STAT 425 Final Project

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Contents

Company XX is a manufacturer of several types of protective packaging, including bubble wrap sold in both retail and bulk. The objective of this project is to determine the best operating conditions for the bubble wrap lines to increase production capacity.

The response variable was the production rate measured in lbs/hr. The experiment was replicated 3 times and the randomization order for each replication was also recorded.

How to account for replication in model?

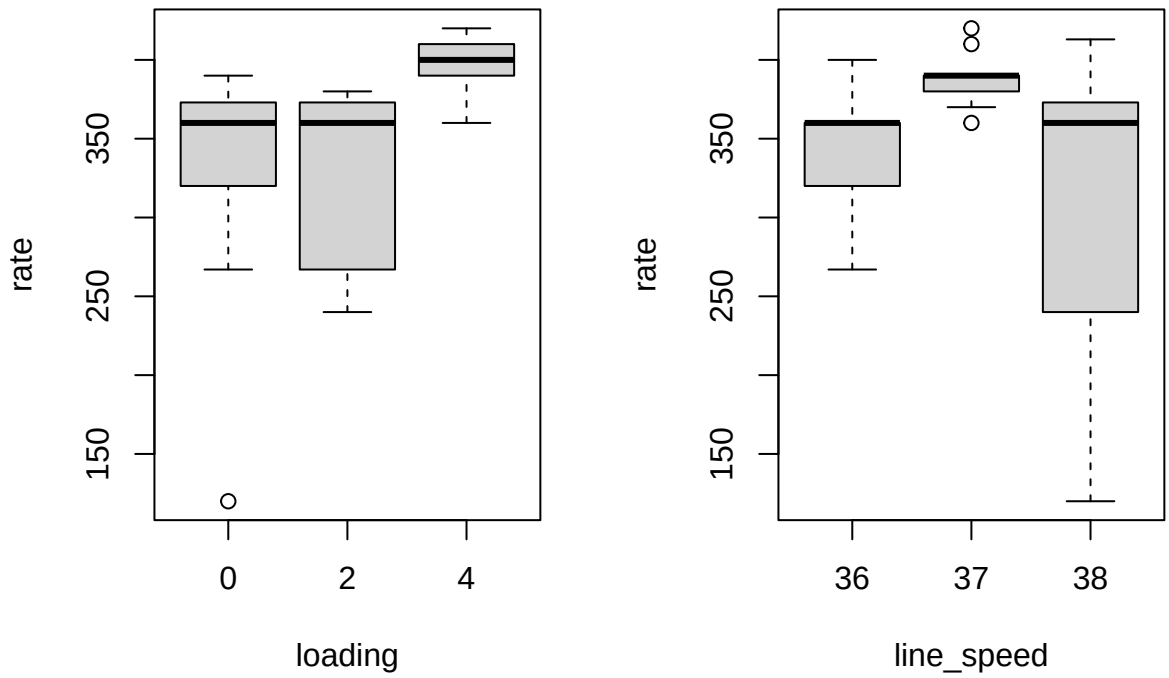
```
bubblewrap <- read.csv('bubblewrap.csv')
```

```
# set factors
bubblewrap$line_speed <- as.factor(bubblewrap$line_speed)
bubblewrap$loading <- as.factor(bubblewrap$loading)
head(bubblewrap)
```

```
##   replication run_order line_speed loading rate
## 1           1         6         38       2  240
## 2           1         8         37       4  390
## 3           1         1         36       0  360
## 4           1         9         38       4  400
## 5           1         3         38       0  320
## 6           1         7         36       4  400
```

```
#Means
aov_model <- aov(rate ~ -1 + loading + line_speed, data = bubblewrap)
group_means <- aov(rate ~ -1 + loading + line_speed, data = bubblewrap)
```

