Peer-graded Assignment: Statistical Inference Course Project - part 2

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11/12/2019

OVERVIEW

This document consits of the analysis required for the secondpart of the Statistical Inference Course Project.

2 Basic Inferential Data Analysis Instructions

2.1 Summary of the data

Running the summary command the basic statistics and characteristics of the dataset are presented bellow

```
##       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
```

2.2 confidence intervals for suup and doses

Did the student perform some relevant confidence intervals and/or tests? ### 2.3.1 Confidence interval for suup Test for supp VC - OJ

```
##
##  Welch Two Sample t-test
##
## data:  data.VC$len and data.OJ$len
## t = -1.9153, df = 55.309, p-value = 0.06063
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -7.5710156  0.1710156
## sample estimates:
## mean of x mean of y
##  16.96333  20.66333
```

Interpretation of the T-test for supp

For paired the two sided t-test at 95% provides an interval -7.57 and 0.17, the interval includes cero. Therefore, when comparing OJ and VC we fail to reject the null hipothesis and we can not conclude wether OJ or VC have an effect on tooth lenght at 95% of confidence inteval.

2.2.2 Confidence interval for dose

dose 1 (0.5) - dose 2 (1)

```
##
##  One Sample t-test
##
## data:  df12
## t = -6.9669, df = 19, p-value = 1.225e-06
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  -11.872879  -6.387121
## sample estimates:
## mean of x
##     -9.13
```

2.2.3 dose 1 (0.5) - dose 3 (2)

```
##
##  One Sample t-test
##
## data:  df13
## t = -11.291, df = 19, p-value = 7.19e-10
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  -18.3672 -12.6228
## sample estimates:
## mean of x
##   -15.495
```

2.2.4 dose 2 (1) - dose 3 (2)

```
##
##  One Sample t-test
##
## data:  df23
## t = -4.6046, df = 19, p-value = 0.0001934
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  -9.258186 -3.471814
## sample estimates:
## mean of x
##    -6.365
```

Interpretation of the t-test for dose

Two main conclusions are obtaned after looking into the confidence intervals of the differences between the doses. First, in a 95% double sided confidence interval, when the dose is bigger the difference in tooth lenght is bigger. Second, that with the available data it is not possible to tell if OJ and VC have an effect on tooth lenght.

Assumptions for this analysis

- The data in the toothgrowth dataset is
- not paired
- independent
- the tooth length reported for each of the doses and the type of supps have different variances
- the tooth length in the dataset follows a t-student distribution