# Thesis Survey Data analysis

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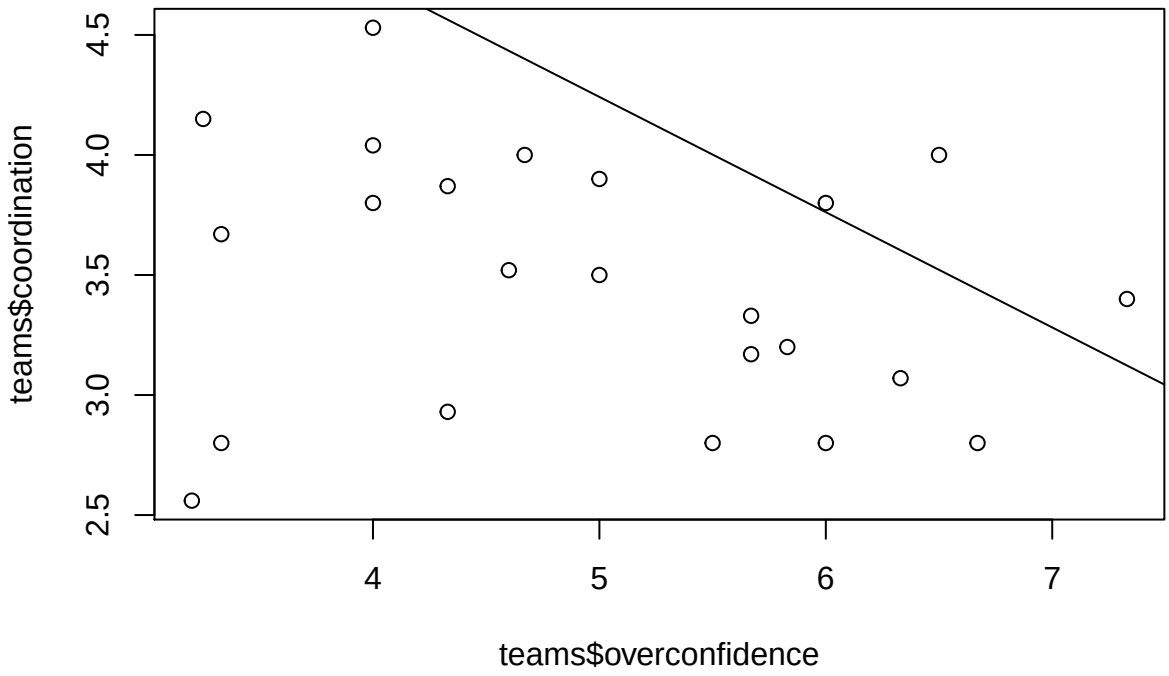
## Contents

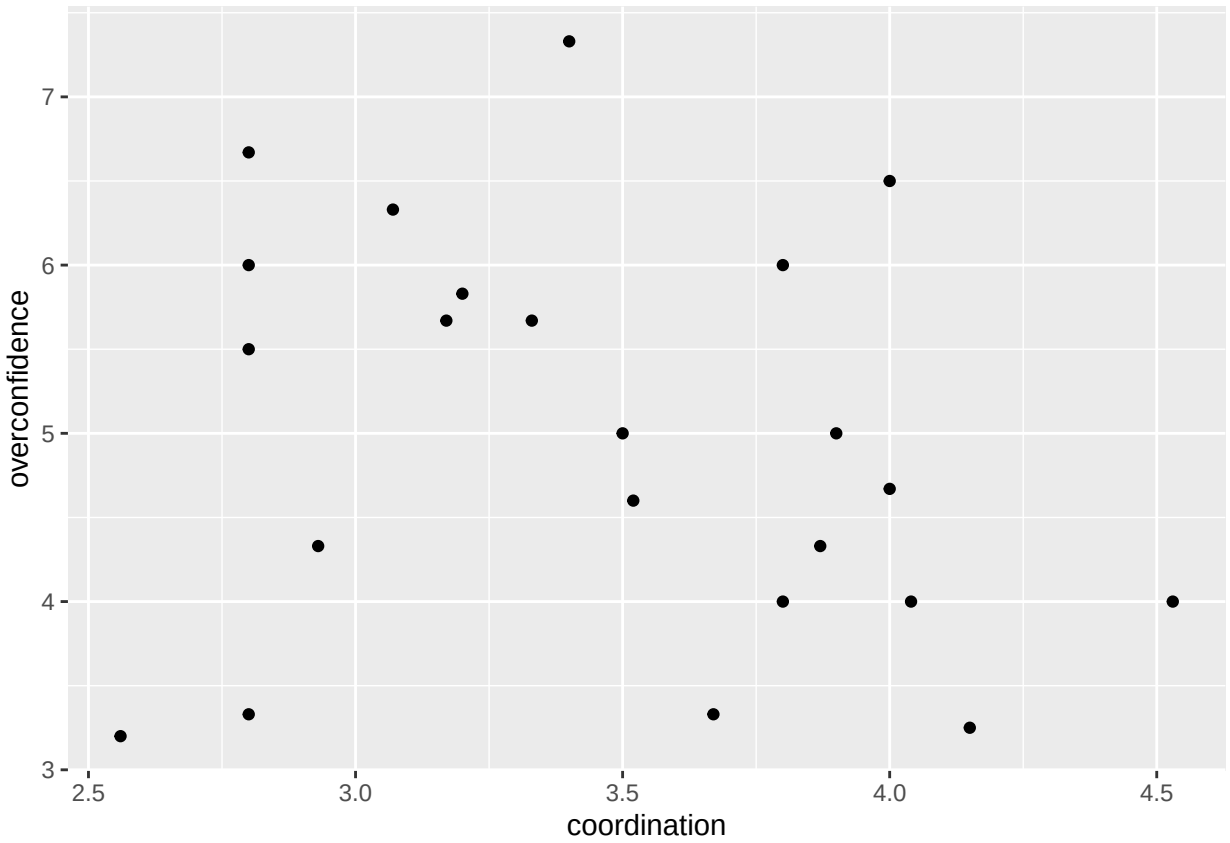
# Hypothesis Testing

## Hypothesis No. 1

H1: Team Overconfidence has a negative effect on team coordination

```
##
## Call:
## lm(formula = overconfidence ~ coordination, data = teams)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.21342 -0.76037  0.03795  0.71286  2.31994
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    6.6427     1.6803   3.953 0.000726 ***
## coordination  -0.4802     0.4798  -1.001 0.328300
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.208 on 21 degrees of freedom
## Multiple R-squared:  0.04553,    Adjusted R-squared:  7.595e-05
## F-statistic: 1.002 on 1 and 21 DF,  p-value: 0.3283
```

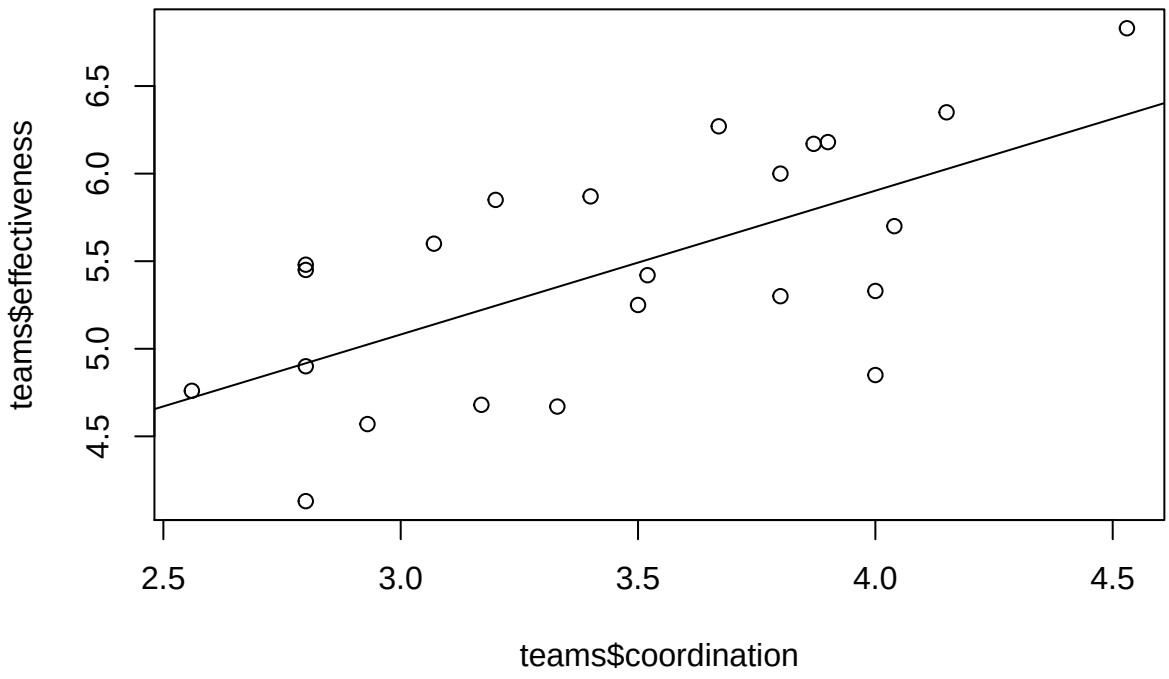


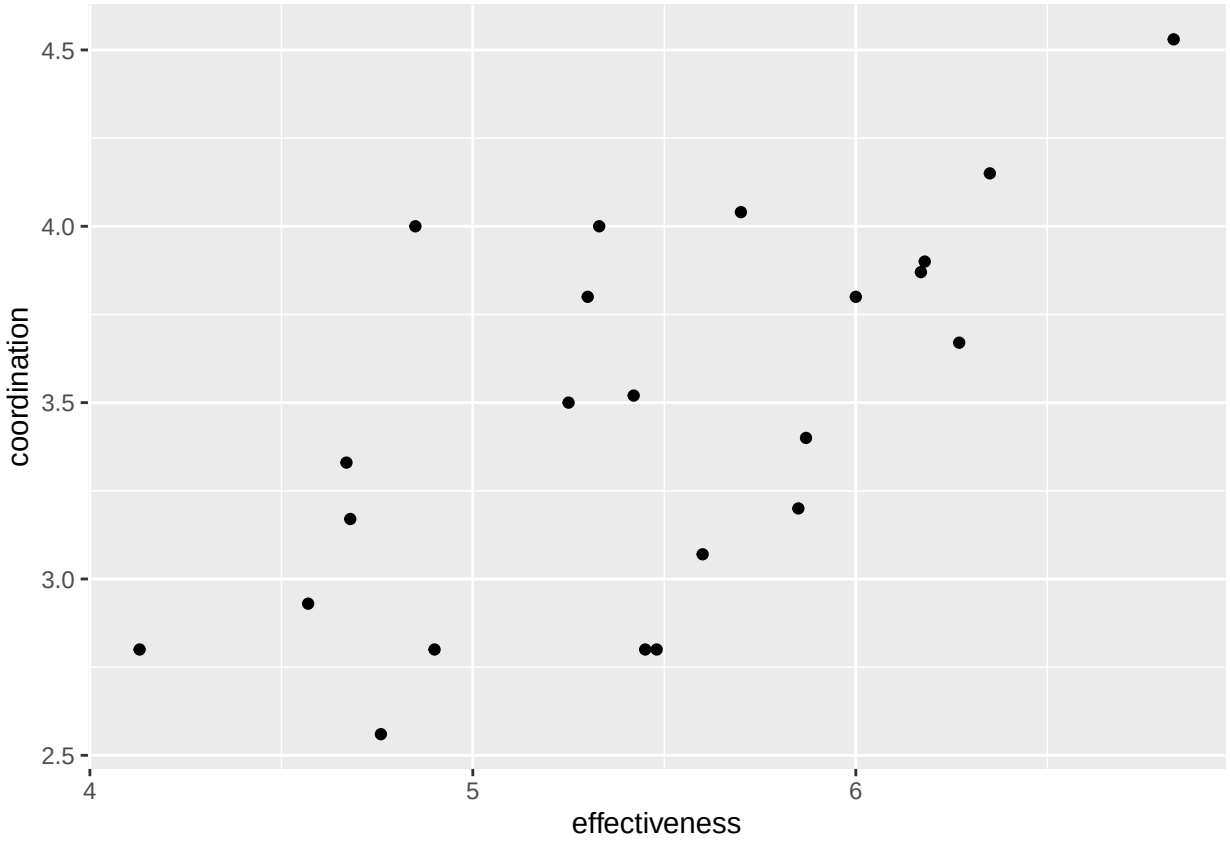

overconfidence
7
6
5
4
3
2.5
3.0
3.5
4.0
4.5
coordination

### Hypothesis No. 2

H2: Team Coordination has a positive effect on team effectiveness

```
##
## Call:
## lm(formula = effectiveness ~ coordination, data = teams)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.05262 -0.44615  0.03993  0.46061  0.63838
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.6177     0.7321   3.576 0.001784 **
## coordination   0.8212     0.2090   3.928 0.000771 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5264 on 21 degrees of freedom
## Multiple R-squared:  0.4236, Adjusted R-squared:  0.3961
## F-statistic: 15.43 on 1 and 21 DF,  p-value: 0.0007709
```



