Bayesian Statistics

Tarleton State University — Homework 5

A study investigated the effectiveness of small-group tutoring and the effectiveness of a classroom instruction technique known as *hot math* (Fuchs et al., 2008). The hot math program teaches students to recognize types or categories of problems so that they can generalize skills from one problem to another. The data below is a math test score for each student after 16 weeks in the study (you can either input this into JASP yourself, or you can load the p1.csv dataset, which you can download from Canvas).

	No tutoring	With tutoring
Traditional instruction	3,6,2,2,4,7	10,4,5,8,4,6
Hot math instruction	7,7,2,6,8,6	8,12,9,13,9,9

1. Sketch a plot of the condition means implied by this experimental design. Plot instruction type on the horizontal axis and separate lines for each level of tutoring group.
2. Perform a factorial analysis of variance on these data. Report p-values for the main effects of instruction type and tutoring group and the interaction.
3. Perform a Bayesian analysis of variance on these data. Which model has the largest posterior probability? Compute and report inclusion Bayes factors for each main effect and the interaction.
4. Re-do the model averaging, but this time select "Across matched models" rather than the default "Across all models". What changes? What do you think is going on here?
5. Given your analyses, do you think the effectiveness of *hot math* instruction depend on whether tutoring is available? Explain.