

Introduction to R/RStudio

Lab Exercise 4: Extended Inferential Statistics in R

Here we will reuse the vehicle maintenance dataset (`cardat.csv`). As a reminder, a researcher is interested in the shape of automobiles that are purchased used. She records the shape of the car when it is purchased (`purc`), as well as after 1 year (`oneyr`) and 2 years (`twoyr`) post purchase. She also records whether the owner is male or female (`sex`), and the type of automobile (`type`: car, truck, van).

1. Run a one-way ANOVA to determine if the shape of the vehicles when they are purchased differs across the type of vehicle. First, check for any assumption violation and be sure to use the appropriate test.
2. Run all pairwise multiple comparisons using Holm familywise error control to determine if the shape of the vehicles after two years differs across the type of vehicle. [You can skip the assumption checks here]
3. Run a one-way repeated measures ANOVA to see if the shape of the vehicles changes over time. Conduct these analyses using both the *ez* and *nlme* packages. If significant, compute appropriate multiple comparisons. [Hint: to convert the data to longform you may need to specify the name of the new repeated measures variable (`timevar`) and the name of the new variable that represents the outcome variable (`v.names`)]
4. Graph the interaction for predicting the shape of the vehicles after two years from both sex and type. Follow this up with a factorial ANOVA to determine if sex, type or the sex by type interaction relates to the shape of the vehicle after two years.
5. Run a mixed ANOVA using the *ez* package to determine if sex, year or the interaction between them relates to the shape of the vehicles. If you are feeling brave, also run this analysis using the *nlme* package.