

Untitled

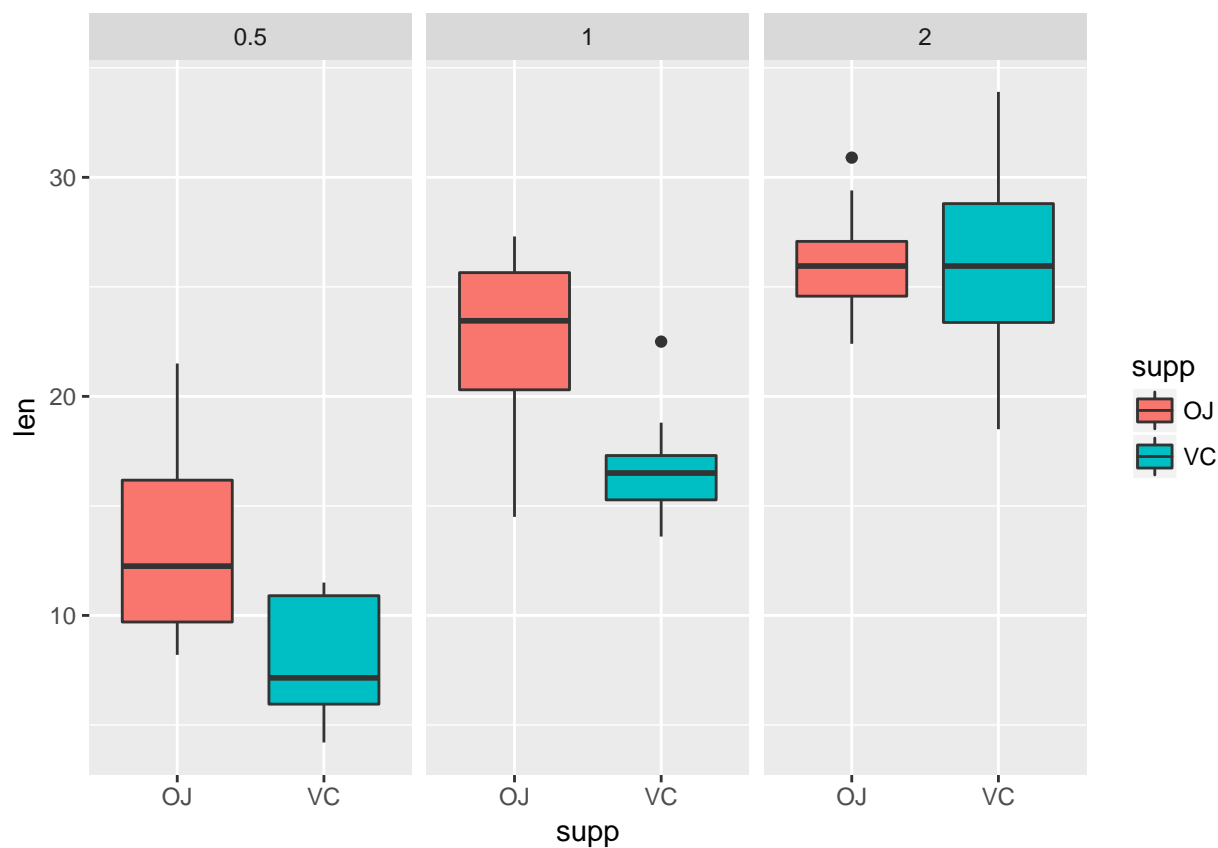
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ToothGrowth Analysis

Basic Exploratory Analyses

```
library(ggplot2)
f<-ToothGrowth
ggplot(f,aes(supp,len))+facet_grid(.~dose)+geom_boxplot(aes(fill = supp))
```



Just in a glance we can see the dose is influencing the growth of tooth. The 2 doses is significantly efficient than the 0.5 dosage. But the VC supp shows more efficiency in large doses than in small doses.

Basic summary of data

```
summary(f)
```

##	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

Hypothesis Tests

Null Hypothesis 01: There is no difference in tooth growth when different supplements are used. Alternate Hypothesis of Null Hypothesis 01: There is more tooth growth when using supplement OJ than VC.

```
OJData<- f[f$supp=="OJ",]
VCData<- f[f$supp=="VC",]
t.test(OJData$len , VCData$len, alternative = "greater", paired = FALSE, conf.level = 0.95)

##
## Welch Two Sample t-test
##
## data: OJData$len and VCData$len
## t = 1.9153, df = 55.309, p-value = 0.03032
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
## 0.4682687 Inf
## sample estimates:
## mean of x mean of y
## 20.66333 16.96333
```

We are getting a p-value of 0.03, this is smaller than the rejection p value 0.05. Thus we dont have enough power i.e we dont have enough evidence to reject the alternate hypothesis. This concludes the OJ shows more toothe growth than VC.

Null Hypothesis 02: There is no difference in tooth growth when different dosages are used. Alternate Hypothesis of Null Hypothesis 02: There is more tooth growth when using dosage 2 than 0.5.

```
OJData<- f[f$dose==0.5,]
VCData<- f[f$dose==2,,]
t.test(VCData$len , OJData$len, alternative = "greater", paired = FALSE, conf.level = 0.95)

##
## Welch Two Sample t-test
##
## data: VCData$len and OJData$len
## t = 11.799, df = 36.883, p-value = 2.199e-14
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
## 13.27926 Inf
## sample estimates:
## mean of x mean of y
## 26.100 10.605
```

Here, once again we are getting a p-value of less than 0.05. This shows its highly likely for the alternate hypothesis to be true, which is there is more tooth growth in dose of 2 than 0.5.

Assumptions:

The variables are independent and identically distributed (i.i.d.). The variables are not from corelated sample