Course Project -Statistical Inference Part 2

Nidhi Mavani

Sunday, October 26, 2014

```
library(datasets)
x<-ToothGrowth
summary(x)
```

```
##       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
```

```
str(x)
```

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

This provides the 2-tail z values for the 95% confidence int.

```
alpha=.95
z=qnorm(alpha/2)
c(-z,z)
```

```
## [1]  0.06270678 -0.06270678
```

evaluate the hypothesis that supplement OJ does not improve growth more than the VC supplement.

```
t.test(x$len[x$supp=="OJ"],x$len[x$supp=="VC"],paired=TRUE)
```

```
##
##  Paired t-test
##
## data:  x$len[x$supp == "OJ"] and x$len[x$supp == "VC"]
## t = 3.3026, df = 29, p-value = 0.00255
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  1.408659 5.991341
## sample estimates:
## mean of the differences
##                     3.7
```

As the 95% confidence interval contains the sample mean of the differences, the hypothesis cannot be rejected. There is insufficient evidence to conclude that supplement VC works any better than supplement OJ.

We now evaluate the hypothesis that dosage does improve growth.

```
t.test(x$len,x$dose)
```

```
##
##  Welch Two Sample t-test
##
## data:  x$len and x$dose
## t = 17.8096, df = 59.798, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  15.66453 19.62881
## sample estimates:
## mean of x mean of y
## 18.813333  1.166667
```

the 95% confidence interval contains the sample mean, the hypothesis cannot be rejected. There is sufficient evidence to conclude that increased dosages do affect tooth Growth.