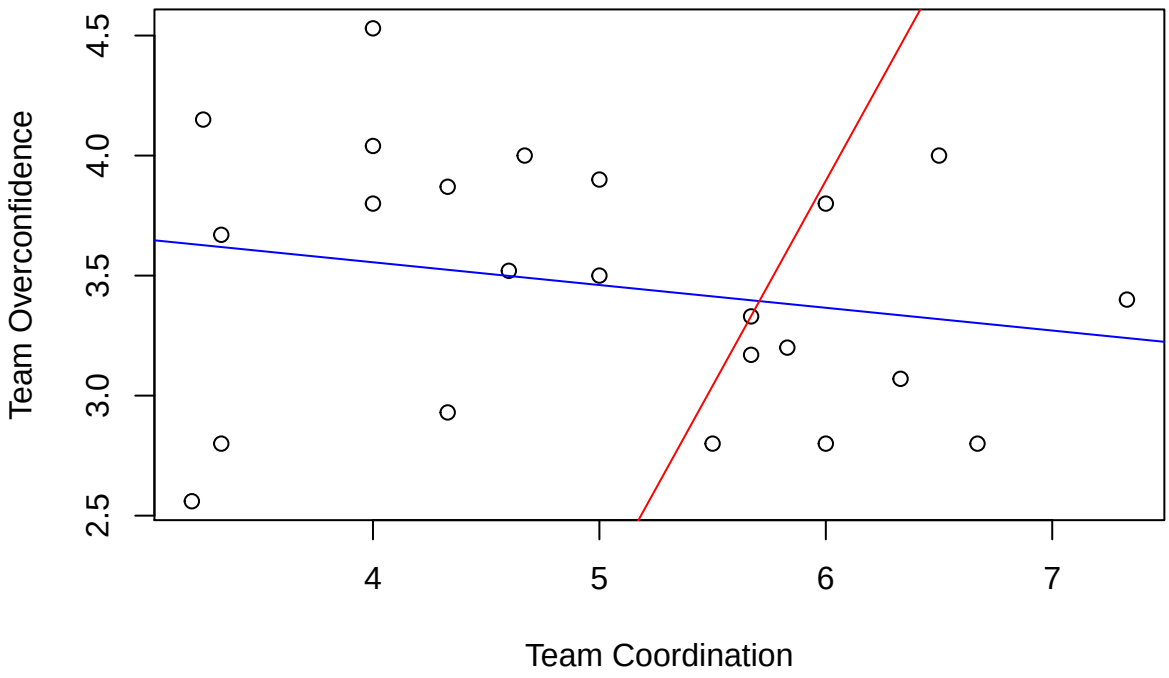

4.5
4.0
3.5
3.0
2.5
coordination
4
5
6
effectiveness

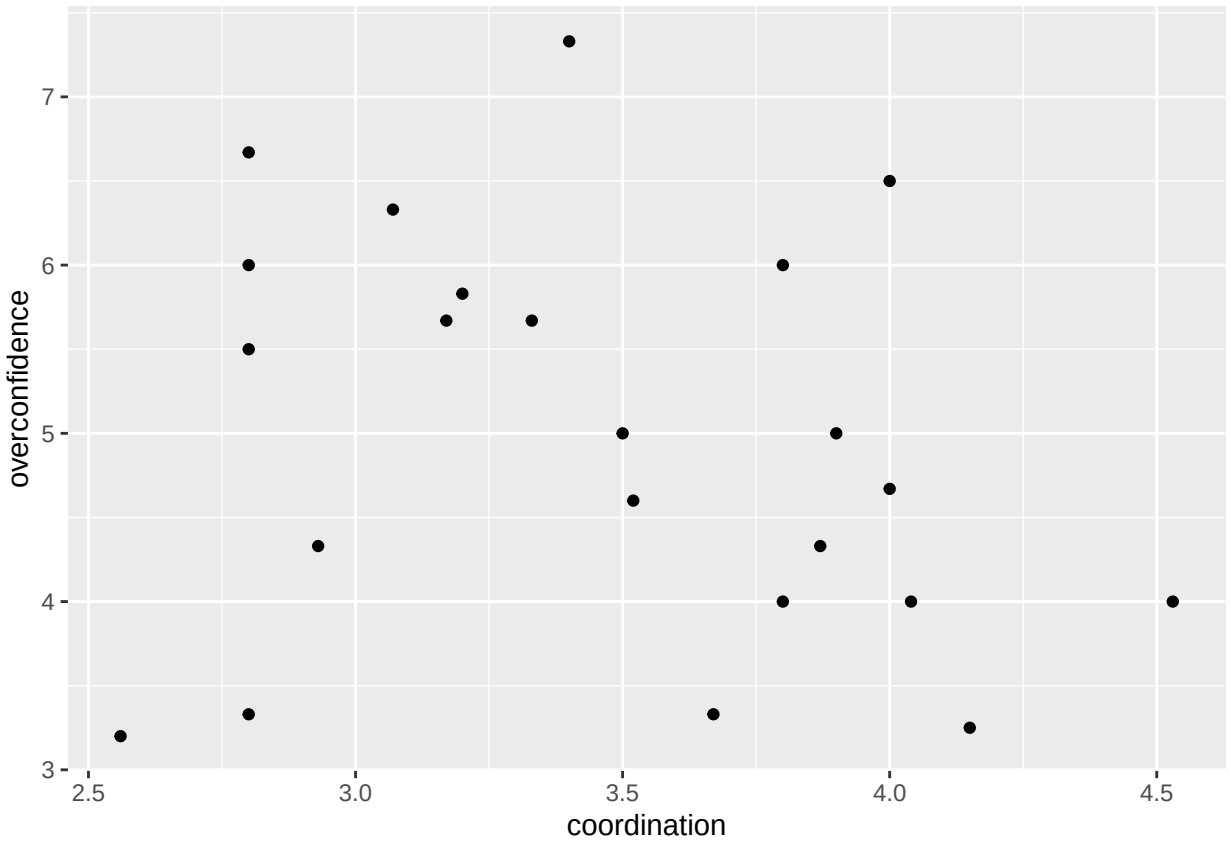
### Hypothesis No. 3

H3: Voice Behavior has a moderator effect on the relationship between overconfidence and team coordination

```
##
## Call:
## lm(formula = coordination ~ overconfidence + voice_behavior +
##     inter, data = teams_voice_interaction)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.8892 -0.2471 -0.0404  0.3102  0.7715
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     -6.3579     3.8966  -1.632   0.1192
## overconfidence   1.7089     0.7269   2.351   0.0297 *
## voice_behavior   2.6272     0.9888   2.657   0.0156 *
## inter           -0.4614     0.1846  -2.499   0.0218 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4807 on 19 degrees of freedom
## Multiple R-squared:  0.3075, Adjusted R-squared:  0.1982
## F-statistic: 2.813 on 3 and 19 DF,  p-value: 0.06707
```

```
## Warning in abline(lm_voice_coordination, col = "red"): only using the first two
## of 4 regression coefficients
```


Team Overconfidence
2.5
3.0
3.5
4.0
4.5
4
5
6
7
Team Coordination

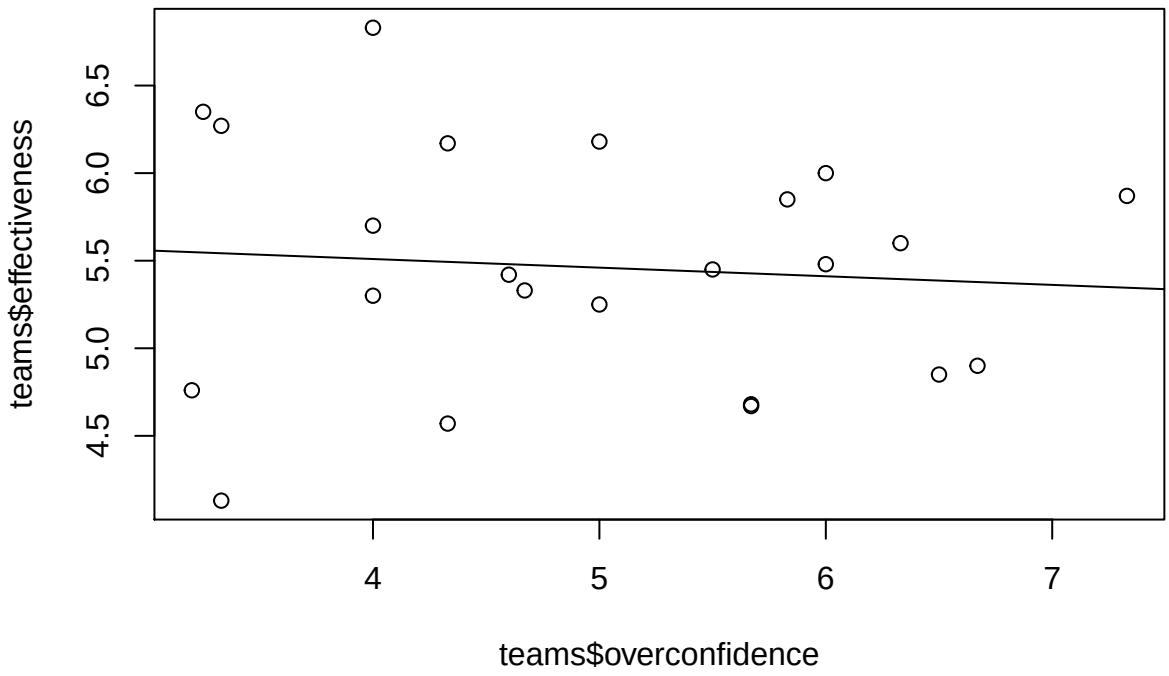

overconfidence
coordination
7
6
5
4
3
2.5
3.0
3.5
4.0
4.5

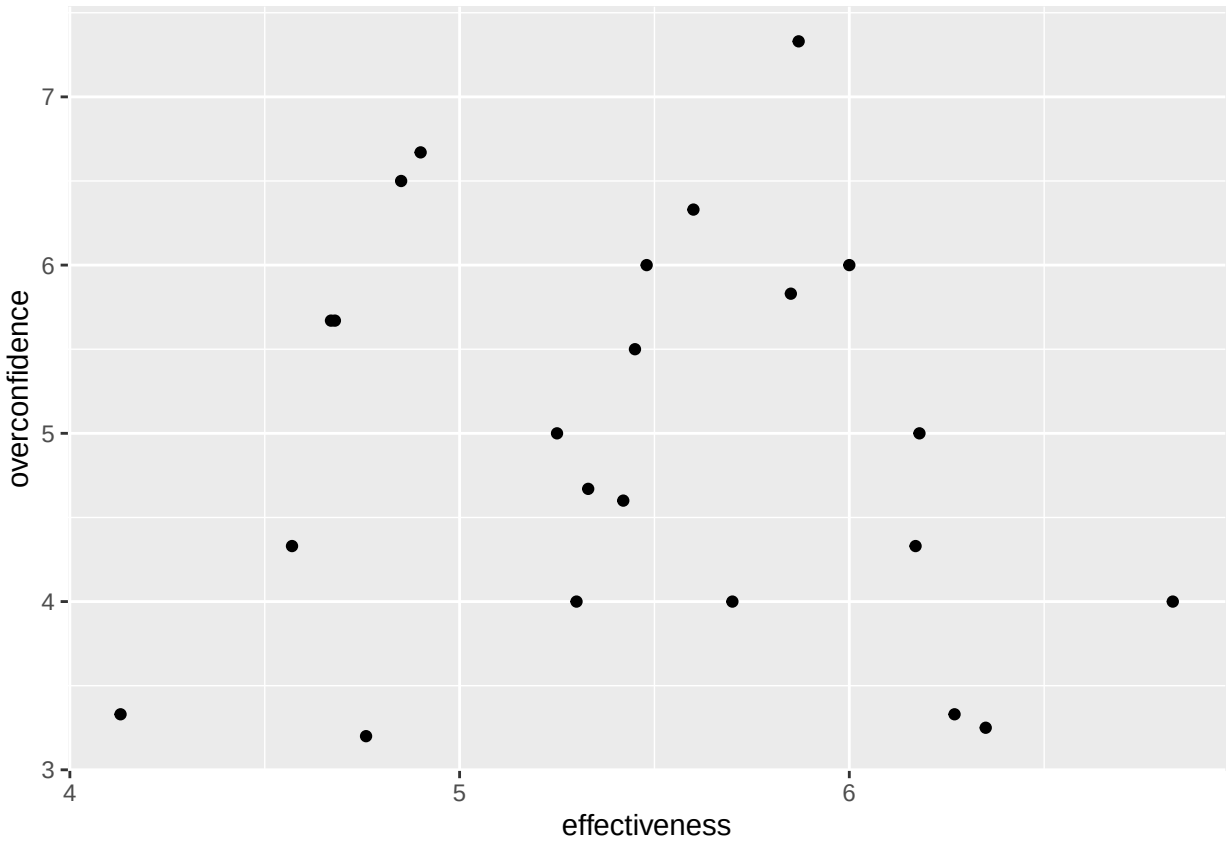
# Extra Hypotheses

## Hypothesis No. 1 - a

Hx1a: Team Overconfidence has a negative effect on team Effectiveness

```
##
## Call:
## lm(formula = effectiveness ~ overconfidence, data = teams)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.4125 -0.5073  0.0143  0.5566  1.3204
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     5.70648    0.62380   9.148    9e-09 ***
## overconfidence -0.04923    0.12188  -0.404     0.69
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6906 on 21 degrees of freedom
## Multiple R-squared:  0.00771,    Adjusted R-squared:  -0.03954
## F-statistic: 0.1632 on 1 and 21 DF,  p-value: 0.6903
```



