ToothGrowth Data Exploratory Analysis

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1 Synopsis

We are now moving to the part 2 of the task. Below we will exlore the `ToothGrowth` dataset from R `datasets` package. The headers below will correspond to the tasks. The data comes from the study "The Effect of Vitamin C on Tooth Growth in Guinea Pigs". The data is described as: *The response is the length of odontoblasts (teeth) in each of 10 guinea pigs at each of three dose levels of Vitamin C (0.5, 1, and 2 mg) with each of two delivery methods (orange juice or ascorbic acid).*

2 Load the ToothGrowth data and perform some basic exploratory data analyses

```
data("ToothGrowth")
```

3 Provide a basic summary of the data

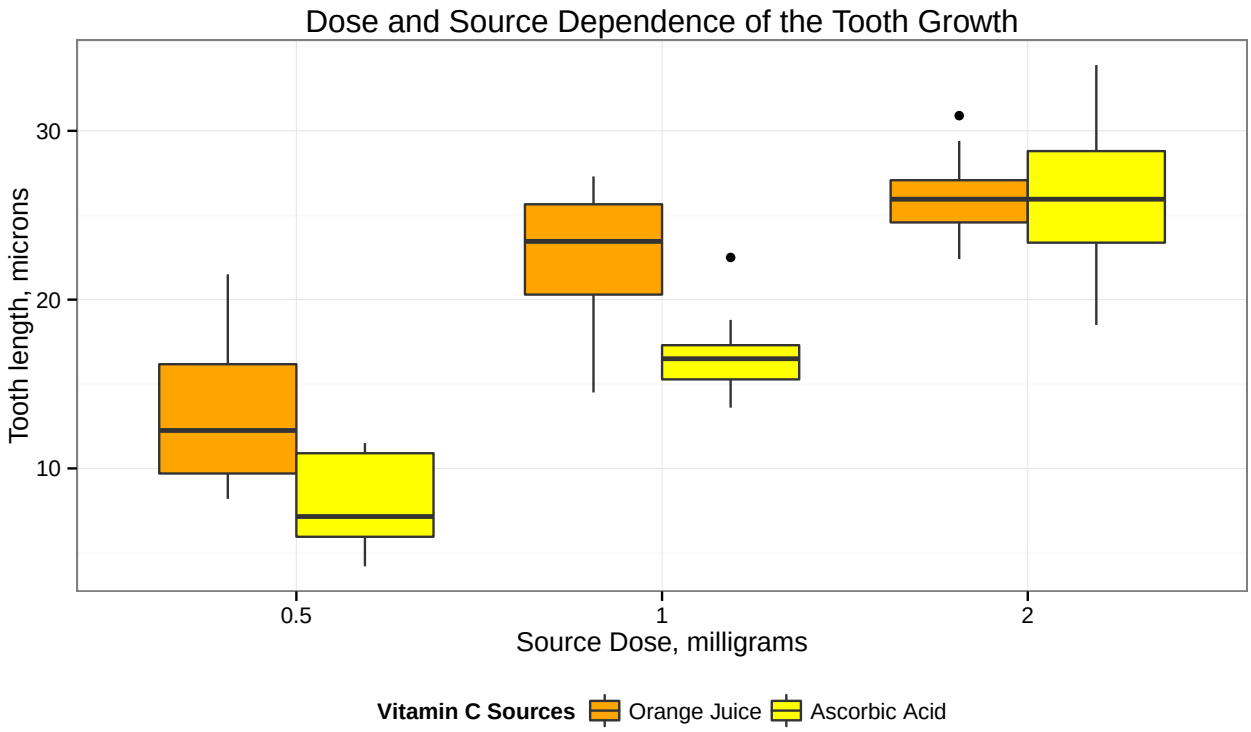
Well, the data is presented as a `data.frame` of 60 samples in 3 rows: len, supp, dose; The data is summarized in the Table 1 below (see **Code Block 1**).

- **len** is the tooth length (microns)
- **supp** is the supplement type (VC or OJ)
- **dose** is the dose (milligrams)

Table 1: Summary of the "ToothGrowth" Data (continued below)

supp	dose	min.len	max.len	mean.len	sd.len
OJ	0.5	8.2	21.5	13.23	4.46
OJ	1	14.5	27.3	22.7	3.911
OJ	2	22.4	30.9	26.06	2.655
VC	0.5	4.2	11.5	7.98	2.747
VC	1	13.6	22.5	16.77	2.515
VC	2	18.5	33.9	26.14	4.798

q25	median.len	q75
9.7	12.25	16.18
20.3	23.45	25.65
24.57	25.95	27.08
5.95	7.15	10.9
15.27	16.5	17.3
23.38	25.95	28.8



There obviously exists a positive and proportionate effect of orange juice as compared with the ascorbic acid, however, this effect can only be observed at dose levels below 2 mg. We can also demonstrate this in numeric values (see below, see **Code Block 2**)

Table 3: Orange Juice vs Ascorbic Acid at 0.5 mg Dose

Test statistic	df	P value	Alternative hypothesis
3.17	14.97	*0.006359* * *	two.sided

Table 4: Orange Juice vs Ascorbic Acid at 1.0 mg Dose

Test statistic	df	P value	Alternative hypothesis
4.033	15.36	*0.001038* * *	two.sided

Table 5: Orange Juice vs Ascorbic Acid at 2.0 mg Dose

Test statistic	df	P value	Alternative hypothesis
-0.04614	14.04	*0.9639*	two.sided

4 References

5 Related R Code

5.1 Code Block 0

5.2 Code Block 1

5.3 Code Block 2