

fingers

Chris Parrish

January 20, 2016

fingers

references:

- Cannon, et al., chapter 6, ex. 6.1 - Cannon, et al., Student R Manual, chapter 6

Import the data.

```
data <- read.table("Fingers.csv", header=TRUE, sep=",")
head(data, 4)
```

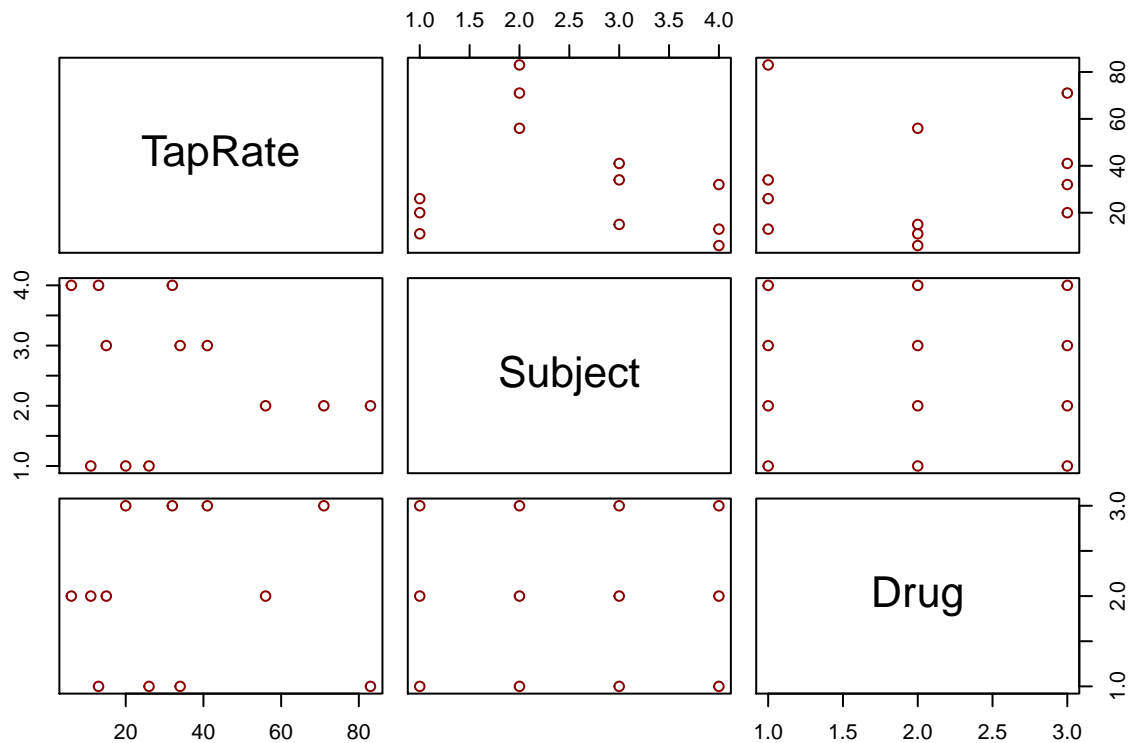
```
## Subject Drug TapRate
## 1 I Placebo 11
## 2 II Placebo 56
## 3 III Placebo 15
## 4 IV Placebo 6
```

```
dim(data)
```

```
## [1] 12 3
```

Scatterplot matrix.

```
pairs(~ TapRate + Subject + Drug, data=data,
      col="darkred")
```



Create a table.

```
fingers.table <- with(data,
                      tapply(TapRate, list(Subject, Drug), mean))
fingers.table
```

```
##      Caffeine Placebo Theobromine
## I         26      11          20
## II        83      56          71
## III       34      15          41
## IV        13       6          32
```

Add marginal means to the table.

Compare with Table 6.1, page 274

```
row.means <- with(data, tapply(TapRate, Subject, mean))
col.means <- with(data, tapply(TapRate, Drug, mean))
fingers.table <- rbind(cbind(fingers.table, row.means),
                      c(col.means, 34))
rownames(fingers.table)[5] <- "Mean"
colnames(fingers.table)[4] <- "Mean"
fingers.table <- fingers.table[, c(2, 1, 3, 4)] # permute the first two columns
fingers.table
```

```
##      Placebo Caffeine Theobromine Mean
## I         11      26          20  19
## II        56      83          71  70
## III       15      34          41  30
## IV         6      13          32  17
## Mean      22      39          41  34
```

One-way ANOVA.

```
options(show.signif.stars=FALSE)
summary(aov(TapRate ~ Drug, data=data))
```

```
##           Df Sum Sq Mean Sq F value Pr(>F)
## Drug       2    872   436.0    0.675  0.533
## Residuals  9   5810   645.6
```

Two-way additive ANOVA.