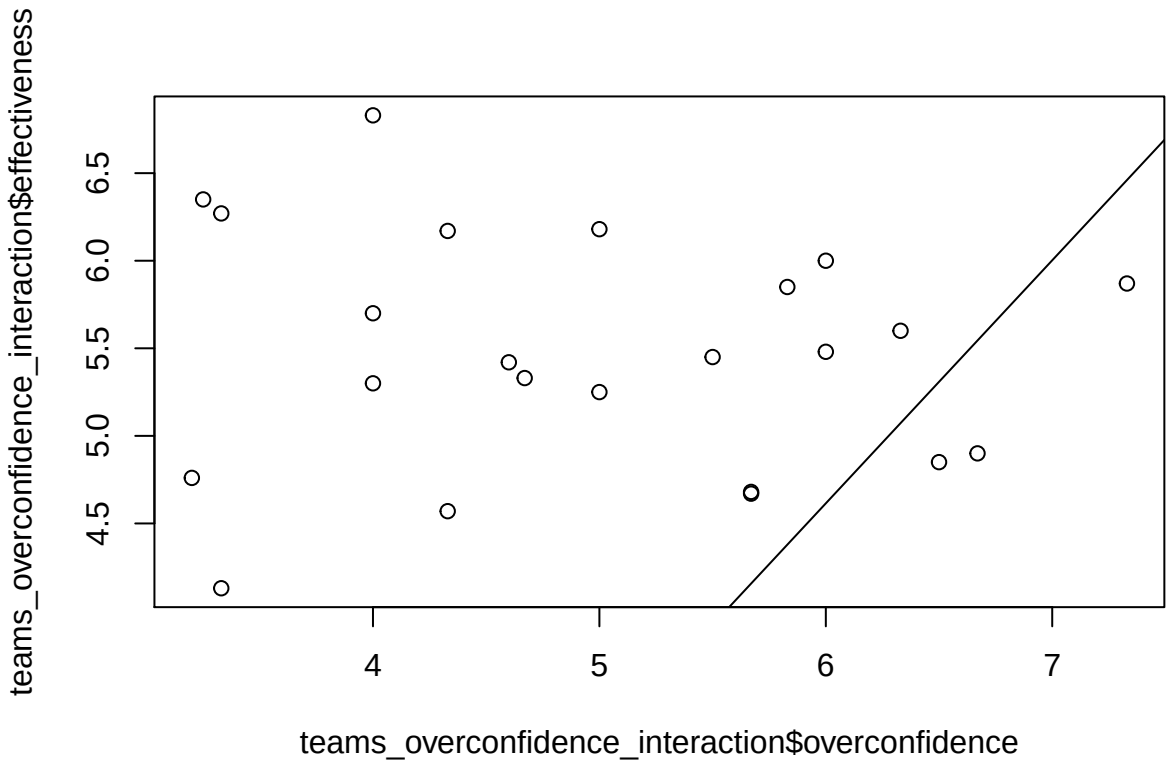

overconfidence
7
6
5
4
3
4
5
6
effectiveness

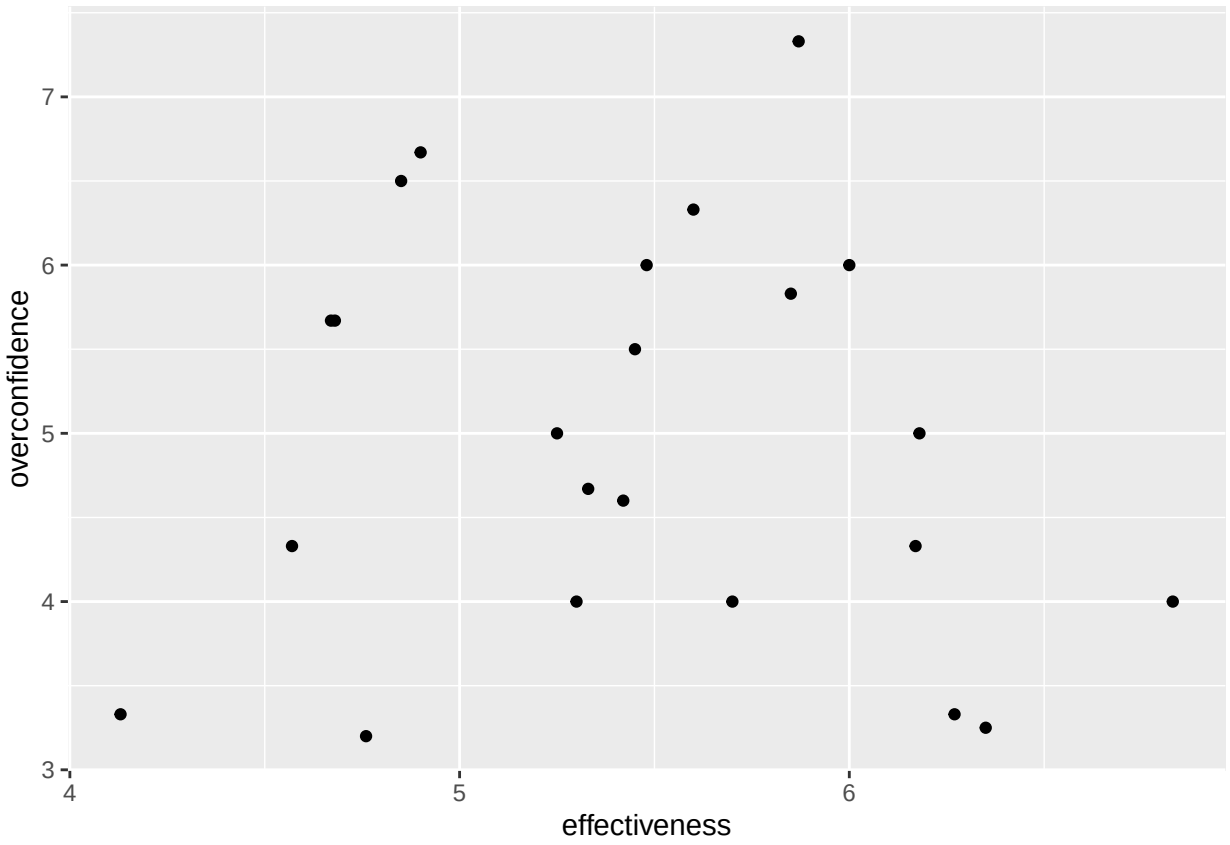
### Hypothesis No. 1 - b

Hx1b: Team Overconfidence has a reverse effect on team Effectiveness mediated by team Coordination

```
##
## Call:
## lm(formula = effectiveness ~ overconfidence + coordination +
##     inter2, data = teams_overconfidence_interaction)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.67371 -0.46438 -0.02151  0.43862  0.55177
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     -3.7121     2.7257  -1.362  0.18917
## overconfidence   1.3878     0.5773   2.404  0.02658 *
## coordination     2.6678     0.7947   3.357  0.00331 **
## inter2          -0.4076     0.1713  -2.380  0.02796 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4846 on 19 degrees of freedom
## Multiple R-squared:  0.558,  Adjusted R-squared:  0.4882
## F-statistic: 7.997 on 3 and 19 DF,  p-value: 0.001197
```

```
## Warning in abline(lm_overconfidence_effectiveness_coordination): only using the
## first two of 4 regression coefficients
```


teams_overconfidence_interaction$effectiveness
4.5
5.0
5.5
6.0
6.5
4
5
6
7
teams_overconfidence_interaction$overconfidence


overconfidence
effectiveness
7
6
5
4
3
4
5
6

## Analysis of Internal Reliability

Cronbach's Alpha is used to determine the reliability of the survey used for each variable.

### Team Effectiveness

```
##
## Cronbach's alpha for the 'eff_survey' data-set
##
## Items: 10
## Sample units: 79
## alpha: 0.823
##
## Bootstrap 95% CI based on 1000 samples
##  2.5% 97.5%
## 0.714 0.888
```

### Team Coordination

```
##
## Cronbach's alpha for the 'coord_survey' data-set
##
## Items: 5
## Sample units: 79
## alpha: 0.67
##
## Bootstrap 95% CI based on 1000 samples
##  2.5% 97.5%
## 0.493 0.775
```

### Team Voice Behavior

```
##
## Cronbach's alpha for the 'voice_survey' data-set
##
## Items: 6
## Sample units: 79
## alpha: 0.85
##
## Bootstrap 95% CI based on 1000 samples
##  2.5% 97.5%
## 0.781 0.891
```

### Overconfidence

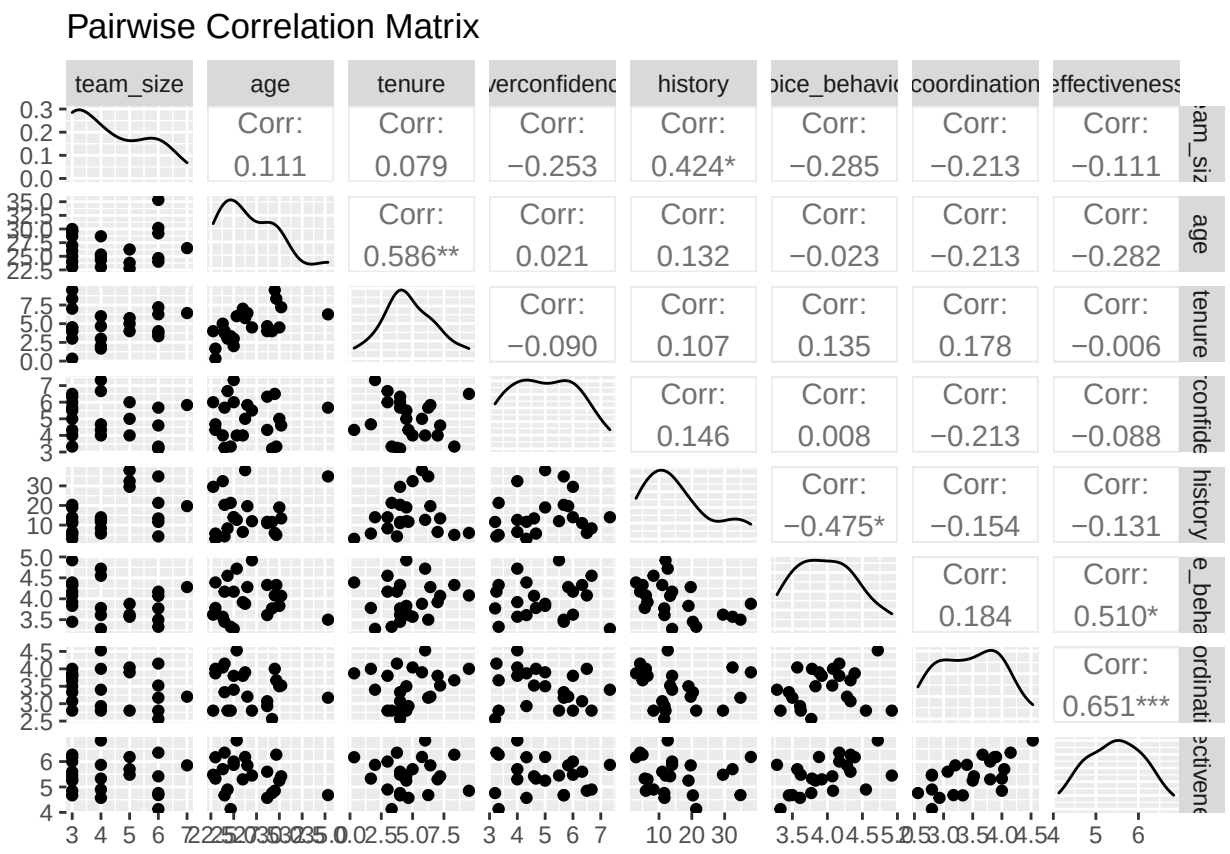
```
##
## Cronbach's alpha for the 'ovconf_survey' data-set
##
## Items: 20
## Sample units: 79
## alpha: 0.607
##
## Bootstrap 95% CI based on 1000 samples
##  2.5% 97.5%
## 0.233 0.757
```

