

Chapter 8 Homework

- Do parts (a), (b) (i) (ii), and (c) of Exercise D8.1 for TFR by region in the United Nations data set.

Note: (b)(i) corresponds to `contr.treatment` in R, (b)(ii) to `contr.sum`. The default is `contr.treatment`. To use `contr.sum`, set `options(contrasts=c("contr.sum", "contr.poly"))`. Alternatively, you can use `contr.Treatment` and `contr.Sum` from the **car** package. Since you're using just the variables `tfr` and `region`, don't bother filtering the data set for missing data.

- Do parts (a), (b), (c) (i) (ii) (iii), and (d) of Exercise D8.2.

Notes:

- The data set is in the data frame `Guyer` in the **car** package.
- You can draw the graph in (a) by hand; there are also many ways to draw a graph of the data and the means with R; a particularly simple way is

```
with(Guyer, {  
  interaction.plot(sex, condition, cooperation, type="b",  
                 ylim=range(cooperation))  
  points(sex, cooperation, pch=as.character(condition))  
})
```

- For (b) and (c) remember to set `options(contrasts=c("contr.sum", "contr.poly"))`. As before, you can use `contr.Sum` in place of `contr.sum`.
- You can generate the deviation regressors for (b) and find their correlation by:

```
X <- model.matrix(~condition*sex, data=Guyer)  
X  
cor(X[, -1]) # removing the column of 1s for the constant
```

Be sure to take a look at the contents of the `X` matrix.

- (c)(i) corresponds to Type-II tests using the `Anova` function, (c)(ii) to Type-III tests. To get $SS(\alpha)$ and $SS(\beta)$ in (c)(iii), you can do two one-way ANOVAs of cooperation by sex and condition separately. R makes it hard to get $SS(\gamma)$, since this implies a model that violates marginality, which R wants to impose; one way is by `anova(lm(Guyer$cooperation ~ X[, 4]))`, using column 4 of the X matrix from (b).