STAT345: Homework 6

Jayson Grace

November 09, 2014

Problem 1

1a

Exercise Group Mean: 287.9167
Non-Exercise Group Mean: 325.375

1b

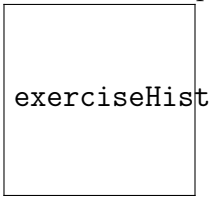
Exercise Group Standard Deviation: 106.0441
Non-Exercise Group Standard Deviation: 120.6754
Based on our results, it would appear that there is more variability in the Non-Exercise Group.

1c

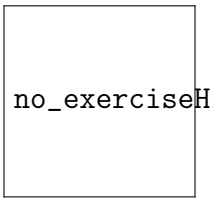
Exercise Group Median: 265.5
Non-Exercise Group Median: 294

1d

Exercise Group Histogram:



Non-Exercise Group Histogram:

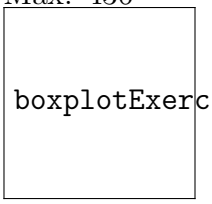


1e

Code used:

```
boxplot(exercise, horizontal = TRUE, axes = FALSE, staplewex = 1)
text(x=fivenum(exercise), labels =fivenum(exercise), y=1.25)
```

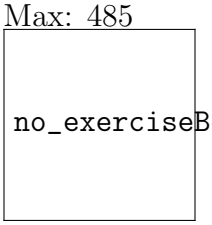
Exercise Group Box Plot:
Min: 139
Q1: 211
Median: 265.5
Q3: 398.5
Max: 436



Code used:

```
boxplot(no_exercise, horizontal = TRUE, axes = FALSE, staplewex = 1)
text(x=fivenum(no_exercise), labels =fivenum(no_exercise), y=1.25)
```

Non-Exercise Group Box Plot:
Min: 160
Q1: 242.5
Median: 294
Q3: 442.5
Max: 485



1f

The results reflect that the Non-Exercise group has higher gene activity. The box plot shows that the min is greater, the q1 range is greater, the median is greater, the q3 range is greater and the max is greater. Additionally we have determined that the mean is higher for the Non-Exercise group as well. Because there are no contrary results from our calculations, we can determine that the Non-Exercise group has higher gene activity overall.

Problem 2

2a Part 1

Code used:

```
sd = 1.5/sqrt(10)
var = sd^2
```

The mean of $\bar{X}_1$ is 2
The variance of $\bar{X}_1$ is 0.225

2b Part 2

Code used:

```
sample=rnorm(20,mean=2,sd=1.5)
mean(sample)
var(sample)
```

The mean of $\bar{X}_2$ is 2.357418
The variance of $\bar{X}_2$ is 1.814159

2a Part 2

The mean of xbar1 is 1.98364
The difference of xbar1's mean and $\bar{X}_1$'s mean is $2 - 1.98364 = 0.01636$

2b Part 2

The variance of xbar1 is 0.2397124
The difference of xbar1's variance and $\bar{X}_1$'s variance is $3.242735 - 0.2397124 = 3.0030226$

2a Part 3

The variance of xbar2 is 0.1201697
The difference of xbar2's variance and $\bar{X}_2$'s variance is $1.814159 - 0.1201697 = 1.6939893$

2b Part 3

The variance of xbar2 is smaller than the variance of xbar1 by 0.1195427