

Stat 505 R Exploration

August 30, 2013

1. What is meant by the term “recycling” in R’s arithmetic??

If you try to add a shorter vector to a longer vector, R will make the shorter vector the same length as the longer vector by repeating the first elements of the shorter vector.

2. You will soon be starting the first homework. Where on your computer (or in your math dept account) will the files (an R script, plots, explanations) reside? Does your group all agree on this structure? If not decribe the differences.

On my personal computer under ../home/leslie/documents/Stat505/assignment. I haven’t yet talked with my group about this structure.

3. On HW1 you should use the `ifelse` function. Read the help file. Use it and the “remainder after division” function `%%` to convert integers 2 through 13 into “odd” or “even”. Show your code and results.

```
x <- seq(1:13)
ifelse(x%%2 == 0, "even", "odd")

## [1] "odd" "even" "odd" "even" "odd" "even" "odd" "even" "odd" "even" "odd" "even" "odd"

## place R code here. It will create the output
```

4. For HW 0.5, you looked at the help on `boxplot` and made a plot of tooth growth relative to two predictors. Use `table` to find out how many animals were assigned each supplement at each dosage. Show your code and output table.

```
require(xtable)

## Loading required package: xtable

xtable(table(ToothGrowth$dose, ToothGrowth$supp))
```

	OJ	VC
0.5	10	10
1	10	10
2	10	10

5. Using the ToothGrowth data again, build a linear model to assess the effects of supplement and dosage on growth. Show your code and the summary of the model you fit. Interpret the output. How big are the effects?

```
## (tooth.regress1<-lm(len~supp*dose, ToothGrowth))
tooth.regress2 <- lm(len ~ supp * factor(dose), data = ToothGrowth)
require(xtable)
xtable(summary(tooth.regress2))
```

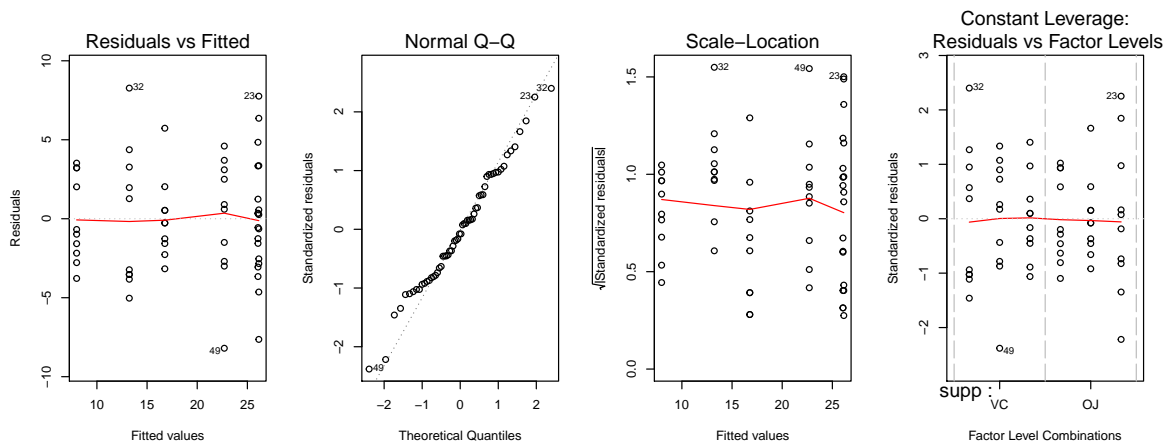
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	13.2300	1.1484	11.52	0.0000
suppVC	-5.2500	1.6240	-3.23	0.0021
factor(dose)1	9.4700	1.6240	5.83	0.0000
factor(dose)2	12.8300	1.6240	7.90	0.0000
suppVC:factor(dose)1	-0.6800	2.2967	-0.30	0.7683
suppVC:factor(dose)2	5.3300	2.2967	2.32	0.0241

```
## fit a linear model, get summary and plots
```

I chose to treat dose as a categorical variable because dose and tooth length didn't show a linear relationship for both supplements. The mean tooth growth for orange juice at a dose of 0.5 mg was 13.23 mm. At the same dosage, the mean tooth growth for ascorbic acid was 5.25 mm less, or 7.98 mm. At a dosage of 2 mg, the mean tooth growth for orange juice was 12.83 mg larger than the 0.5 mg dose. The mean tooth growth for ascorbic acid at a 2 mg dose was 18.16 mg larger than the growth for the 0.5 mg dose. We can see that the increase in tooth growth for increasing dose size is larger in the ascorbic acid case.

6. Show the “usual” four diagnostic plots for the above linear model. Are any problems evident? Save the plot as a png and as a pdf file in the folder from (or parallel to #2 above).

```
## plot diagnostics for a linear model
par(mfrow = c(1, 4))
plot(tooth.regress2)
```



We seem to have no problem with the normality and constant variance assumptions.

- The math department server is backed up regularly so that we shouldn't all lose our saved documents. When did you last back up your personal computer? Have you used outside storage like google, dropbox, github, or other? Explain with regard to how you will keep your work safe for this class. In particular, if you are using more than one computer, how will you transfer an partially completed HW back and forth?

I will backup my files on google drive, and also use google drive to transfer files from computer to computer.

R Code Appendix

```
x <- seq(1:13)
ifelse(x%%2 == 0, "even", "odd")
## place R code here. It will create the output
```

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require(xtable)
xtable(table(ToothGrowth$dose, ToothGrowth$supp))
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