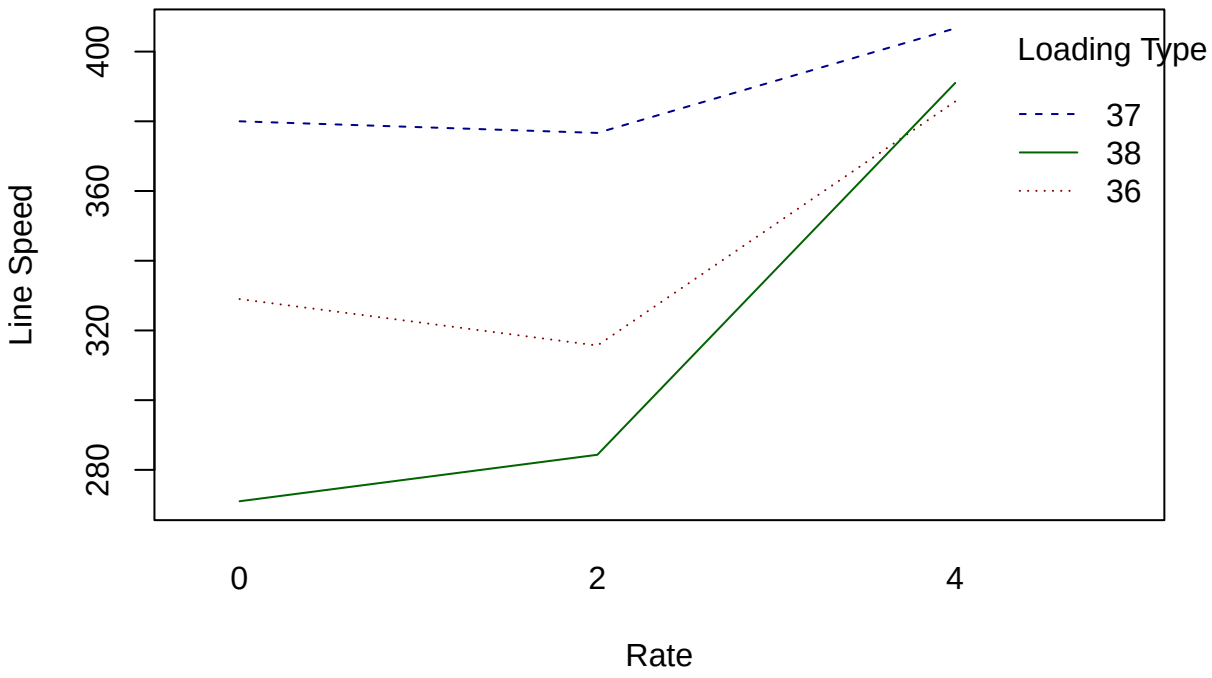
```
par(mfrow = c(1,2))
boxplot(rate ~ loading, data = bubblewrap)
boxplot(rate ~ line_speed, data = bubblewrap)
```



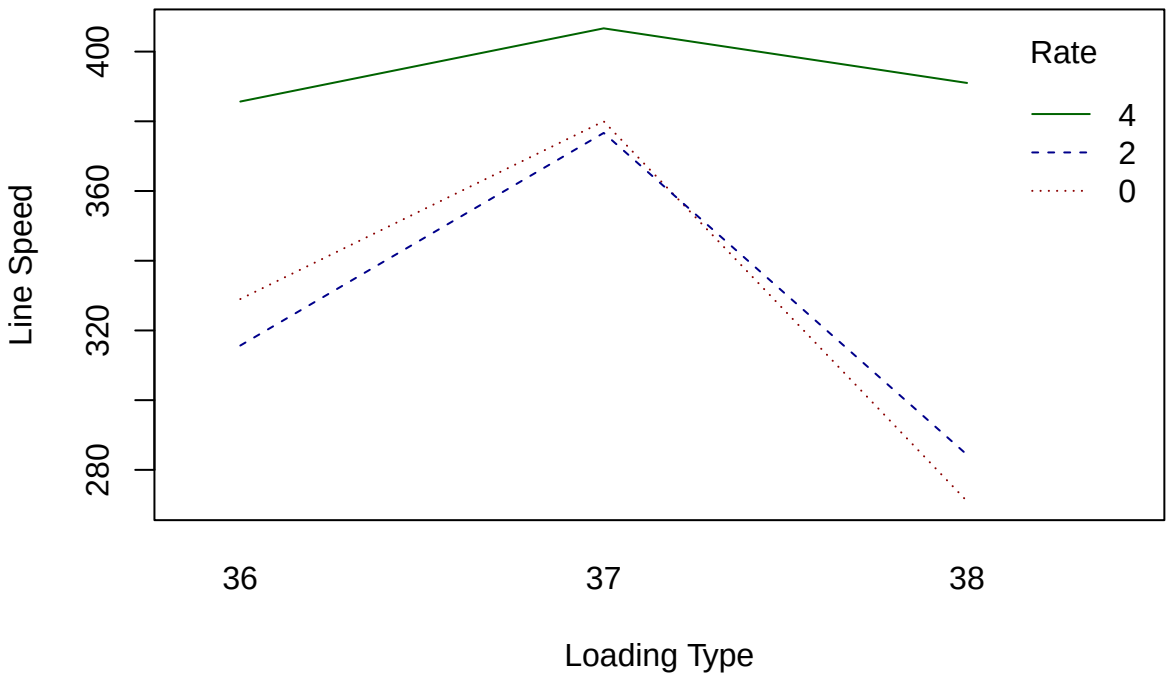
Loading 4 and Line Speed 37 seem to have different means than their counterparts.

#Todo: Fix Margins

```
loading_and_line_plot <- interaction.plot(x.factor = bubblewrap$loading, response = bubblewrap$rate, tra
```




```
line_and_loading_plot <- interaction.plot(trace.factor = bubblewrap$loading, response = bubblewrap$rate
```


Line Speed
400
360
320
280
Rate
4
2
0
36
37
38
Loading Type