

The data below were designed to test whether learning performance (i.e., number of items correct on a task) differs as a function of temperature condition

| 50° | 70° | 90° |
|-----|-----|-----|
| 0 | 4 | 1 |
| 1 | 3 | 2 |
| 3 | 6 | 2 |
| 1 | 3 | 0 |
| 0 | 4 | 0 |

- Write precise definitions for a null hypothesis \mathcal{H}_0 and alternative hypothesis \mathcal{H}_1 for this scenario.
- Calculate the F statistic for an ANOVA comparing the means of the three groups.
- Calculate and interpret the p -value and Bayes factor associated with your obtained F statistic. Which model (\mathcal{H}_0 or \mathcal{H}_1) receives the most support from the data? Explain.
- Compute a 95% confidence interval for each of the group means.

The data below represent the efficacy of three pain-relief drugs against a placebo:

| Placebo | Drug A | Drug B | Drug C |
|---------|--------|--------|--------|
| 3 | 4 | 6 | 7 |
| 0 | 3 | 3 | 6 |
| 2 | 1 | 4 | 5 |
| 0 | 1 | 3 | 4 |
| 0 | 1 | 4 | 3 |

- Write precise definitions for a null hypothesis \mathcal{H}_0 and alternative hypothesis \mathcal{H}_1 for this scenario.
- Calculate the F statistic for an ANOVA comparing the means of the three groups.
- Calculate and interpret the p -value and Bayes factor associated with your obtained F statistic. Which model (\mathcal{H}_0 or \mathcal{H}_1) receives the most support from the data? Explain.
- Compute a 95% confidence interval for each of the group means.

Perform an ANOVA to determine if there are meaningful differences among the treatments below:

| Treatment 1 | Treatment 2 | Treatment 3 | |
|-------------|-------------|-------------|--------------------|
| $n = 10$ | $n = 10$ | $n = 10$ | $N = 30$ |
| $T = 10$ | $T = 20$ | $T = 30$ | $\Sigma X = 60$ |
| $SS = 27$ | $SS = 16$ | $SS = 23$ | $\Sigma X^2 = 206$ |