Statistical Inference Course Project 2

Analysis of the ToothGrowth of Guinea pigs

Humbert Costas

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Overview

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

Basic exploratory data analyses

Data shows the results of a study on the effects that Vitamic C has on the growth (length) of teeth of guinea pigs. Vitamin C was provided either in the form of Orange Juice (OJ) or ascorbic acid (VC), at three different dose levels to 10 animals, giving a total of 60 different sample values.

```
data(ToothGrowth)
ToothGrowth$dose <- as.factor(ToothGrowth$dose)
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 ...
```

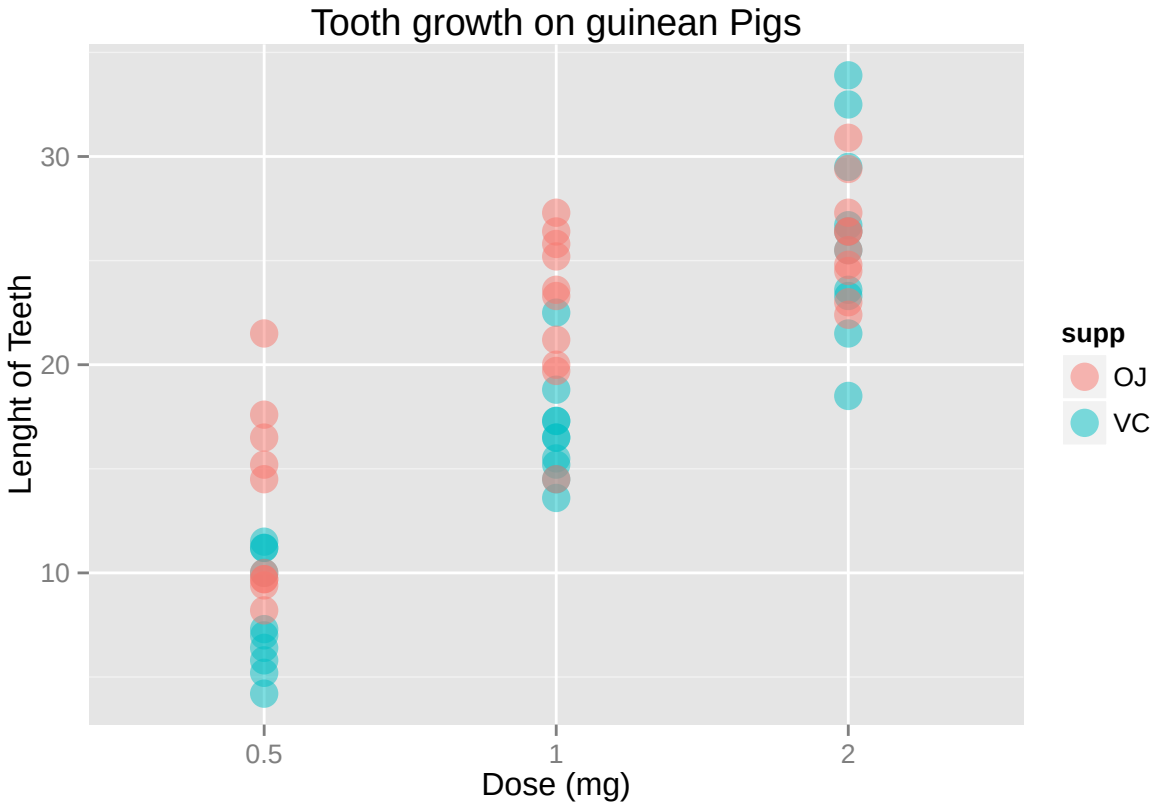
```
summary(ToothGrowth)
```

```
##       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
```

Summary of the data.

Let's take a look of the data distribution with a scattered points graph

```
library(ggplot2)
g <- ggplot(ToothGrowth, aes(x = dose,y = len, color = supp))
g <- g + geom_point(alpha = 0.5, size = 5)
g <- g + ylab("Lenght of Teeth")
g <- g + xlab("Dose (mg)")
g <- g + ggtitle("Tooth growth on guinean Pigs")
g
```



By looking at the graph, we could say that at doses =0,5 and =1.0 OJ seems to have a clear effect on the length of teeth, compared to VC. On the other hand, when the dose =2.0 the results are less clear.

Comparison tooth growth by supp and dose. (using confidence intervals and hypothesis tests)

Test if OJ and VC has equality for each dosage

$H_0 : \mu_{oj} - \mu_{vc} = 0$ $H_a : \mu_{oj} - \mu_{vc} \neq 0$

Conclusions