

# Analyzing Female Mice Body Weights

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## Objective:

Your mission is to use R to analyze the body weights of female mice on different diets. You'll apply statistical measures to understand trends and variations in the data.

## Data Overview:

The dataset you'll be working with is about the body weights of female mice on different diets. The .csv file is attached to this assignment. The dataset contains two columns:

1. Diet: This column indicates the type of diet each mouse was on. For example, it might be 'chow' or other specific diet types.
2. Bodyweight: This column shows the bodyweight of each mouse in grams.

## Instructions

1. Central Tendencies of Body Weights
  - Goal: Discover key central tendencies in the body weights of the mice.
  - Task: Calculate the mean, median, and mode for the body weights.

Action:

```
# Load the dataset into R.
```

```
df <- read.csv('female-mice-weights.csv')
df
```

```
##   Diet Bodyweight
## 1  chow      21.51
## 2  chow      28.14
## 3  chow      24.04
## 4  chow      23.45
## 5  chow      23.68
## 6  chow      19.79
## 7  chow      28.40
## 8  chow      20.98
## 9  chow      22.51
## 10 chow      20.10
## 11 chow      26.91
## 12 chow      26.25
## 13  hf      25.71
## 14  hf      26.37
## 15  hf      22.80
## 16  hf      25.34
```

```
## 17 hf 24.97
## 18 hf 28.14
## 19 hf 29.58
## 20 hf 30.92
## 21 hf 34.02
## 22 hf 21.90
## 23 hf 31.53
## 24 hf 20.73
```

*# Apply mean(), median(), and a custom function to find the mode for the Bodyweight column.*

```
avg_bodyweight <- mean(df$Bodyweight)
avg_bodyweight
```

```
## [1] 25.32375
```

```
median_bodyweight <- median(df$Bodyweight)
median_bodyweight
```

```
## [1] 25.155
```

*# Mode function*

```
mode_function <- function(x) {
  ux <- unique(x)
  ux[which.max(tabulate(match(x, ux)))]
}
```

```
mode_bodyweight <- mode_function(df$Bodyweight)
mode_bodyweight
```

```
## [1] 28.14
```

*# Reflection: Write about which measure (mean, median, or mode) you think best represents the bodyweight*

## 2. Understanding Body Weight Variability

- Goal: Explore the variability in the body weights across all diets.
- Task: Calculate the range, variance, and standard deviation for the body weights.

Action:

*# Use R's range(), var(), and sd() functions on the Bodyweight column.*

```
range_bodyweight <- range(df$Bodyweight)
range_bodyweight
```

```
## [1] 19.79 34.02
```

```
var_bodyweight <- var(df$Bodyweight)
var_bodyweight
```

```
## [1] 14.78
```

```
sd_bodyweight <- sd(df$Bodyweight)
sd_bodyweight
```

```
## [1] 3.844476
```

*# Reflection: Discuss what these measures tell you about the spread of body weights.*

## 3. Overall Data Summary

- Goal: Gain a comprehensive statistical overview of the dataset.
- Task: Use the `summary()` function in R.

Action:

```
# Run summary() on the entire dataset.
```

```
summary(df)
```

```
##      Diet      Bodyweight
## Length:24      Min.   :19.79
## Class :character 1st Qu.:22.36
## Mode  :character Median :25.16
##                      Mean  :25.32
##                      3rd Qu.:28.14
##                      Max.   :34.02
```

```
# Reflection: Highlight any standout points from the summary, such as differences in weight across diet.
```

#### 4. Diet Comparison

- Goal: Compare body weights across different diets.
- Task: Group the data by diet and calculate the average bodyweight for each diet group.

Action:

```
# Utilize the dplyr package to group data and calculate mean body weights.
```

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##   filter, lag
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
```

```
df %>% group_by(Diet) %>% summarise(mean_bodyweight = mean(Bodyweight))
```

```
## # A tibble: 2 x 2
##   Diet mean_bodyweight
##   <chr>      <dbl>
## 1 chow      23.8
## 2 hf        26.8
```

```
# Reflection: Share insights on how diet might influence bodyweight based on your findings.
```