

Tooth Growth

Richie Liew

Nov 16, 2016

```
library(ggplot2)
library(lattice)
```

Part 2: Basic Inferential Data Analysis Instructionsless

Now in the second portion of the project, we're going to analyze the ToothGrowth data in the R datasets package.

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

```
data(ToothGrowth)
str(ToothGrowth)

## 'data.frame':    60 obs. of  3 variables:
##  $ len : num  4.2 11.5 7.3 5.8 6.4 10 11.2 11.2 5.2 7 ...
##  $ supp: Factor w/ 2 levels "OJ","VC": 2 2 2 2 2 2 2 2 2 2 ...
##  $ dose: num  0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 ...

# convert variable dose from numeric to factor
ToothGrowth$dose <- as.factor(ToothGrowth$dose)
# look at the dataset variables after conversion
str(ToothGrowth)

## 'data.frame':    60 obs. of  3 variables:
##  $ len : num  4.2 11.5 7.3 5.8 6.4 10 11.2 11.2 5.2 7 ...
##  $ supp: Factor w/ 2 levels "OJ","VC": 2 2 2 2 2 2 2 2 2 2 ...
##  $ 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.

```
head(ToothGrowth)

##      len supp dose
## 1  4.2   VC  0.5
## 2 11.5   VC  0.5
## 3  7.3   VC  0.5
## 4  5.8   VC  0.5
## 5  6.4   VC  0.5
## 6 10.0   VC  0.5

str(ToothGrowth)

## 'data.frame':    60 obs. of  3 variables:
##  $ len : num  4.2 11.5 7.3 5.8 6.4 10 11.2 11.2 5.2 7 ...
##  $ supp: Factor w/ 2 levels "OJ","VC": 2 2 2 2 2 2 2 2 2 2 ...
##  $ dose: Factor w/ 3 levels "0.5","1","2": 1 1 1 1 1 1 1 1 1 1 ...
```

```
summary(ToothGrowth)
```

```
##      len      supp  dose
##  Min.   : 4.20    OJ:30  0.5:20
##  1st Qu.:13.07    VC:30  1 :20
##  Median :19.25           2 :20
##  Mean   :18.81
##  3rd Qu.:25.27
##  Max.   :33.90
```

```
nrow(ToothGrowth)
```

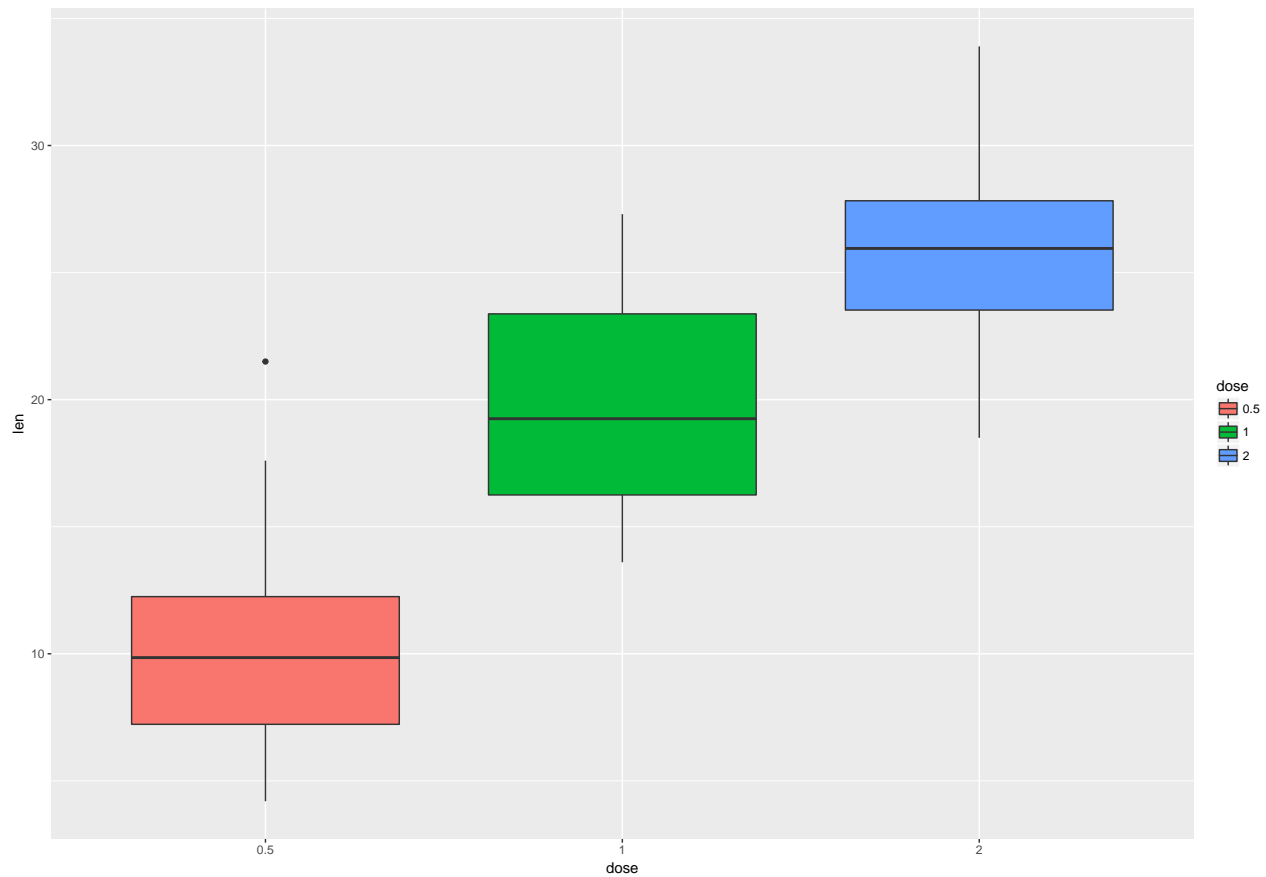
```
## [1] 60
```