# Multiple Regression Backward Elimination of Variables

$$\widehat{\text{effectiveness}} = -0.49 + 0.06(\text{team\_size}) - 0.02(\text{age}) - 0.06(\text{tenure}) + 0.02(\text{overconfidence}) + 0.01(\text{history}) + 0.83(\text{voice\_behavior}) + 0.8(\text{coordination}) \quad (1)$$

## Stage 0: All Variables Included

### Initial




```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.62854 -0.22927 -0.03915  0.16603  0.86074
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.49250    2.01881  -0.244  0.81057
## team_size       0.06384    0.09287   0.687  0.50230
## age            -0.01548    0.04384  -0.353  0.72891
## tenure         -0.05607    0.06438  -0.871  0.39754
## overconfidence  0.01759    0.09439   0.186  0.85467
## history         0.01310    0.01287   1.018  0.32502
## voice_behavior  0.83127    0.26915   3.088  0.00749 **
## coordination    0.79609    0.22088   3.604  0.00260 **
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4735 on 15 degrees of freedom
## Multiple R-squared:  0.6668, Adjusted R-squared:  0.5113
## F-statistic: 4.289 on 7 and 15 DF,  p-value: 0.008611
```

**Eliminating Overconfidence**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_overconfidence)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.59581 -0.23279 -0.03367  0.15673  0.90227
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.37168    1.85330  -0.201  0.84358
## team_size       0.05719    0.08310   0.688  0.50121
## age            -0.01540    0.04249  -0.362  0.72179
## tenure         -0.05675    0.06231  -0.911  0.37587
## history         0.01381    0.01191   1.160  0.26313
## voice_behavior  0.83637    0.25955   3.222  0.00532 **
## coordination    0.78602    0.20762   3.786  0.00162 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.459 on 16 degrees of freedom
## Multiple R-squared:  0.6661, Adjusted R-squared:  0.5408
## F-statistic: 5.319 on 6 and 16 DF,  p-value: 0.003449
```

**Eliminating Coordination**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_coordination)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.02281 -0.36840  0.09421  0.33216  1.15332
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     3.94306    2.11665   1.863   0.0809 .
## team_size      -0.01723    0.11917  -0.145   0.8868
## age            -0.07396    0.05386  -1.373   0.1886
## tenure          0.02619    0.07962   0.329   0.7464
## overconfidence -0.06557    0.12106  -0.542   0.5955
## history         0.01427    0.01702   0.838   0.4142
## voice_behavior  0.89026    0.35533   2.505   0.0234 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6263 on 16 degrees of freedom
## Multiple R-squared:  0.3783, Adjusted R-squared:  0.1452
## F-statistic: 1.623 on 6 and 16 DF,  p-value: 0.2048
```

**Eliminating Voice Behavior**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_voice_behavior)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.9608 -0.3387  0.0967  0.4294  0.8673
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     2.926057   2.090840   1.399  0.18076
## team_size       0.047799   0.114829   0.416  0.68275
## age            -0.025175   0.054148  -0.465  0.64825
## tenure         -0.015705   0.078070  -0.201  0.84310
## overconfidence  0.047276   0.116287   0.407  0.68972
## history        -0.004059   0.014377  -0.282  0.78129
## coordination    0.837574   0.273034   3.068  0.00736 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5864 on 16 degrees of freedom
## Multiple R-squared:  0.455,  Adjusted R-squared:  0.2506
## F-statistic: 2.226 on 6 and 16 DF,  p-value: 0.09416
```

**Eliminating History**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.78325 -0.16354  0.01271  0.13269  0.81803
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.17433    1.99666  -0.087  0.93151
## team_size       0.10072    0.08560   1.177  0.25657
## age            -0.01595    0.04388  -0.363  0.72108
## tenure         -0.04642    0.06375  -0.728  0.47703
## overconfidence  0.04624    0.09019   0.513  0.61522
## voice_behavior  0.71306    0.24306   2.934  0.00974 **
## coordination    0.80175    0.22105   3.627  0.00227 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.474 on 16 degrees of freedom
## Multiple R-squared:  0.6438, Adjusted R-squared:  0.5103
## F-statistic:  4.82 on 6 and 16 DF,  p-value: 0.005457
```

**Eliminating Tenure**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.81388 -0.18447  0.03224  0.19101  0.92059
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.34513    1.76152   0.196  0.84714
## team_size       0.05901    0.09200   0.641  0.53031
## age            -0.04003    0.03332  -1.202  0.24703
## overconfidence  0.02229    0.09352   0.238  0.81460
## history         0.01145    0.01263   0.906  0.37838
## voice_behavior  0.78368    0.26155   2.996  0.00855 **
## coordination    0.72789    0.20497   3.551  0.00266 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4699 on 16 degrees of freedom
## Multiple R-squared:   0.65,  Adjusted R-squared:  0.5187
## F-statistic: 4.952 on 6 and 16 DF,  p-value: 0.004823
```

**Eliminating Age**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_age)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.61751 -0.21310 -0.02139  0.16785  0.85367
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.96501    1.46974  -0.657 0.520781
## team_size       0.06461    0.09027   0.716 0.484427
## tenure         -0.07069    0.04794  -1.475 0.159714
## overconfidence  0.01726    0.09177   0.188 0.853173
## history         0.01314    0.01251   1.050 0.309120
## voice_behavior  0.83807    0.26101   3.211 0.005452 **
## coordination    0.82496    0.19950   4.135 0.000777 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4604 on 16 degrees of freedom
## Multiple R-squared:  0.6641, Adjusted R-squared:  0.5381
## F-statistic: 5.271 on 6 and 16 DF,  p-value: 0.003599
```

**Eliminating Team Size**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_team_size)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.63126 -0.24063 -0.02852  0.21967  0.90123
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.028413   1.840108   0.015  0.98787
## age            -0.016190   0.043096  -0.376  0.71209
## tenure         -0.053427   0.063198  -0.845  0.41036
## overconfidence -0.007364   0.085684  -0.086  0.93258
## history         0.016548   0.011653   1.420  0.17476
## voice_behavior  0.820917   0.264264   3.106  0.00679 **
## coordination    0.759307   0.210741   3.603  0.00238 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4656 on 16 degrees of freedom
## Multiple R-squared:  0.6563, Adjusted R-squared:  0.5275
## F-statistic: 5.093 on 6 and 16 DF,  p-value: 0.004234
```

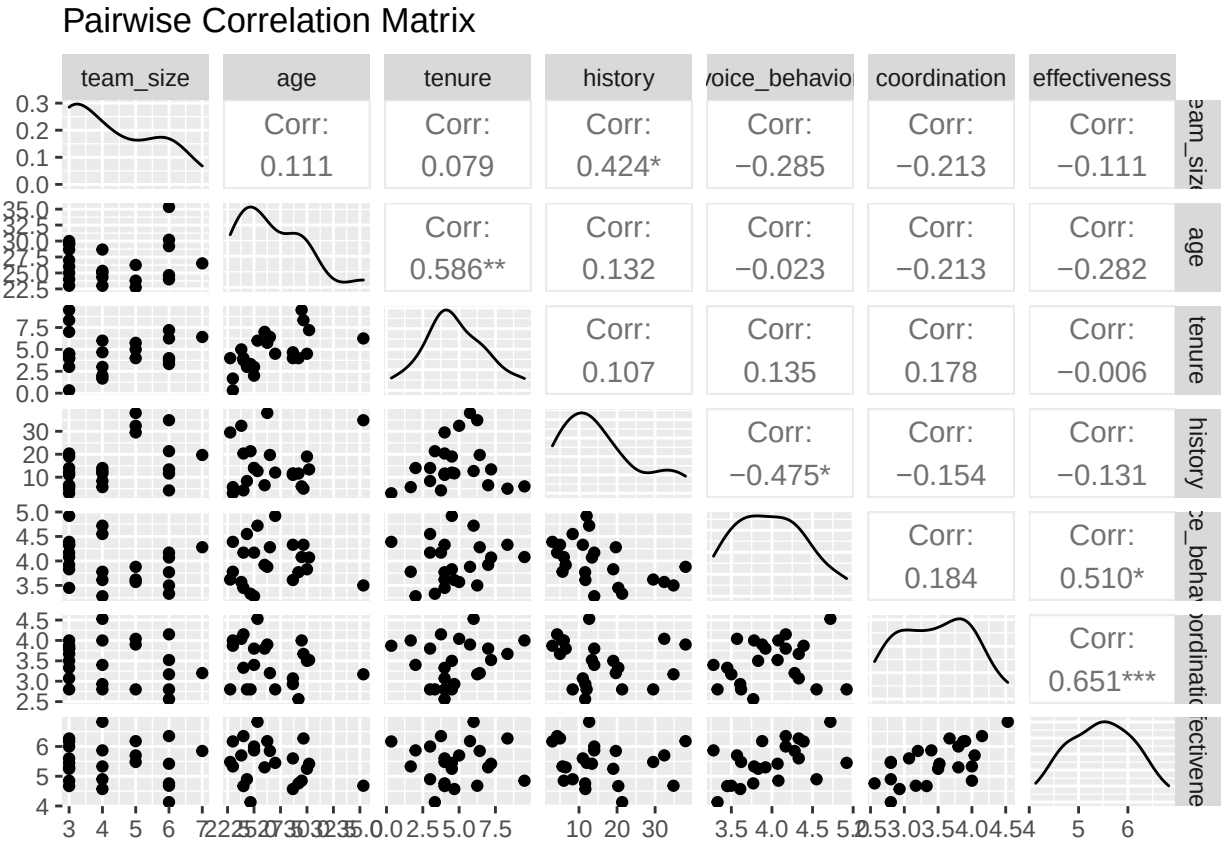
**Outcome**

Overconfidence is the least correlated with the Effectiveness, so it is eliminated.

$$\begin{aligned}\widehat{\text{effectiveness}} = -0.37 + 0.06(\text{team\_size}) - 0.02(\text{age}) - 0.06(\text{tenure}) + \\ 0.01(\text{history}) + 0.84(\text{voice\_behavior}) + 0.79(\text{coordination})\end{aligned} \tag{2}$$

### Stage 1: Overconfidence is Eliminated

#### Initial




```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.59581 -0.23279 -0.03367  0.15673  0.90227
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.37168    1.85330  -0.201  0.84358
## team_size       0.05719    0.08310   0.688  0.50121
## age            -0.01540    0.04249  -0.362  0.72179
## tenure         -0.05675    0.06231  -0.911  0.37587
## history         0.01381    0.01191   1.160  0.26313
## voice_behavior  0.83637    0.25955   3.222  0.00532 **
## coordination    0.78602    0.20762   3.786  0.00162 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.459 on 16 degrees of freedom
## Multiple R-squared:  0.6661, Adjusted R-squared:  0.5408
## F-statistic: 5.319 on 6 and 16 DF,  p-value: 0.003449
```

**Eliminating Coordination**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_coordination)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.09496 -0.31082  0.02896  0.34751  1.00334
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     3.686304   2.019551   1.825   0.0856 .
## team_size       0.005092   0.109471   0.047   0.9634
## age            -0.077211   0.052401  -1.473   0.1589
## tenure          0.033039   0.076961   0.429   0.6731
## history         0.011489   0.015885   0.723   0.4794
## voice_behavior  0.872970   0.346460   2.520   0.0220 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6131 on 17 degrees of freedom
## Multiple R-squared:  0.3669, Adjusted R-squared:  0.1807
## F-statistic:  1.97 on 5 and 17 DF,  p-value: 0.1351
```

