Homework_1

Aishwarya Thorat - 24211250

Introduction

The `ToothGrowth` dataset is a built-in dataset in R. It examines the effect of Vitamin C on tooth growth in 60 guinea pigs. The experiment compares two supplement types
- **orange juice (OJ)**
- **ascorbic acid (VC)**
administered at three dose levels: 0.5, 1, and 2 mg/day.

This dataset is commonly used for visualizing grouped data and performing basic exploratory data analysis.

Dataset Description

The dataset contains 3 variables:

- `len`: Tooth length (numeric)
- `supp`: Supplement type – Orange Juice (`OJ`) or Vitamin C (`VC`)
- `dose`: Dose of vitamin C in milligrams per day (numeric: 0.5, 1, 2)

These variables allow us to compare how both the supplement type and dosage level affect tooth growth in guinea pigs.

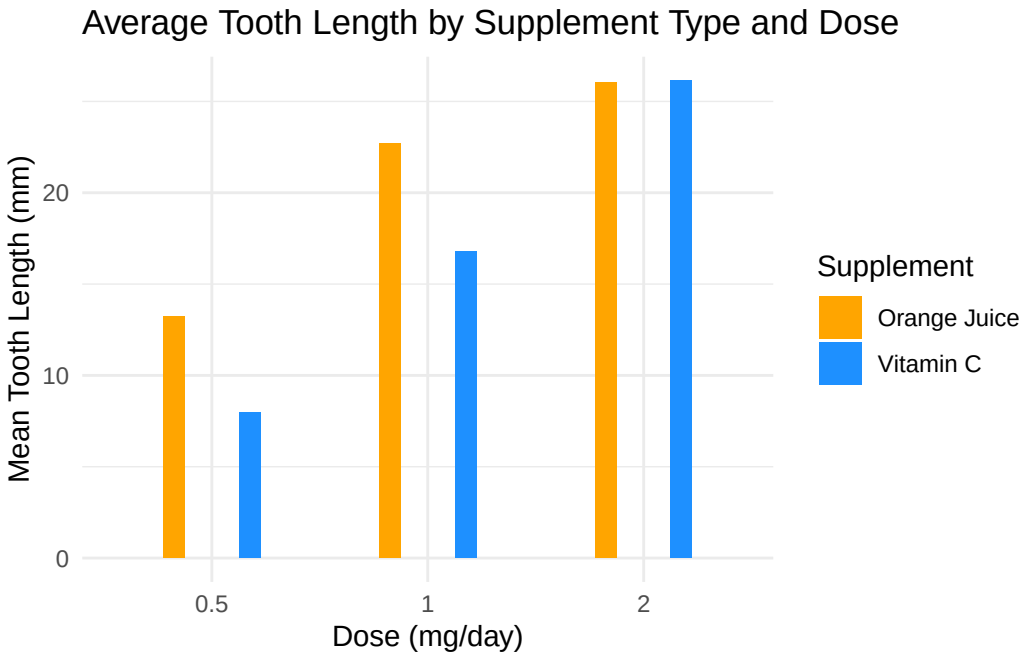
Summary Statistics

```
      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
```

This summary shows the range and distribution of tooth length values for different doses and supplement types.

Plot

The bar plot below displays the average tooth length for each combination of supplement type and dose level.



Explanation

- The bar plot visualizes how tooth growth varies by dose and supplement type.
- Bars are grouped by supplement type for each dose level.
- Custom colors improve clarity: orange for Orange Juice and blue for Vitamin C.

Interpretation

- Tooth growth increases as the dose increases.
- At lower doses, Orange Juice results in more growth than Vitamin C.
- At the highest dose (2 mg/day), both supplements produce similar growth.

This indicates that dose has a stronger effect on growth than supplement type, especially at high levels.