Ralph Fehrer

Sunday, November 23, 2014

1.Load the ToothGrowth data and perform some basic exploratory data analyses

The R ToothGrowth data set contains data from an experiment studying the effect of vitamin C on the tooth growth of guinea pigs.

```
library(datasets)
data(ToothGrotwh)
```

```
## Warning: data set 'ToothGrotwh' not found
```

The vitamin C was supplied through two different supplements, orange juice and asorbic acid

```
str(ToothGrowth$supp)
```

```
##  Factor w/ 2 levels "OJ","VC": 2 2 2 2 2 2 2 2 2 2 ...
```

in three doses each

```
str(as.factor(ToothGrowth$dose))
```

```
##  Factor w/ 3 levels "0.5","1","2": 1 1 1 1 1 1 1 1 1 1 ...
```

2. Provide a basic summary of the data.

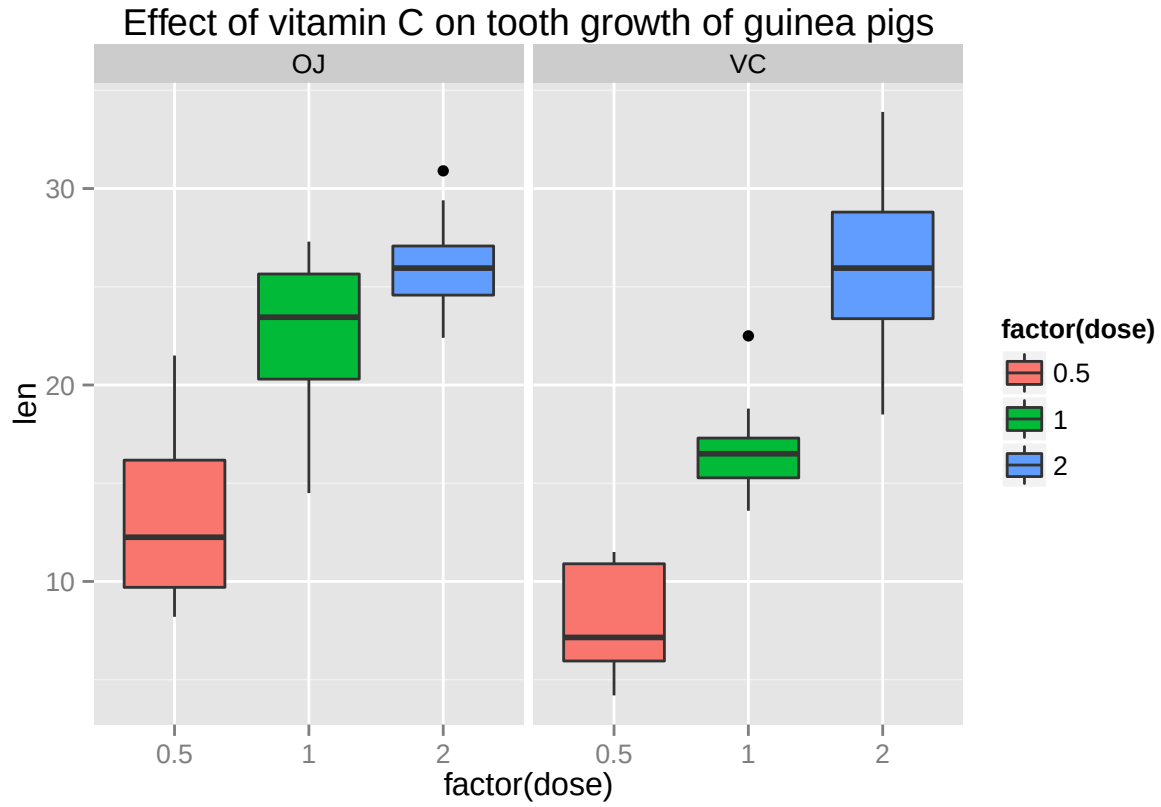
```
summary(ToothGrowth)
```

```
##       len       supp         dose
##  Min.   : 4.2   OJ:30   Min.   :0.50
##  1st Qu.:13.1   VC:30   1st Qu.:0.50
##  Median :19.2           Median :1.00
##  Mean   :18.8           Mean   :1.17
##  3rd Qu.:25.3           3rd Qu.:2.00
##  Max.   :33.9           Max.   :2.00
```

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.1.1
```

```
ggplot(ToothGrowth, aes(x=factor(dose), y=len, fill=factor(dose)))+geom_boxplot()+facet_grid(.~supp)+gg
```



###3. Use confidence intervals and/or hypothesis tests to compare tooth growth by supp and dose

```
xBar<-mean(ToothGrowth$len[1:30])
yBar<-mean(ToothGrowth$len[31:60])
xVar<-(sd(ToothGrowth$len[1:30]))^2
yVar<-(sd(ToothGrowth$len[31:60]))^2
q<-(((xVar+yVar)/30)^2)/((((xVar/30)^2)+((yVar/30)^2))/29)
t<-qt(0.975, q)
yBar -xBar + c(-1,1)*t*sqrt(xVar/30 + yVar/30)
```

```
## [1] -0.171  7.571
```

```
t.test(len~supp, data=ToothGrowth, paired=FALSE)
```

```
##
##  Welch Two Sample t-test
##
## data:  len by supp
## t = 1.915, df = 55.31, p-value = 0.06063
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.171  7.571
## sample estimates:
## mean in group OJ mean in group VC
##            20.66            16.96
```

4.State your conclusions and the assumptions needed for your conclusions

the boxplot shows, that vitamin C has an effect on teeth growth in guinea pigs. The effect increases as the dose increases, regardless of the supplement.