**Eliminating Voice Behavior**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_voice_behavior)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.90144 -0.34809  0.02491  0.43369  0.79225
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   3.311244   1.817518   1.822   0.0861 .
## team_size     0.029456   0.102969   0.286   0.7783
## age          -0.025118   0.052802  -0.476   0.6403
## tenure       -0.016897   0.076076  -0.222   0.8269
## history      -0.002403   0.013445  -0.179   0.8603
## coordination  0.810941   0.258470   3.137   0.0060 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5718 on 17 degrees of freedom
## Multiple R-squared:  0.4493, Adjusted R-squared:  0.2874
## F-statistic: 2.774 on 5 and 17 DF,  p-value: 0.05208
```

**Eliminating History**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.71318 -0.16321 -0.01143  0.18738  0.82834
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.22441    1.79861   0.125  0.90217
## team_size       0.08733    0.07973   1.095  0.28867
## age            -0.01579    0.04292  -0.368  0.71754
## tenure         -0.04688    0.06235  -0.752  0.46235
## voice_behavior  0.70917    0.23762   2.985  0.00833 **
## coordination    0.77362    0.20944   3.694  0.00180 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4636 on 17 degrees of freedom
## Multiple R-squared:  0.638,  Adjusted R-squared:  0.5315
## F-statistic: 5.992 on 5 and 17 DF,  p-value: 0.00226
```

**Eliminating Tenure**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.77514 -0.20528  0.02038  0.17158  0.97433
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.51182    1.57131   0.326  0.74861
## team_size       0.05048    0.08236   0.613  0.54806
## age            -0.04031    0.03236  -1.246  0.22976
## history         0.01233    0.01174   1.050  0.30821
## voice_behavior  0.78944    0.25311   3.119  0.00625 **
## coordination    0.71403    0.19102   3.738  0.00164 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4567 on 17 degrees of freedom
## Multiple R-squared:  0.6487, Adjusted R-squared:  0.5454
## F-statistic: 6.279 on 5 and 17 DF,  p-value: 0.001786
```

**Eliminating Age**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_age)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.58544 -0.21699 -0.03302  0.16233  0.89446
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.84402    1.28346  -0.658 0.519593
## team_size       0.05808    0.08091   0.718 0.482639
## tenure         -0.07129    0.04645  -1.535 0.143280
## history         0.01385    0.01160   1.194 0.249017
## voice_behavior  0.84305    0.25219   3.343 0.003856 **
## coordination    0.81494    0.18672   4.364 0.000422 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4471 on 17 degrees of freedom
## Multiple R-squared:  0.6633, Adjusted R-squared:  0.5643
## F-statistic: 6.698 on 5 and 17 DF,  p-value: 0.001282
```

**Eliminating Team Size**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_team_size)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.64748 -0.24150 -0.02411  0.22325  0.88290
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.004267   1.747035  -0.002  0.99808
## age            -0.016266   0.041810  -0.389  0.70207
## tenure         -0.052954   0.061093  -0.867  0.39813
## history         0.016374   0.011134   1.471  0.15967
## voice_behavior  0.817878   0.254126   3.218  0.00504 **
## coordination    0.762367   0.201558   3.782  0.00149 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4518 on 17 degrees of freedom
## Multiple R-squared:  0.6562, Adjusted R-squared:  0.555
## F-statistic: 6.489 on 5 and 17 DF,  p-value: 0.001511
```

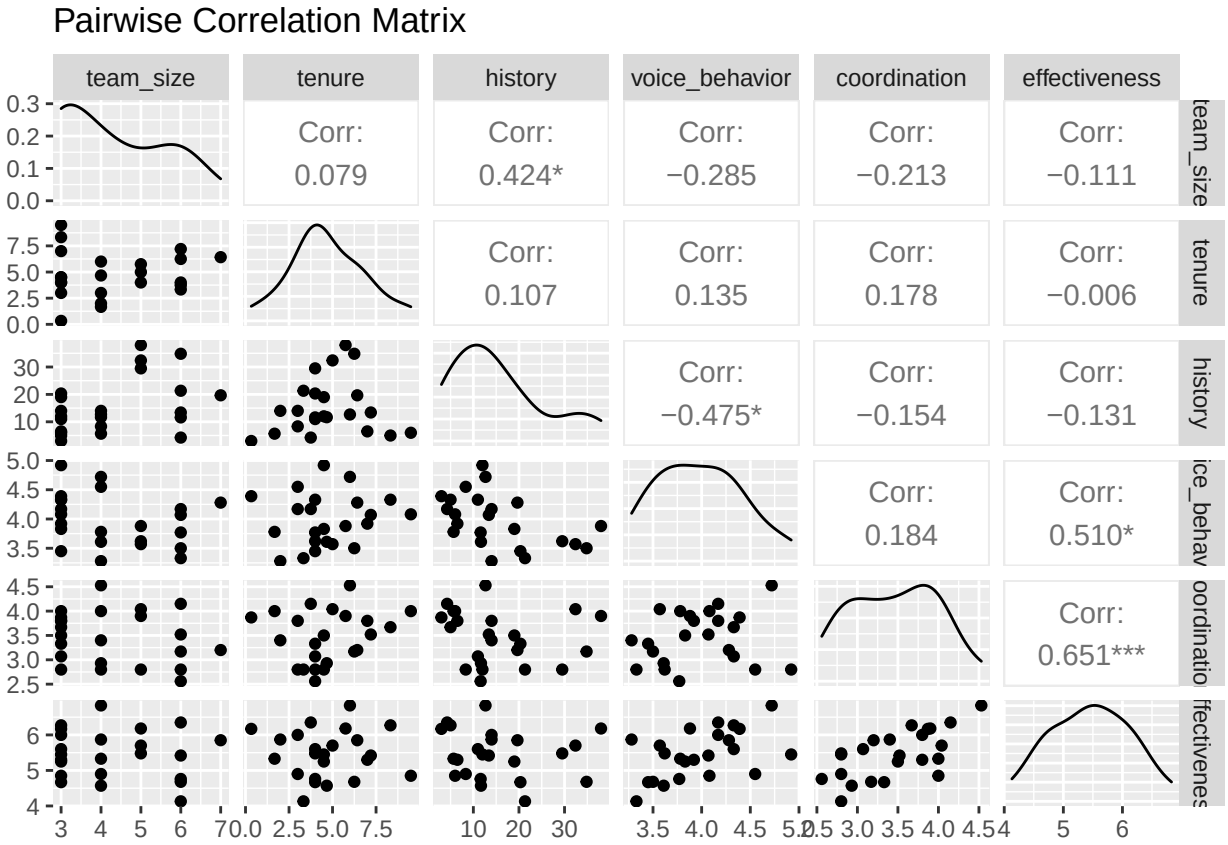
**Outcome**

Age has the least correlation with the Effectiveness, so it is eliminated.

$$\widehat{\text{effectiveness}} = -0.84 + 0.06(\text{team\_size}) - 0.07(\text{tenure}) + 0.01(\text{history}) + 0.84(\text{voice\_behavior}) + 0.81(\text{coordination}) \tag{3}$$

### Stage 2: Age is Eliminated

#### Initial




```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.58544 -0.21699 -0.03302  0.16233  0.89446
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.84402    1.28346  -0.658 0.519593
## team_size       0.05808    0.08091   0.718 0.482639
## tenure         -0.07129    0.04645  -1.535 0.143280
## history         0.01385    0.01160   1.194 0.249017
## voice_behavior  0.84305    0.25219   3.343 0.003856 **
## coordination    0.81494    0.18672   4.364 0.000422 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4471 on 17 degrees of freedom
## Multiple R-squared:  0.6633, Adjusted R-squared:  0.5643
## F-statistic: 6.698 on 5 and 17 DF,  p-value: 0.001282
```

**Eliminating Coordination**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_coordination)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.06289 -0.46376  0.06147  0.38072  0.97927
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     1.7857442  1.6037247   1.113   0.2801
## team_size      -0.0009279  0.1128976  -0.008   0.9935
## tenure         -0.0330196  0.0645573  -0.511   0.6152
## history         0.0111862  0.0163923   0.682   0.5037
## voice_behavior  0.9201626  0.3560216   2.585   0.0187 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6328 on 18 degrees of freedom
## Multiple R-squared:  0.2861, Adjusted R-squared:  0.1274
## F-statistic: 1.803 on 4 and 18 DF,  p-value: 0.1723
```

**Eliminating Voice Behavior**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_voice_behavior)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.86416 -0.38862 -0.01612  0.44893  0.78961
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.58509    0.96506   2.679   0.0153 *
## team_size     0.03056    0.10071   0.303   0.7650
## tenure       -0.04020    0.05694  -0.706   0.4892
## history      -0.00256    0.01315  -0.195   0.8478
## coordination  0.85866    0.23303   3.685   0.0017 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5594 on 18 degrees of freedom
## Multiple R-squared:  0.442,  Adjusted R-squared:  0.318
## F-statistic: 3.565 on 4 and 18 DF,  p-value: 0.02611
```

**Eliminating History**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.7028 -0.2035 -0.0311  0.1975  0.8202
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.25836    1.19988  -0.215 0.831940
## team_size       0.08832    0.07775   1.136 0.270874
## tenure         -0.06176    0.04630  -1.334 0.198876
## voice_behavior  0.71569    0.23119   3.096 0.006238 **
## coordination    0.80323    0.18865   4.258 0.000473 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4524 on 18 degrees of freedom
## Multiple R-squared:  0.6351, Adjusted R-squared:  0.554
## F-statistic: 7.832 on 4 and 18 DF,  p-value: 0.0007703
```

**Eliminating Tenure**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.9340 -0.2412 -0.1023  0.2372  1.0219
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.58800    1.31960  -0.446 0.661209
## team_size       0.04679    0.08356   0.560 0.582410
## history         0.01079    0.01185   0.910 0.374719
## voice_behavior  0.76557    0.25622   2.988 0.007890 **
## coordination    0.76085    0.19014   4.002 0.000837 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4636 on 18 degrees of freedom
## Multiple R-squared:  0.6167, Adjusted R-squared:  0.5315
## F-statistic: 7.239 on 4 and 18 DF,  p-value: 0.00117
```

**Eliminating Team Size**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_team_size)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.63737 -0.29321 -0.04652  0.19393  0.87433
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.49758    1.17312  -0.424 0.676485
## tenure         -0.06826    0.04563  -1.496 0.152049
## history         0.01645    0.01087   1.514 0.147395
## voice_behavior  0.82463    0.24748   3.332 0.003709 **
## coordination    0.79254    0.18160   4.364 0.000374 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4411 on 18 degrees of freedom
## Multiple R-squared:  0.6531, Adjusted R-squared:  0.576
## F-statistic: 8.473 on 4 and 18 DF,  p-value: 0.0005002
```

