Project 2

Statistical Inference Course Project

18/03/2022

Part 2: Basic Inferential Data Analysis Instructions

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

Load the ToothGrowth data and perform some basic exploratory data analysis

```
library(datasets)
data(ToothGrowth)
library(ggplot2)
```

```
## '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 ...
```

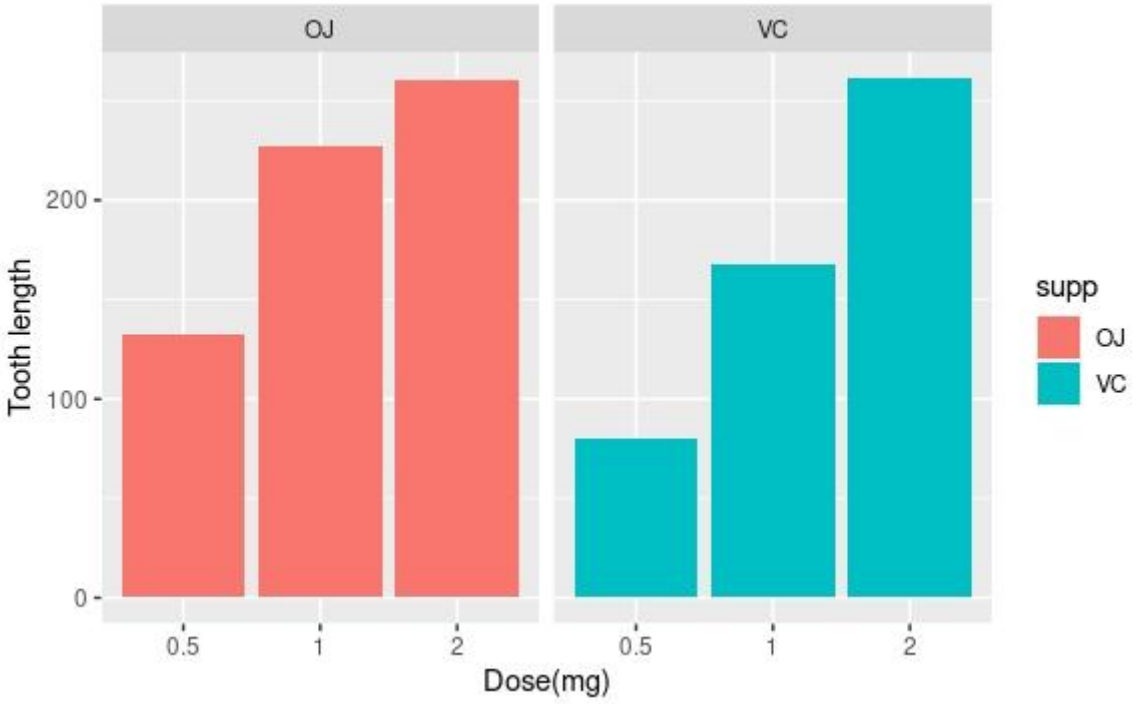
```
head(ToothGrowth)
```

```
##    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
```

```
summary(ToothGrowth)
```

```
##       len        supp         dose
##  Min.   : 4.20   OJ:30   Min.   :0.500
##  1st Qu.:13.07   VC:30   1st Qu.:0.500
##  Median :19.25           Median :1.000
##  Mean   :18.81           Mean   :1.167
##  3rd Qu.:25.27           3rd Qu.:2.000
##  Max.   :33.90           Max.   :2.000
```

```
ggplot(data=ToothGrowth, aes(x=as.factor(dose), y=len, fill=supp)) +
    geom_bar(stat="identity") +
    facet_grid(. ~ supp) +
    xlab("Dose(mg)") +
    ylab("Tooth length")
```



hypothesis tests to compare tooth growth by supp and dose. (Only use the techniques from class, even if there are other approaches worth considering)

```
hypoth1 <- t.test(len ~ supp, data = ToothGrowth)
hypoth1$conf.int
```

[1] -0.1710156 7.5710156
attr(,"conf.level")
[1] 0.95

```
hypoth1$p.value
```

[1] 0.06063451

```
hypoth2<-t.test(len ~ supp, data = subset(ToothGrowth, dose == 0.5))
hypoth2$conf.int
```

[1] 1.719057 8.780943
attr(,"conf.level")
[1] 0.95

```
hypoth2$p.value
```

[1] 0.006358607

```
hypoth3<-t.test(len ~ supp, data = subset(ToothGrowth, dose == 1))
hypoth3$conf.int
```

[1] 2.802148 9.057852
attr(,"conf.level")
[1] 0.95

```
hypoth3$p.value
```

[1] 0.001038376

```
hypoth4<-t.test(len ~ supp, data = subset(ToothGrowth, dose == 2))
hypoth4$conf.int
```

[1] -3.79807 3.63807
attr(,"conf.level")
[1] 0.95

```
hypoth4$p.value
```

[1] 0.9638516

Conclusions

OJ ensures more tooth growth than VC for dosages 0.5 & 1.0. OJ and VC gives the same amount of tooth growth for a dose amount of 2.0 mg/day. For the entire trial we cannot conclude OJ is more effective than VC for all scenarios.