What's the evidence? On P-values and Bayes factors

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P-values are ubiquitous in scientific research. However, interpretation of the P-value as a measure of statistical evidence is still not well understood (Goodman, 2008). In this talk I will first review the literature how to transform P-values to (minimum) Bayes factors in order to quantify the evidence against a null hypothesis. I will emphasize that the Bayesian view calls for a sharp distinction of tests for direction vs. tests for existence. For the latter, I will unify several proposals made in the literature to calibrate two-sided P-values (Held et al., 2015) based on test-based Bayes factors using the deviance statistic (Johnson, 2008). This perspective is useful to show how the maximal evidence of two-sided P-values depends on sample size (Held and Ott, 2016).

References

[1] Goodman, S. (2008). *A dirty dozen: Twelve P-value misconceptions.* Seminars in Hematology, 45, 135-40

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[4] Johnson, V. E. (2008). *Properties of Bayes factors based on test statistics.* Scandinavian Journal of Statistics, 35, 354-368.