Vitamin C in Guinea Pigs

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Basic Inferential Data Analysis on tooth growth

Overview

R has a data set called ToothGrowth. This dataset contains the growth of a tooth in Guinea Pigs given two different vitamin C supplements (OJ = orange juice, VC = asorbic acid) at 3 different dosages. The set has 60 objects with 3 variables, length of tooth, supplement and dosage.

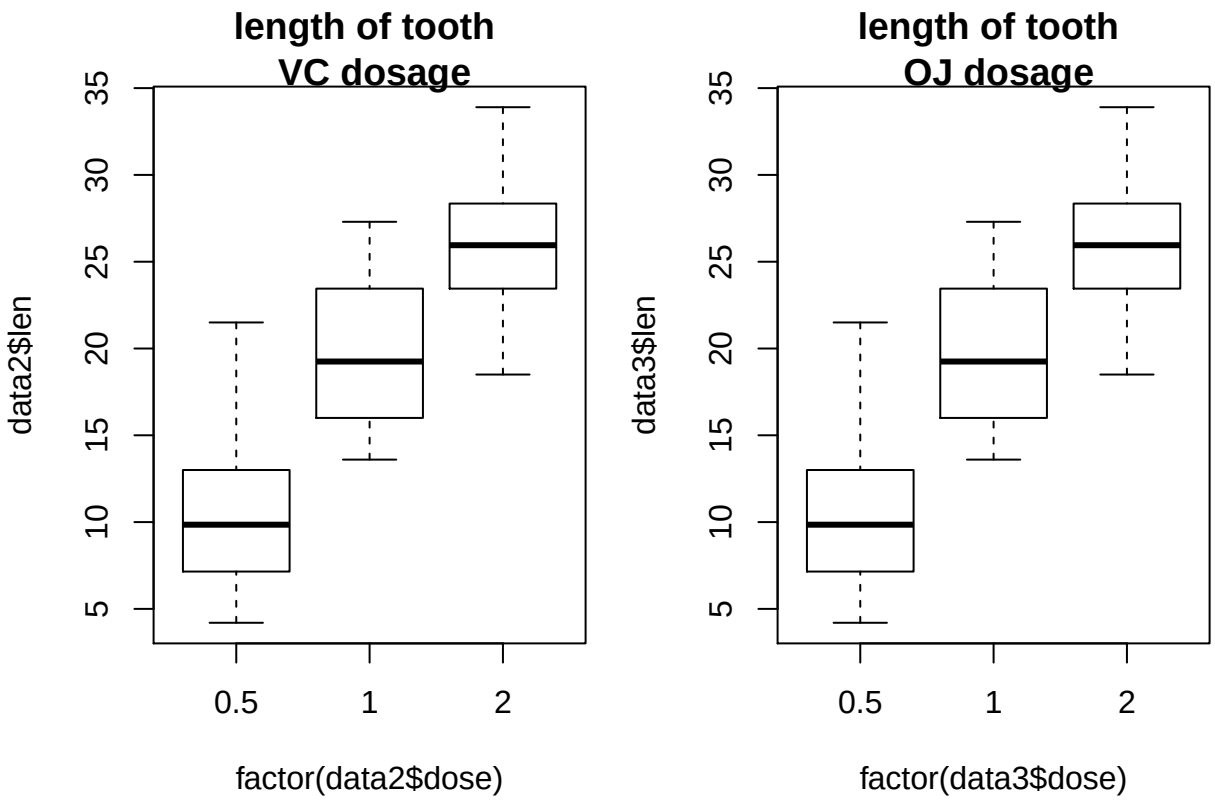
Conclusion

There is not a clear difference between the supplements based on t-test p = 0.06. There is also not a difference between the different dosages and the supplements. There is however a difference, based on t-test that the different dosages contribute to length of tooth. The significance range from e-05 to e-14. The largest significance was from 0.5 dosing to 2.0, regardless of the supplement.

```
data("ToothGrowth"); summary(ToothGrowth);dat1 <- aggregate(.~dose, data=ToothGrowth, mean)
```

```
##       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
```

```
data2 <- subset(ToothGrowth, supp="VC"); data3 <- subset(ToothGrowth, supp="OJ")
par(mfrow = c(1, 2), mar = c(4, 4, 2, 1), oma = c(0, 0, 2, 0))
plot(data2$len ~factor(data2$dose), main = "length of tooth \n VC dosage")
plot(data3$len ~factor(data3$dose),main = "length of tooth \n OJ dosage")
```




```
VC <- ToothGrowth[ which(ToothGrowth$supp == "VC"), ]
OJ <- ToothGrowth[ which(ToothGrowth$supp == "OJ"), ]
VC0.5 <-data2[which(data2$dose == 0.5),]; VC1.0 <-data2[which(data2$dose == 1.0),];VC2.0 <-data2[which(
OJ0.5 <-data3[which(data2$dose == 0.5),]; OJ1.0 <-data3[which(data2$dose == 1.0),];OJ2.0 <-data3[which(
t1 <-t.test(VC$len, OJ$len, mu = 0, paired=F, conf.level = 0.95 )
t2 <-t.test(VC0.5$len, OJ0.5$len, mu = 0, paired=F, conf.level = 0.95 );t3 <-t.test(VC1.0$len, OJ1.0$len
t4 <-t.test(VC2.0$len, OJ2.0$len, mu = 0, paired=F, conf.level = 0.95 );t5 <-t.test(VC0.5$len, VC1.0$len
t6 <-t.test(VC0.5$len, VC2.0$len, mu = 0, paired=F, conf.level = 0.95 );
t8 <-t.test(OJ0.5$len, OJ1.0$len, mu = 0, paired=F, conf.level = 0.95 );t9 <-t.test(OJ0.5$len, OJ2.0$len
jj<- c("VC_OJ", "VC0.5_OJ0.5","VC1.0_OJ1.0","VC2.0_OJ2.0","VC0.5_VC1.0","VC0.5_VC2.0","VC1.0_VC2.0","OJ
jj <- cbind(t1$p.value, t2$p.value,t3$p.value,t4$p.value,t5$p.value,t6$p.value,t8$p.value,t9$p.value)
hh <- cbind(t1$conf.int, t2$conf.int,t3$conf.int,t4$conf.int,t5$conf.int,t6$conf.int,t8$conf.int,t9$conf
note <- c("VC_OJ", "VC0.5_OJ0.5", "VC1.0_OJ1.0", "VC2.0_OJ2.0", "VC0.5_VC1.0","VC0.5_VC2.0","OJ0.5_OJ1.0
note2 <-c("CI lower", "upper","p-value")
x <- rbind( hh, jj); dat2 <- as.data.frame(x, row.names = note2); colnames(dat2) <- note; print(dat2, di
```

```
##           VC_OJ VC0.5_OJ0.5 VC1.0_OJ1.0 VC2.0_OJ2.0 VC0.5_VC1.0
## CI lower -7.571        -2.9        -2.8        -2.4    -1.2e+01
## upper     0.171         2.9         2.8         2.4    -6.3e+00
## p-value   0.061         1.0         1.0         1.0     1.3e-07
##          VC0.5_VC2.0 OJ0.5_OJ1.0 OJ0.5_OJ2.0
## CI lower    -1.8e+01    -1.2e+01    -1.8e+01
## upper       -1.3e+01    -6.3e+00    -1.3e+01
## p-value      4.4e-14     1.3e-07     4.4e-14
```