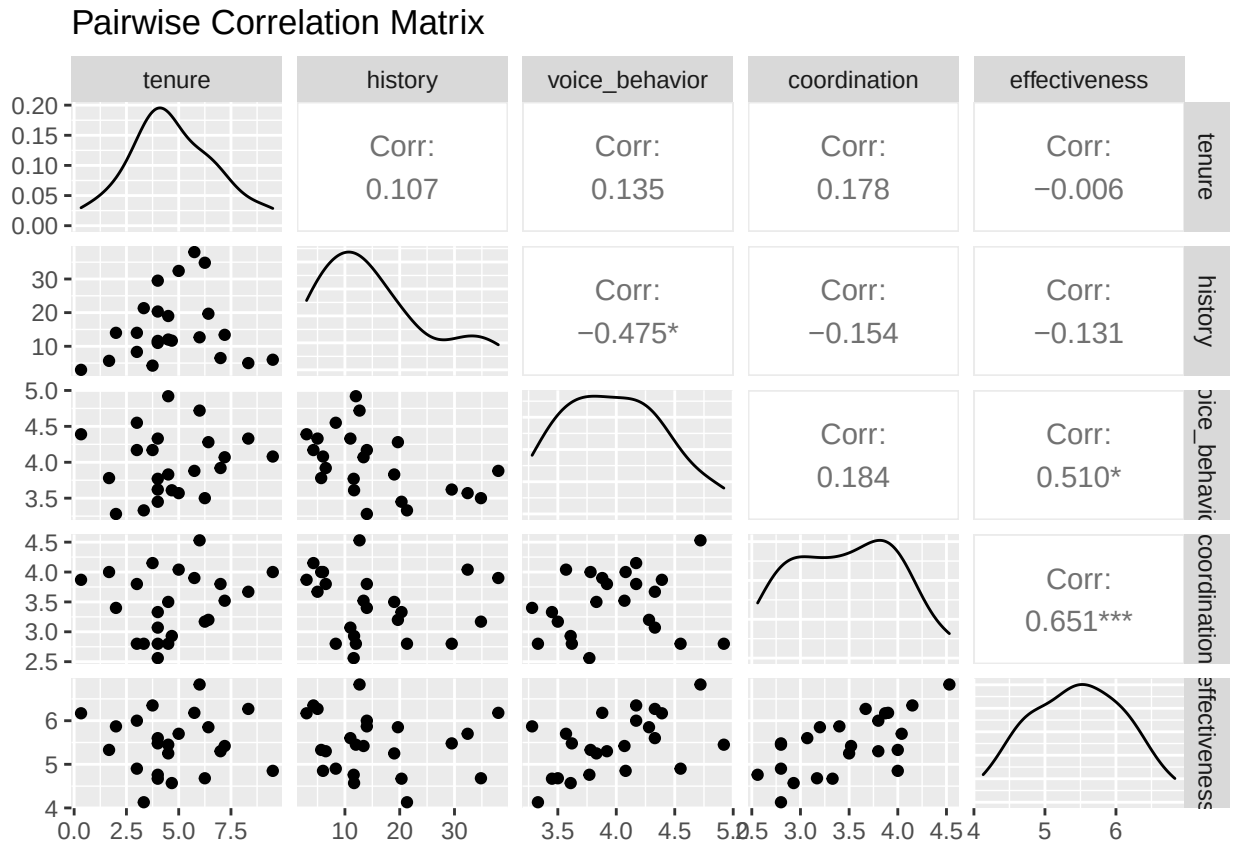
**Outcome**

Team Size seems to have the least correlation with the Effectiveness, so it is eliminated.

$$\widehat{\text{effectiveness}} = -0.5 - 0.07(\text{tenure}) + 0.02(\text{history}) + 0.82(\text{voice\_behavior}) + 0.79(\text{coordination}) \tag{4}$$

### Stage 3: Team Size is Eliminated

#### Initial




```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.63737 -0.29321 -0.04652  0.19393  0.87433
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.49758    1.17312  -0.424 0.676485
## tenure         -0.06826    0.04563  -1.496 0.152049
## history         0.01645    0.01087   1.514 0.147395
## voice_behavior  0.82463    0.24748   3.332 0.003709 **
## coordination    0.79254    0.18160   4.364 0.000374 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4411 on 18 degrees of freedom
## Multiple R-squared:  0.6531, Adjusted R-squared:  0.576
## F-statistic: 8.473 on 4 and 18 DF,  p-value: 0.0005002
```

**Eliminating Coordination**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_coordination)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.06317 -0.46415  0.06129  0.38104  0.97964
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     1.78124    1.46690   1.214    0.240
## tenure         -0.03305    0.06272  -0.527    0.604
## history         0.01114    0.01508   0.739    0.469
## voice_behavior  0.92050    0.34421   2.674    0.015 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6159 on 19 degrees of freedom
## Multiple R-squared:  0.2861, Adjusted R-squared:  0.1733
## F-statistic: 2.538 on 3 and 19 DF,  p-value: 0.08724
```

**Eliminating Voice Behavior**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_voice_behavior)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.88853 -0.40587  0.03136  0.42534  0.76418
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.7294401  0.8193399   3.331  0.00351 **
## tenure       -0.0389490  0.0554180  -0.703  0.49069
## history      -0.0009833  0.0117871  -0.083  0.93439
## coordination  0.8462506  0.2238636   3.780  0.00127 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5459 on 19 degrees of freedom
## Multiple R-squared:  0.4391, Adjusted R-squared:  0.3506
## F-statistic: 4.959 on 3 and 19 DF,  p-value: 0.01042
```

**Eliminating History**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.82767 -0.25254 -0.00891  0.18329  0.76261
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.51162    0.99762   0.513 0.613972
## tenure         -0.05362    0.04609  -1.163 0.259071
## voice_behavior  0.64421    0.22416   2.874 0.009719 **
## coordination    0.76176    0.18649   4.085 0.000631 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4558 on 19 degrees of freedom
## Multiple R-squared:  0.6089, Adjusted R-squared:  0.5472
## F-statistic: 9.862 on 3 and 19 DF,  p-value: 0.0003884
```

**Eliminating Tenure**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.9642 -0.2525 -0.1032  0.2415  1.0011
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.31542    1.20418  -0.262 0.796190
## history         0.01301    0.01096   1.187 0.249904
## voice_behavior  0.75329    0.25063   3.006 0.007271 **
## coordination    0.74453    0.18447   4.036 0.000706 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4552 on 19 degrees of freedom
## Multiple R-squared:   0.61,  Adjusted R-squared:  0.5484
## F-statistic: 9.906 on 3 and 19 DF,  p-value: 0.0003788
```

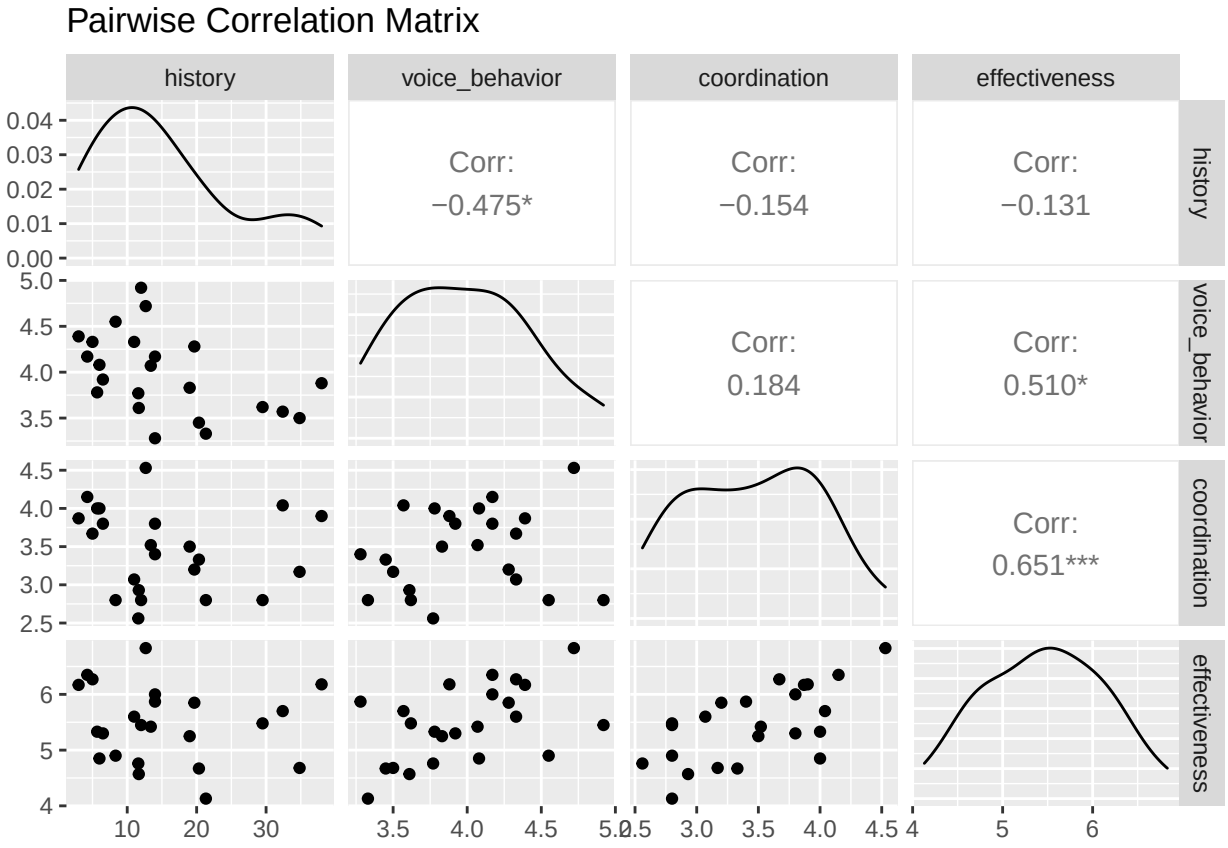
**Outcome**

The elimination of either History or Tenure seems to reduce the goodness of fit of the model. However, eliminating tenure has less negative effect on the model, so it is excluded.

$$\widehat{\text{effectiveness}} = -0.32 + 0.01(\text{history}) + 0.75(\text{voice\_behavior}) + 0.74(\text{coordination}) \tag{5}$$

### Stage 4: Tenure is Eliminated

#### Initial




```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.9642 -0.2525 -0.1032  0.2415  1.0011
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.31542    1.20418  -0.262 0.796190
## history         0.01301    0.01096   1.187 0.249904
## voice_behavior  0.75329    0.25063   3.006 0.007271 **
## coordination    0.74453    0.18447   4.036 0.000706 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4552 on 19 degrees of freedom
## Multiple R-squared:   0.61,  Adjusted R-squared:  0.5484
## F-statistic: 9.906 on 3 and 19 DF,  p-value: 0.0003788
```

**Eliminating Coordination**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_coordination)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.99590 -0.50411 -0.02275  0.45202  1.03983
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    1.803285   1.439580   1.253   0.2248
## history        0.009582   0.014516   0.660   0.5167
## voice_behavior 0.881934   0.330215   2.671   0.0147 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6047 on 20 degrees of freedom
## Multiple R-squared:  0.2756, Adjusted R-squared:  0.2032
## F-statistic: 3.805 on 2 and 20 DF,  p-value: 0.03978
```

**Eliminating Voice Behavior**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_voice_behavior)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.06932 -0.46020  0.02627  0.45303  0.61752
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.67193    0.80486   3.320  0.00342 **
## history      -0.00213    0.01153  -0.185  0.85524
## coordination  0.81504    0.21662   3.763  0.00123 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5389 on 20 degrees of freedom
## Multiple R-squared:  0.4246, Adjusted R-squared:  0.367
## F-statistic: 7.378 on 2 and 20 DF,  p-value: 0.003981
```

**Eliminating History**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.06368 -0.32158  0.07167  0.24025  0.88613
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)      0.4877     1.0062   0.485 0.633136
## voice_behavior   0.6166     0.2249   2.742 0.012562 *
## coordination     0.7276     0.1858   3.916 0.000856 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4598 on 20 degrees of freedom
## Multiple R-squared:  0.5811, Adjusted R-squared:  0.5392
## F-statistic: 13.87 on 2 and 20 DF,  p-value: 0.0001665
```

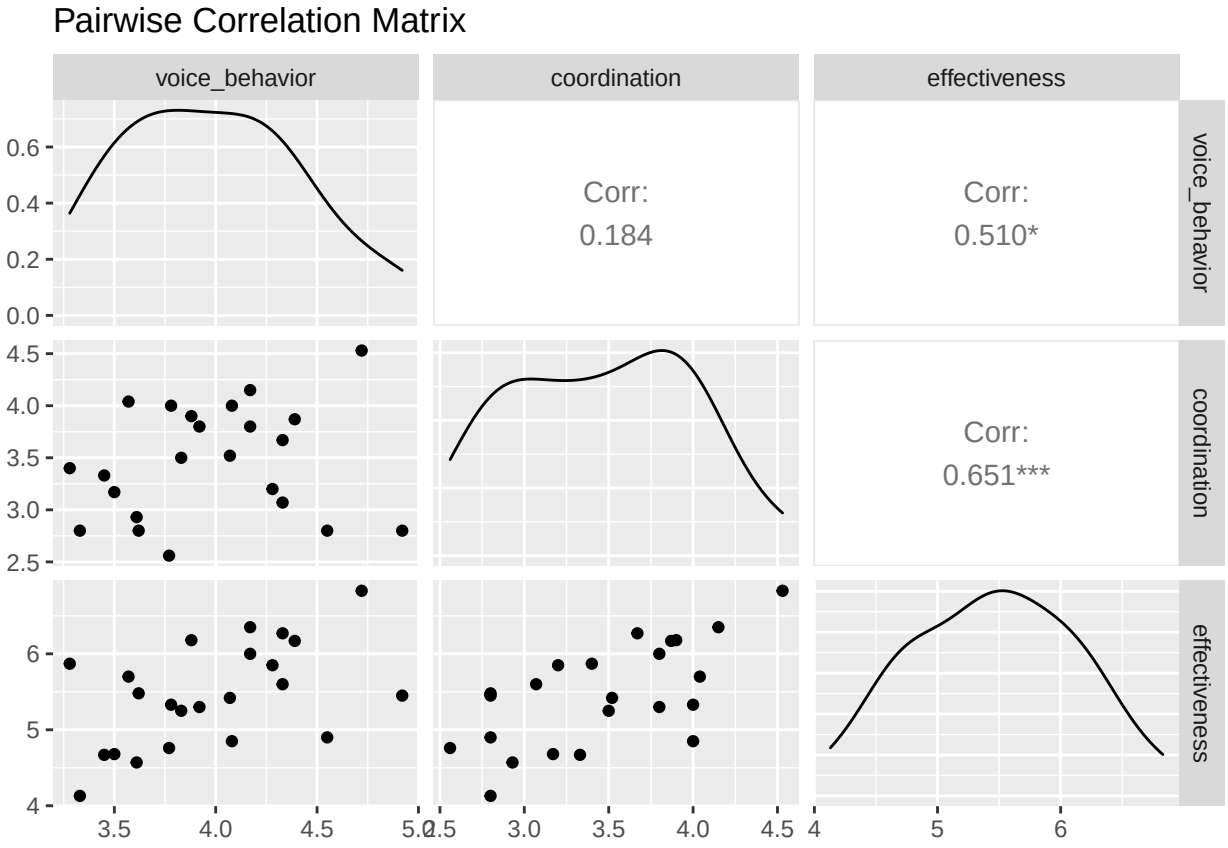
**Outcome**

History has the least correlation with the Effectiveness, so it is eliminated.

$$\widehat{\text{effectiveness}} = 0.49 + 0.62(\text{voice\_behavior}) + 0.73(\text{coordination}) \tag{6}$$

### Stage 5: History is Eliminated

#### Initial




