Tootgrowth Analysis

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analysis of tooth growth data

Generic analysis of toothgrowth data

processing data

Loading data

```
library(UsingR)
```

```
## Loading required package: MASS
## Loading required package: HistData
## Loading required package: Hmisc
## Loading required package: grid
## Loading required package: lattice
## Loading required package: survival
## Loading required package: Formula
## Loading required package: ggplot2
##
## Attaching package: 'Hmisc'
##
## The following objects are masked from 'package:base':
##
##     format.pval, round.POSIXt, trunc.POSIXt, units
##
##
## Attaching package: 'UsingR'
##
## The following object is masked from 'package:ggplot2':
##
##     movies
##
## The following object is masked from 'package:survival':
##
##     cancer
```

```
data(ToothGrowth)
```

Initial analysis of tooth growth

```
dim(ToothGrowth)
```

```
## [1] 60  3
```

Contains 3 dimensions and 60 findings in total

```
names(ToothGrowth)
```

```
## [1] "len"  "supp" "dose"
```

"len", "supp", and "dose" are column names

Getting a summary

```
summary(ToothGrowth)
```

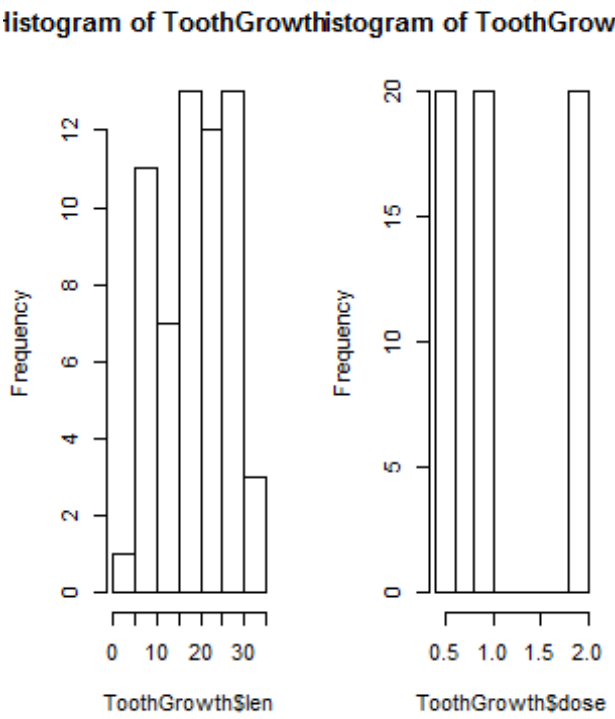
```
##       len        supp         dose
##  Min.   : 4.20   OJ:30   Min.   :0.500
##  1st Qu.:13.07   VC:30   1st Qu.:0.500
##  Median :19.25           Median :1.000
##  Mean   :18.81           Mean   :1.167
##  3rd Qu.:25.27           3rd Qu.:2.000
##  Max.   :33.90           Max.   :2.000
```

There are 2 levels on the Supplement

histograms

Seeing a histogram of the values

```
par(mfrow = c(1, 3))
hist(ToothGrowth$len)
hist(ToothGrowth$dose)
```



Looks like dose is discrete as well

```
unique(ToothGrowth$dose)
```

```
## [1] 0.5 1.0 2.0
```

We see there are 3 unique values here.

Looks like the data uses 2 segments for treatment with a supplement and having 3 doses on each. lets see each one separate as a confidence interval ##Confidence and p-values

```
#treatment on OJ
X0<-ToothGrowth[ToothGrowth$supp=="OJ",c(1,3)]
#treatment on VC
Y0<-ToothGrowth[ToothGrowth$supp=="VC",c(1,3)]
summary(lm(X0$len ~ X0$dose))
```

```
##
## Call:
## lm(formula = X0$len ~ X0$dose)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.2557 -3.7979 -0.0643  3.3521  7.9386
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   11.550      1.722   6.708 2.79e-07 ***
```