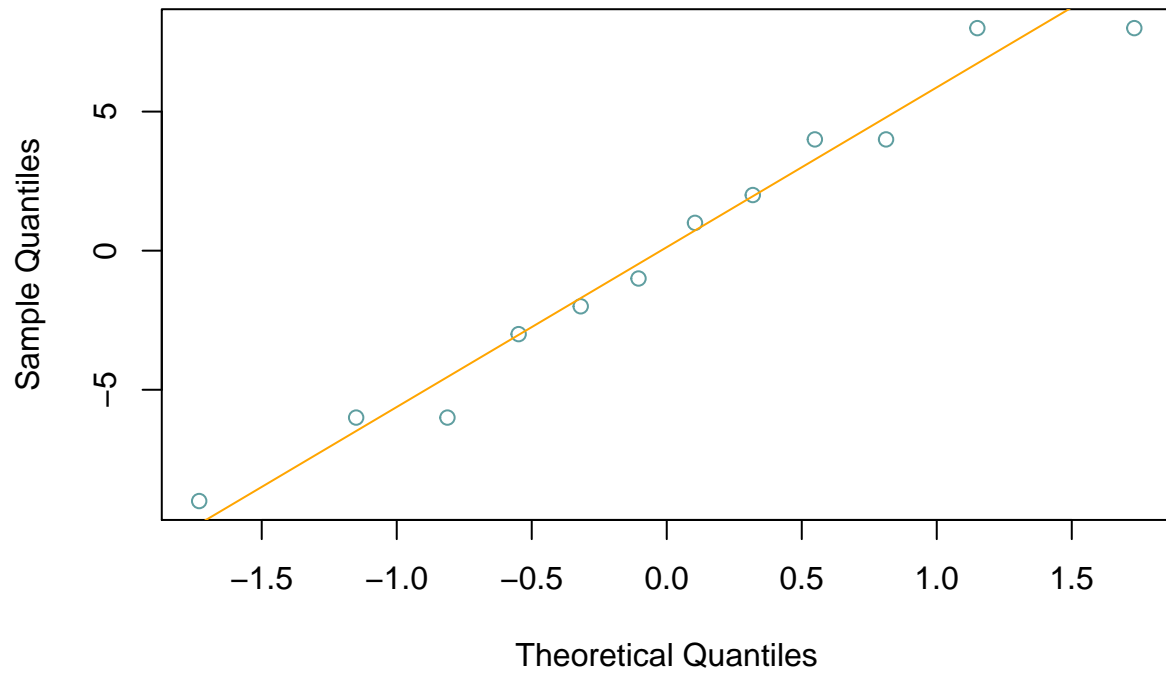
```
fingers.aov <- aov(TapRate ~ Subject + Drug, data=data)
summary(fingers.aov)
```

```
##           Df Sum Sq Mean Sq F value    Pr(>F)
## Subject    3   5478  1826.0    33.00 0.000399
## Drug       2    872   436.0     7.88 0.020967
## Residuals  6    332    55.3
```

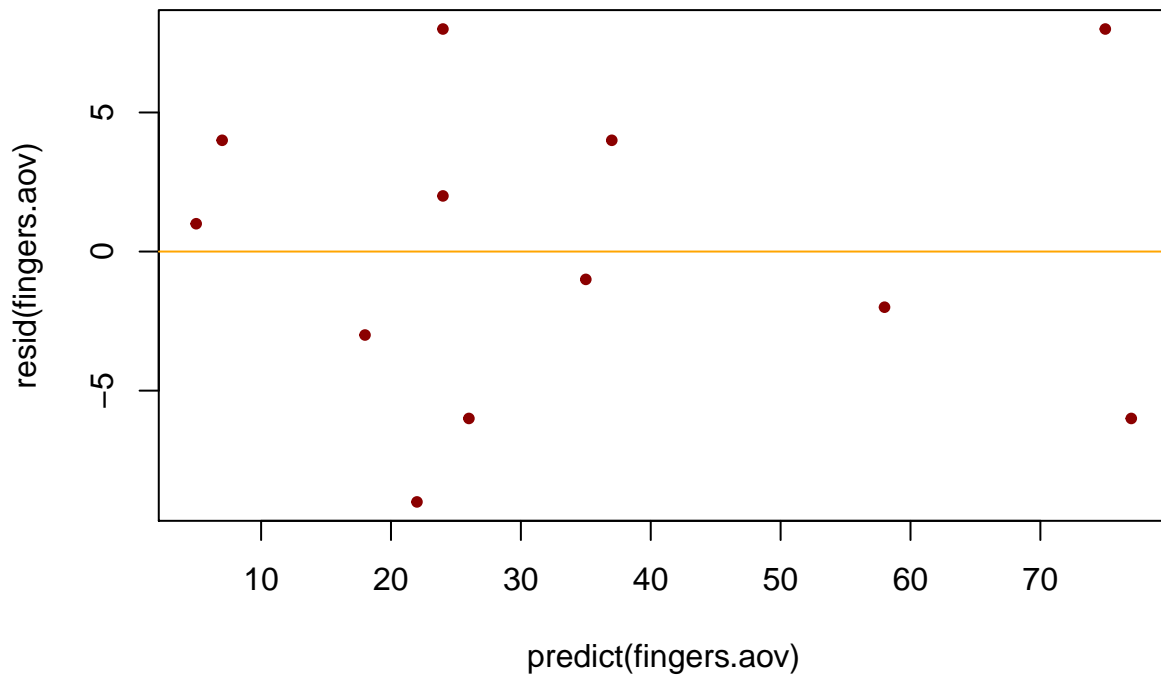
Residuals.

```
qqnorm(resid(fingers.aov), col="cadetblue")
qqline(resid(fingers.aov), col="orange")
```

Normal Q-Q Plot



```
plot(predict(fingers.aov), resid(fingers.aov),
      pch=20, col="darkred")
abline(h=0, col="orange")
```



Effect plots: without interaction.

```
fingers.lm1 <- lm(TapRate ~ Subject + Drug, data=data)
library(alr4)
plot(allEffects(fingers.lm1))
```

