearson (decision theory) or Bayesian (Bayes-factor tests).

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