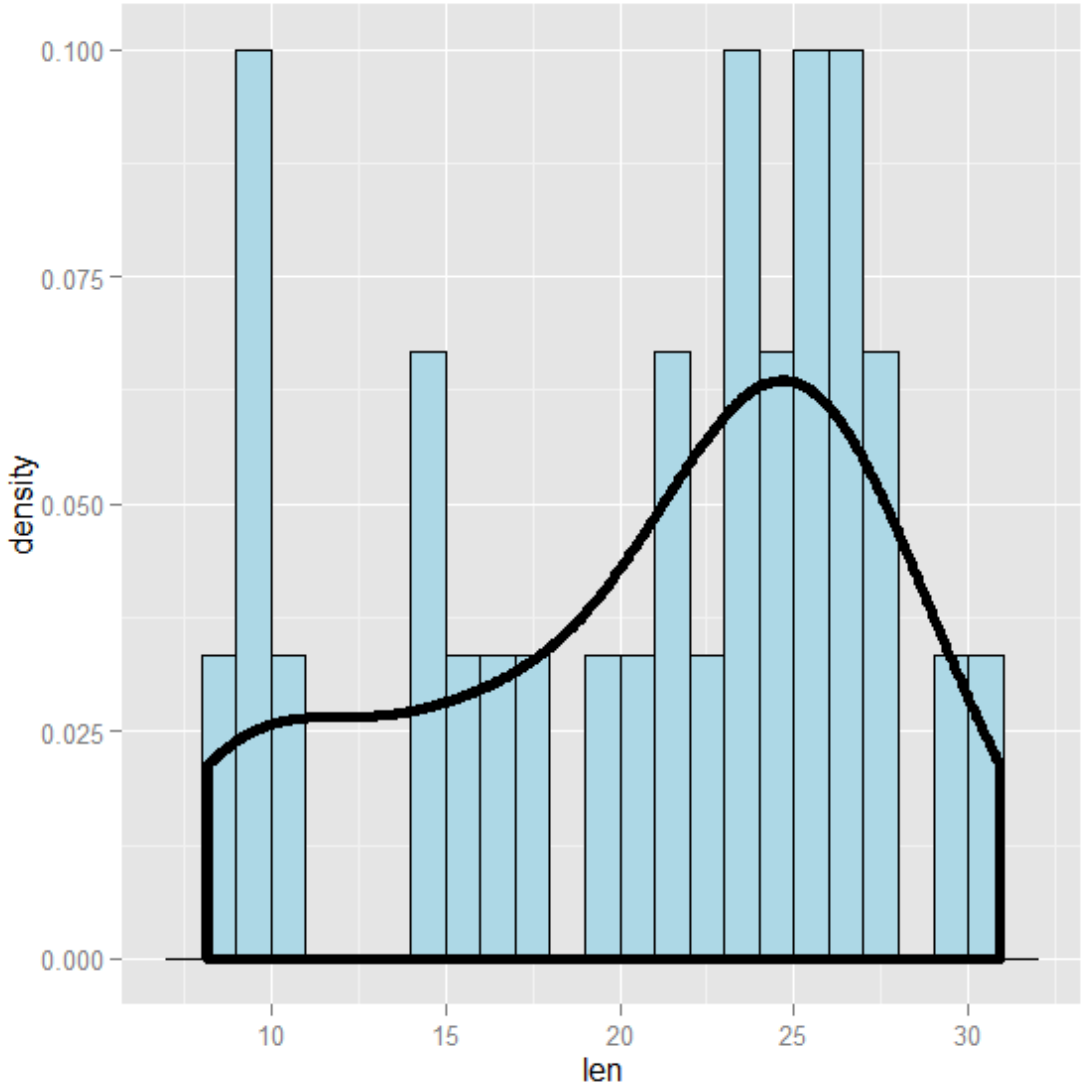
```
## X0$dose        7.811      1.302   6.001 1.82e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.446 on 28 degrees of freedom
## Multiple R-squared:  0.5626, Adjusted R-squared:  0.547
## F-statistic: 36.01 on 1 and 28 DF,  p-value: 1.825e-06
```

```
summary(lm(Y0$len ~ Y0$dose))
```

```
##
## Call:
## lm(formula = Y0$len ~ Y0$dose)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -8.2264 -2.6029  0.0814  2.2288  7.4893
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)    3.295      1.427   2.309   0.0285 *
## Y0$dose       11.716      1.079  10.860 1.51e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.685 on 28 degrees of freedom
## Multiple R-squared:  0.8082, Adjusted R-squared:  0.8013
## F-statistic: 117.9 on 1 and 28 DF,  p-value: 1.509e-11
```

Both show very small p values hence without knowing what the supplement was I can say that there is very little support for this study to take the supplement for growth of teeth.

Plot of supplement "OJ"



Plot of supplement "VC"