```
# split of cases between different dose levels and delivery methods
```

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

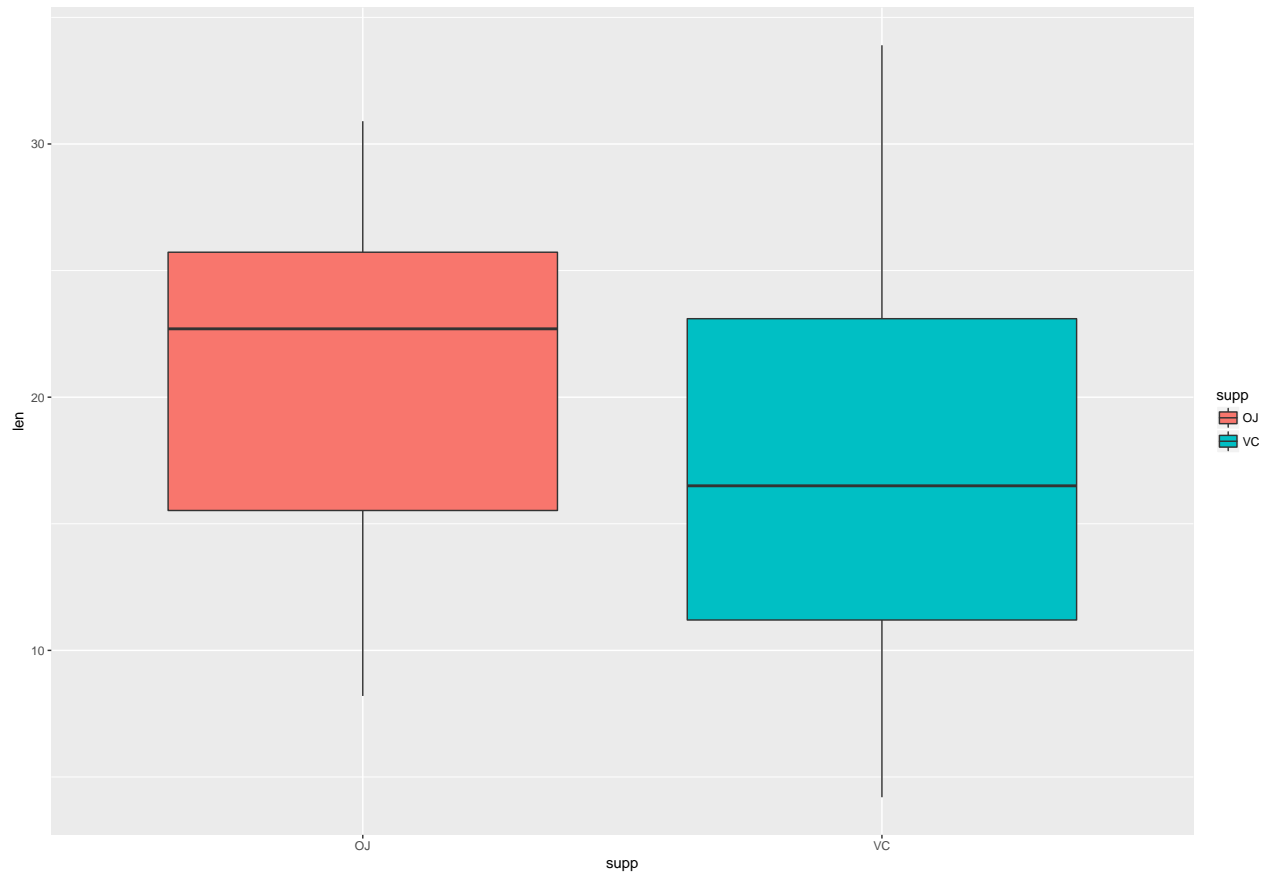
```
##
##      OJ VC
##  0.5 10 10
##    1 10 10
##    2 10 10
```

