Exercises

Introduction to Linear Models: ANOVAs, Multiple Regression and ANCOVA

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Exercise 1: Clinical trials

A clinical trial was conducted to study the effect the levels of a drug on some measure of well-being (called `SCORE` in this case). Both male and female subjects were randomly choosen for the study and then randomly assigned to to either a low or a high `DOSE` treatment.

To read this data, directly from the web, into an object called `drugTrials`, do the following in R:

```
drugTrials <- read.csv("https://git.io/Jew2T")
```

Make sure the data is read in correctly. If it is read correctly, there should be 48 rows and 4 columns (we don't need the first column which is unique ID for each individual).

1.) Perform some exploratory analysis on the data set and answer the following questions: (a) Do you think the SCOREs are different between genders? (b) are SCORES different between differend doses of the drug? (c) is there an interaction between GENDER and DOSE? (d) is this data set balanced (i.e. equal observations across all subgroups)

2.) Carry out a two way ANOVA with interaction on this data set and answer the following questions (a) Is the interaction effect signficant? (b) are any of the main effects signficant? (c) if the interaction is signficant can you still easily interpret the results for any significant main effects?

3.) Carry out the appropriate Tukey Post-hoc tests and examine the results. do they contradict your interpretation of 2(c) ?

4.) Evaluate the assumptions of the anova model for the drug trial data? Are there any assumptions violated? Which one might be the most problematic?

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Exercise 2: The Diet Experiment

Exercise 3: Swiss Fertility Data

Exercise 4: Stickleback Association Study