```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.06368 -0.32158  0.07167  0.24025  0.88613
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)      0.4877     1.0062   0.485 0.633136
## voice_behavior   0.6166     0.2249   2.742 0.012562 *
## coordination     0.7276     0.1858   3.916 0.000856 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4598 on 20 degrees of freedom
## Multiple R-squared:  0.5811, Adjusted R-squared:  0.5392
## F-statistic: 13.87 on 2 and 20 DF,  p-value: 0.0001665
```

**Eliminating Coordination**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_coordination)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.0047 -0.4724 -0.0942  0.4638  0.9540
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)      2.3627     1.1480   2.058   0.0522 .
## voice_behavior   0.7785     0.2867   2.715   0.0130 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5965 on 21 degrees of freedom
## Multiple R-squared:  0.2598, Adjusted R-squared:  0.2246
## F-statistic: 7.372 on 1 and 21 DF,  p-value: 0.01297
```

**Eliminating Voice Behavior**

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_voice_behavior)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.05262 -0.44615  0.03993  0.46061  0.63838
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.6177     0.7321   3.576 0.001784 **
## coordination   0.8212     0.2090   3.928 0.000771 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5264 on 21 degrees of freedom
## Multiple R-squared:  0.4236, Adjusted R-squared:  0.3961
## F-statistic: 15.43 on 1 and 21 DF,  p-value: 0.0007709
```

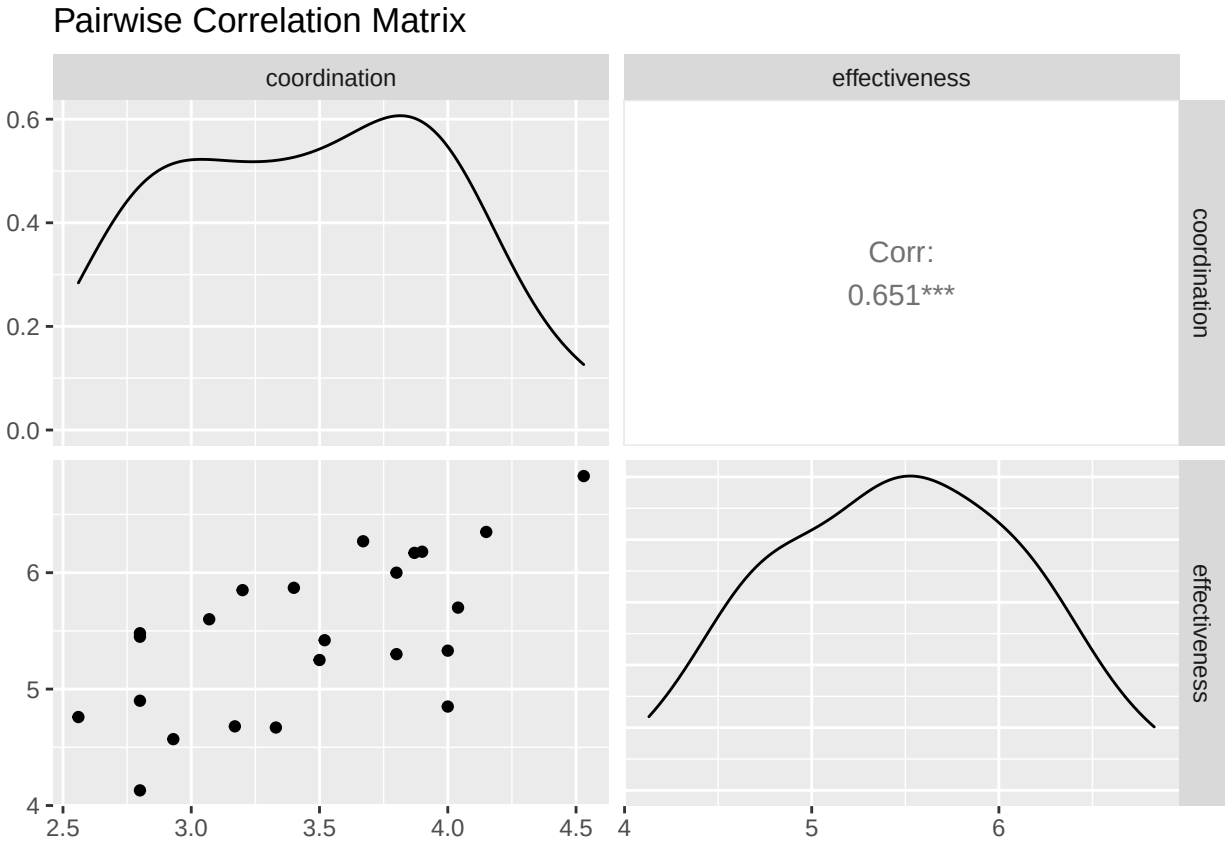
**Outcome**

Eliminating Voice Behavior has less detrimental effect on Adjusted R-Sqaured, so it is eliminated.

$$\widehat{\text{effectiveness}} = 2.62 + 0.82(\text{coordination}) \tag{7}$$

### Stage 6: Voice Behavior is Eliminated

At this point, the model only includes one independant variable which is Coordination.