```
ggplot(aes(x=dose, y=len), data=ToothGrowth) + geom_boxplot(aes(fill=dose))
```



```
# visualization of tooth growth as function of supplement type
```

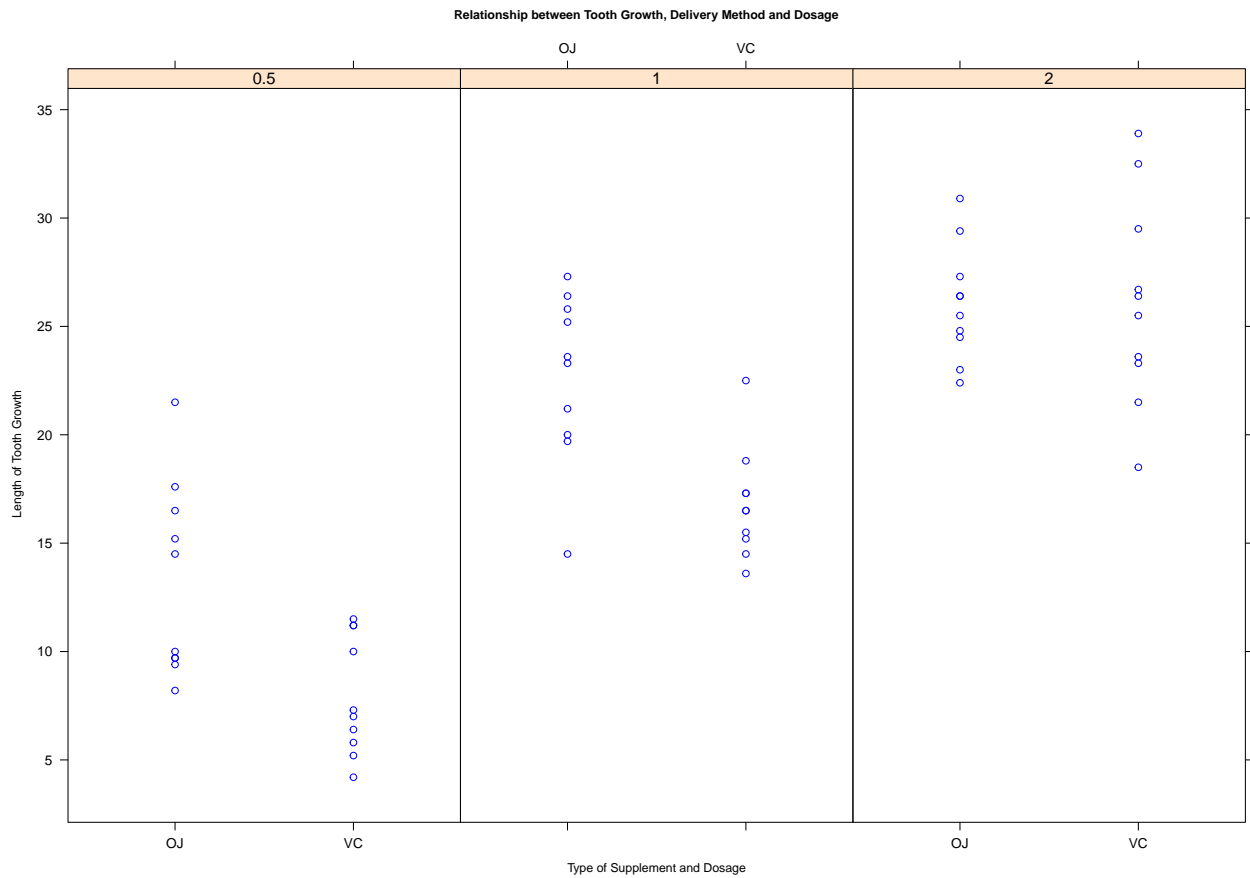
```
ggplot(aes(x=supp, y=len), data=ToothGrowth) + geom_boxplot(aes(fill=supp))
```



3. Use confidence intervals and/or hypothesis tests to compare tooth growth by supp and dose. (Only use the techniques from class, even if there's other approaches worth considering)

Visual examination of relationships between variables.

```
xyplot(len ~ supp | dose, ToothGrowth,
       layout= c(3,1),
       main=list(label=" Relationship between Tooth Growth, Delivery Method and Dosage",cex=0.75),
       xlab=list(label="Type of Supplement and Dosage", cex=0.75),
       ylab=list(label=" Length of Tooth Growth", cex=0.75),
       par.settings = simpleTheme(col="blue"))
```



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

1. Supplement type has no effect on tooth growth.
2. Increasing the dose level leads to increased tooth growth.