

1. This exercise will use the “Directed Reading Activities” dataset from the JASP data library. A teacher believes that directed reading activities in the classroom can improve the reading ability of elementary school children. She convinces her colleagues to give her the chance to try out the new method on a random sample of 21 third-graders. After they participated for 8 weeks in the program, the children take the Degree of Reading Power test (DRP). Their scores are compared to a control group of 23 children who took the test on the same day and followed the same curriculum apart from the reading activities.
 - (a) Let’s first get a descriptive overview of the data.
 - Create a table that shows the means and standard deviations of DRP scores in the control and treatment group.
 - Play around with the plots that JASP offers in the Descriptives module to produce a nice boxplot showing the distribution of DRP scores for each group.
 - (b) Perform a Bayesian independent samples t -test to test whether the control group performs *worse* than the treatment group. Note – you’ll probably want to use a directional test here (Group 1 < Group 2). What do you notice about the prior and posterior plot that is different from our examples we’ve done previously? What do you think is going on here?
 - (c) How do you interpret the Bayes factor obtained in part (b)?
 - (d) Perform a sensitivity analysis. To what extent does your inference depend on the specific choice of prior scale?
2. Borota et al. (2014) observed that in a sample of 73 participants, the 35 participants who received 200 mg of caffeine had significantly better scores on a test for memory of objects than did the 38 participants who took a placebo, $t(71) = 2.0$, $p = 0.049$. Borota et al. (2014) concluded that caffeine enhances memory consolidation.
 - (a) Using the JASP Summary Statistics module, perform a Bayesian reanalysis of this claim. What do you find?
 - (b) Note that the Bayes factor depends on the choice of prior on the population effect size δ . Are there any choices for prior that would result in the data becoming evidential for the null?
 - (c) Given these results, how confident are you of Borota et al.’s claims?