

Masco: Introduction to Probability and Statistics

Academic Year 2025–2026

October 24, 2025

Questions on Reading

A Tutorial on Conducting and Interpreting a Bayesian ANOVA in JASP, Van den Bergh et al., 2020.

1. What does ANOVA stand for? In which cases do we apply this method? Discuss one-way and two-way ANOVA, MANOVA, and repeated/mixed ANOVA.
2. On page 75, what do the authors mean by *binary thinking*?
3. Explain what is meant by **knowledge update** in Bayesian inference.
4. In Bayesian ANOVA, what are the null and alternative models?
5. What is the Bayes factor for two models M_1 and M_2 ? How to interpret $BF_{12} = 5$?
6. Discuss the differences between Frequentist and Bayesian approaches.
7. Comment on the following sentence: "Bayesian ANOVA contrasts the predictive performance of competing models."
8. What are the assumptions for ANOVA models? How can you verify they are satisfied?
9. What is transitivity from a mathematical/logic point of view? Using transitivity, compute BF_{02} knowing that $BF_{01} = a$ and $BF_{12} = b$.
10. How are model-averaged effects obtained?
11. Discuss the principle of marginality.
12. Explain the error percentage given in JASP outputs.
13. Outline the main steps involved in conducting an ANOVA.
14. Give a brief description of the `ToothGrowth` dataset.
15. Import this data in JASP, then perform a Bayesian two-way ANOVA, and comment on the output.
16. Discuss the different possible prior specifications available in JASP and perform a robustness check.