```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.05262 -0.44615  0.03993  0.46061  0.63838
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.6177     0.7321   3.576 0.001784 **
## coordination   0.8212     0.2090   3.928 0.000771 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5264 on 21 degrees of freedom
## Multiple R-squared:  0.4236, Adjusted R-squared:  0.3961
## F-statistic: 15.43 on 1 and 21 DF,  p-value: 0.0007709
```

## Results

The table of independant variables in order of their predictive power (highest to lowest) is as follows:

| Rank | Variable |
|---|---|
| 1 | Coordination |
| 2 | Voice Behavior |
| 3 | History |
| 4 | Tenure |
| 5 | Team Size |
| 6 | Age |
| 7 | Overconfidence |

The optimal model (model with highest adjusted R-Squared) is as follows:

$$\widehat{\text{effectiveness}} = -0.5 - 0.07(\text{tenure}) + 0.02(\text{history}) + 0.82(\text{voice\_behavior}) + 0.79(\text{coordination}) \tag{8}$$

# Conclusion

# Appendix A: Aggregated Data From Teams That Participated

| team | org | team_size | response_rate | response_count | age | tenure | overconfidence | history | voice_behavior | coordination | effectiveness |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VxWVZXy | qX0d3XD | 3 | 0.67 | 2 | 26.00 | 7.00 | 4.00 | 6.50 | 3.92 | 3.80 | 5.30 |
| OlvA1P1 | ml4MwXj | 4 | 0.75 | 3 | 25.33 | 6.00 | 4.00 | 12.67 | 4.72 | 4.53 | 6.83 |
| 5xOnMXW | oXoqeP0 | 3 | 1.00 | 3 | 24.00 | 4.00 | 5.67 | 20.33 | 3.45 | 3.33 | 4.67 |
| JlBq3PN | Kl3zeP6 | 4 | 0.75 | 3 | 25.00 | 2.00 | 7.33 | 14.00 | 3.28 | 3.40 | 5.87 |
| rX1wnPb | ylrepPL | 6 | 0.83 | 5 | 29.20 | 4.00 | 3.20 | 11.60 | 3.77 | 2.56 | 4.76 |
| 5xOnqXW | 2PJKklO | 3 | 0.67 | 2 | 29.50 | 9.50 | 6.50 | 6.00 | 4.08 | 4.00 | 4.85 |
| KPjegx7 | VxWvAXy | 4 | 0.75 | 3 | 24.33 | 3.00 | 6.67 | 8.33 | 4.55 | 2.80 | 4.90 |
| WXz0pPm | 0xAoGlQ | 4 | 0.75 | 3 | 28.67 | 4.67 | 4.33 | 11.67 | 3.61 | 2.93 | 4.57 |
| zP7KKP8 | 5xO2qXW | 6 | 0.67 | 4 | 24.00 | 3.75 | 3.25 | 4.25 | 4.17 | 4.15 | 6.35 |
| 5P88oP9 | 5xO2qXW | 7 | 0.86 | 6 | 26.50 | 6.42 | 5.83 | 19.67 | 4.28 | 3.20 | 5.85 |
| 4xdmYPE | 5P8oox9 | 3 | 1.00 | 3 | 29.67 | 8.33 | 3.33 | 5.00 | 4.33 | 3.67 | 6.27 |
| YXmyDXN | k7lkqxD | 3 | 0.67 | 2 | 25.00 | 3.00 | 6.00 | 14.00 | 4.17 | 3.80 | 6.00 |
| DPpkGx8 | k7lkqxD | 4 | 0.75 | 3 | 23.00 | 1.67 | 4.67 | 5.67 | 3.78 | 4.00 | 5.33 |
| 8xNAJXm | yEXnYlg | 5 | 1.00 | 5 | 23.80 | 5.00 | 4.00 | 32.40 | 3.57 | 4.04 | 5.70 |
| ml4MwXj | GVX26X9 | 5 | 0.80 | 4 | 22.75 | 4.00 | 6.00 | 29.50 | 3.62 | 2.80 | 5.48 |
| gxwyalv | M8xNJxm | 3 | 1.00 | 3 | 28.67 | 4.00 | 6.33 | 11.00 | 4.33 | 3.07 | 5.60 |
| ylrepPL | M8xNJxm | 3 | 0.67 | 2 | 30.00 | 4.50 | 5.00 | 19.00 | 3.83 | 3.50 | 5.25 |
| 2PJKklO | M8xNJxm | 3 | 1.00 | 3 | 23.00 | 0.33 | 4.33 | 3.00 | 4.39 | 3.87 | 6.17 |
| VxWvAXy | M8xNJxm | 6 | 0.83 | 5 | 30.20 | 7.20 | 4.60 | 13.40 | 4.07 | 3.52 | 5.42 |
| 0xAoGlQ | 3Bl6Nlb | 3 | 0.67 | 2 | 27.00 | 4.50 | 5.50 | 12.00 | 4.92 | 2.80 | 5.45 |
| rX1dnlb | 3Bl6Nlb | 5 | 0.80 | 4 | 26.25 | 5.75 | 5.00 | 38.00 | 3.88 | 3.90 | 6.18 |
| 5xO2qXW | 3Bl6Nlb | 6 | 0.50 | 3 | 24.67 | 3.33 | 3.33 | 21.33 | 3.33 | 2.80 | 4.13 |
| JlBJYlN | 3Bl6Nlb | 6 | 1.00 | 6 | 35.33 | 6.25 | 5.67 | 34.83 | 3.50 | 3.17 | 4.68 |

# Appendix B: Data From Actual Survey Responses

| | id | team | eff_q1 | eff_q2 | eff_q3 | eff_q4 | eff_q5 | eff_q6 | eff_q7 | eff_q8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | KPjenx7 | VxWVZXy | 6 | 7 | 6 | 6 | 6 | 6 | 6 | 6 |
| 2 | 8XM1vXy | VxWVZXy | 5 | 3 | 5 | 6 | 3 | 5 | 6 | 6 |
| 3 | WXz0NPm | OlvA1P1 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 4 | GxD15PN | OlvA1P1 | 7 | 2 | 7 | 7 | 7 | 7 | 7 | 7 |
| 5 | YxeoLl9 | OlvA1P1 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 6 | zP7KkP8 | JlBq3PN | 7 | 5 | 7 | 7 | 7 | 6 | 7 | 6 |
| 7 | 5P88MP9 | 5xOnMXW | 6 | 5 | 3 | 4 | 4 | 2 | 3 | 2 |
| 8 | RXKYnPe | 5xOnMXW | 6 | 5 | 4 | 7 | 2 | 5 | 5 | 6 |
| 9 | 0xAJGPQ | JlBq3PN | 6 | 6 | 7 | 7 | 7 | 4 | 6 | 6 |
| 10 | 5xOnqXW | JlBq3PN | 6 | 6 | 6 | 7 | 6 | 5 | 4 | 5 |
| 11 | JlBqYPN | 5xOnMXW | 6 | 6 | 5 | 7 | 4 | 5 | 5 | 6 |
| 12 | 8XM1qXy | ml4MwXj | 6 | 5 | 7 | 7 | 6 | 6 | 3 | 6 |
| 13 | WXz0pPm | ml4MwXj | 5 | 6 | 7 | 7 | 7 | 4 | 6 | 4 |
| 14 | Yxeo0l9 | 0xAoGlQ | 6 | 6 | 6 | 6 | 5 | 4 | 5 | 5 |
| 15 | zP7KKP8 | 5xO2qXW | 7 | 6 | 6 | 7 | 5 | 4 | 3 | 5 |
| 16 | 5P88oP9 | JlBJYlN | 7 | 7 | 6 | 7 | 5 | 4 | 3 | 5 |
| 17 | RXKY8Pe | DPpkGx8 | 6 | 4 | 6 | 7 | 6 | 6 | 5 | 6 |
| 18 | BXqe5Xb | rX1wnPb | 6 | 1 | 6 | 7 | 5 | 5 | 6 | 6 |
| 19 | EXnKYxg | rX1wnPb | 7 | 1 | 6 | 7 | 3 | 7 | 5 | 7 |
| 20 | NP97vXA | YXmyDXN | 7 | 3 | 6 | 7 | 5 | 6 | 5 | 6 |
| 21 | GlgNzPg | YXmyDXN | 6 | 7 | 7 | 7 | 7 | 6 | 7 | 6 |
| 22 | oPGYjXz | DPpkGx8 | 6 | 6 | 5 | 6 | 4 | 5 | 5 | 4 |
| 23 | VX2m6l9 | 8xNAJXm | 7 | 7 | 7 | 7 | 5 | 6 | 7 | 7 |
| 24 | JPRoKly | 8xNAJXm | 7 | 6 | 7 | 7 | 4 | 3 | 5 | 5 |
| 25 | YXmyDXN | 8xNAJXm | 6 | 5 | 6 | 6 | 1 | 6 | 5 | 6 |
| 26 | DPpkGx8 | 8xNAJXm | 6 | 5 | 6 | 5 | 4 | 5 | 6 | 5 |
| 27 | 2PyOwXW | 8xNAJXm | 6 | 5 | 5 | 5 | 4 | 4 | 6 | 5 |
| 28 | mPZ9Yxv | 5xOnqXW | 6 | 3 | 5 | 6 | 4 | 6 | 5 | 6 |
| 29 | 8xNAJXm | KPjegx7 | 3 | 6 | 6 | 7 | 5 | 4 | 3 | 5 |
| 30 | WlQnRXO | 5xOnqXW | 5 | 1 | 5 | 7 | 3 | 6 | 6 | 6 |
| 31 | Bl6eNPb | rX1wnPb | 6 | 6 | 3 | 7 | 2 | 2 | 5 | 5 |
| 32 | qXOd3XD | gxwyalv | 7 | 1 | 5 | 7 | 4 | 7 | 6 | 7 |
| 33 | ml4MwXj | gxwyalv | 6 | 2 | 7 | 7 | 7 | 4 | 6 | 7 |
| 34 | 7lEA9lQ | rX1wnPb | 5 | 5 | 6 | 7 | 5 | 6 | 5 | 5 |
| 35 | oXoqePO | VxWvAXy | 6 | 6 | 3 | 6 | 6 | 5 | 6 | 2 |
| 36 | jXVAWle | zP7KKP8 | 7 | 5 | 7 | 7 | 6 | 6 | 7 | 7 |
| 37 | 8PYv8lL | zP7KKP8 | 6 | 6 | 7 | 7 | 6 | 7 | 7 | 7 |
| 38 | ePbaqxJ | 5P88oP9 | 7 | 4 | 7 | 7 | 6 | 6 | 6 | 5 |
| 39 | rlLNAx2 | 5P88oP9 | 6 | 2 | 7 | 6 | 6 | 6 | 6 | 7 |
| 40 | gxwyalv | 5P88oP9 | 6 | 6 | 7 | 7 | 6 | 6 | 6 | 6 |
| 41 | ylrepPL | 5P88oP9 | 6 | 4 | 7 | 7 | 7 | 5 | 6 | 5 |
| 42 | 2PJKklO | 5P88oP9 | 7 | 6 | 7 | 7 | 6 | 5 | 6 | 4 |
| 43 | RX5ybXO | zP7KKP8 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 7 |
| 44 | VxWvAXy | zP7KKP8 | 7 | 2 | 7 | 7 | 6 | 7 | 6 | 6 |
| 45 | Olv9DP1 | KPjegx7 | 7 | 5 | 7 | 7 | 5 | 6 | 1 | 7 |
| 46 | 0xAoGlQ | KPjegx7 | 7 | 6 | 6 | 7 | 4 | 5 | 4 | 5 |
| 47 | rX1dnlb | 5P88oP9 | 7 | 7 | 7 | 7 | 5 | 5 | 4 | 6 |
| 48 | 5xO2qXW | rX1dnlb | 6 | 7 | 6 | 7 | 6 | 5 | 6 | 6 |
| 49 | JlBJYlN | WXz0pPm | 7 | 7 | 1 | 6 | 1 | 6 | 5 | 1 |
| 50 | KPjEgx7 | VxWvAXy | 7 | 6 | 7 | 7 | 6 | 6 | 4 | 6 |
| 51 | WXzqplm | 5xO2qXW | 5 | 3 | 5 | 6 | 2 | 3 | 4 | 5 |

```
## 52 GxDEwPN WXz0pPm      5      5      6      7      4      5      4      6
## 53 Yxe40X9 WXz0pPm      5      5      6      6      3      4      5      4
## 54 k7lkqxD JlBJYlN      6      6      6      7      4      5      3      5
## 55 5GlgzPg 4xdmYPE      7      7      7      7      6      6      6      5
## 56 roPGjxz 4xdmYPE      6      3      7      6      5      6      6      6
## 57 GVX26X9 4xdmYPE      7      7      7      7      7      7      7      7
## 58 D4xdYPE JlBJYlN      1      1      1      1      1      1      1      1
## 59 wJPRKly gxwyalv      7      2      7      7      7      7      5      7
## 60 VYXmDlN DPpkGx8      6      3      6      7      5      6      5      6
## 61 M8xNJxm ml4MwXj      5      4      7      7      6      4      4      6
## 62 3Bl6Nlb ml4MwXj      6      7      7      7      5      6      5      6
## 63 zml4wPj rX1wnPb      6      2      1      7      1      1      4      4
## 64 N7lE9lQ ylrepPL      6      6      6      7      4      5      6      6
## 65 1oXoeP0 VxWvAXy      6      5      6      6      6      5      6      5
## 66 aKl3ex6 VxWvAXy      6      5      5      7      2      5      6      6
## 67 eYXaMXq JlBJYlN      6      6      6      7      6      7      7      6
## 68 yjXVWxe ylrepPL      6      5      5      7      2      5      5      5
## 69 E8PY8xL 2PJKklO      7      6      6      7      6      7      7      7
## 70 1ePbqxJ 2PJKklO      7      7      7      7      7      1      6      6
## 71 GylrpxL 2PJKklO      7      6      6      7      5      6      5      6
## 72 7RX5bxO VxWvAXy      6      5      7      7      5      5      6      5
## 73 oVxWAly 5xO2qXW      5      3      2      7      1      5      4      5
## 74 eOlvDx1 0xAoGlQ      7      4      7      7      6      7      4      7
## 75 y0xAGlQ rX1dnlb      6      6      7      7      6      6      6      6
## 76 ZrX1nxb rX1dnlb      7      7      7      7      7      7      7      6
## 77 K5xOqlW JlBJYlN      6      5      4      7      5      5      5      6
## 78 mJlBYPN rX1dnlb      6      6      6      6      5      6      5      4
## 79 mKPjgl7 JlBJYlN      7      5      6      7      5      5      5      6
##    eff_q9 eff_q10 coord_q1 coord_q2 coord_q3 coord_q4 coord_q5 voice_q1
## 1       6       4        5        2        3        4        4        4
## 2       5       3        5        4        4        4        3        5
## 3       7       7        5        4        5        5        4        5
## 4       7       7        5        4        4        5        4        4
## 5       7       7        5        4        5        5        4        5
## 6       6       6        4        1        2        4        4        2
## 7       2       5        4        4        2        5        4        3
## 8       6       4        3        2        2        4        2        3
## 9       4       6        4        2        4        4        3        4
## 10      4       4        3        4        4        4        4        4
## 11      5       5        4        4        4        3        3        4
## 12      3       4        2        3        1        4        2        5
## 13      6       4        1        3        5        2        3        2
## 14      3       5        3        2        3        3        2        5
## 15      2       4        3        4        2        3        2        5
## 16      1       4        3        2        2        3        2        5
## 17      6       5        4        4        4        4        3        3
## 18      4       4        4        3        3        4        2        3
## 19      4       6        5        3        3        4        2        4
## 20      5       6        4        3        4        3        3        4
## 21      5       6        4        4        5        4        4        5
## 22      5       6        5        4        3        4        4        4
## 23      6       7        5        3        4        5        5        3
## 24      6       7        5        3        5        5        4        5
## 25      5       7        4        3        5        4        2        2
```

```
## 26     7     6     4     4     5     4     3     5
## 27     7     7     4     3     4     4     4     3
## 28     4     6     4     4     4     4     4     4
## 29     2     3     4     3     4     2     3     5
## 30     4     3     4     4     4     4     4     5
## 31     2     4     2     2     2     2     2     4
## 32     4     6     4     3     2     4     2     4
## 33     4     6     4     2     3     4     5     5
## 34     5     5     4     3     2     3     3     4
## 35     3     5     4     4     4     3     3     5
## 36     7     6     4     4     4     4     3     4
## 37     7     6     4     4     4     4     4     4
## 38     6     6     5     2     4     4     3     5
## 39     4     6     4     4     3     4     4     3
## 40     5     5     4     3     4     4     3     4
## 41     4     6     4     2     2     3     2     4
## 42     6     5     3     2     2     4     3     3
## 43     7     7     4     5     5     5     4     5
## 44     1     6     4     4     5     4     4     4
## 45     1     6     4     2     2     3     1     4
## 46     3     4     4     2     2     3     3     4
## 47     5     6     5     2     1     4     2     5
## 48     6     6     5     5     5     3     4     4
## 49     5     1     4     1     4     3     1     4
## 50     4     6     4     4     4     4     4     4
## 51     1     3     2     3     4     2     2     2
## 52     5     4     3     2     2     4     2     4
## 53     3     5     4     3     4     3     4     4
## 54     3     3     3     3     2     2     4     2
## 55     7     6     4     5     2     5     4     4
## 56     6     5     5     3     2     4     2     4
## 57     6     6     5     4     2     4     4     5
## 58     7     1     1     1     5     2     5     5
## 59     4     5     2     4     2     4     1     5
## 60     3     4     4     4     5     4     4     4
## 61     3     4     2     2     3     3     5     4
## 62     4     7     4     1     1     5     4     5
## 63     7     6     1     1     1     2     1     5
## 64     4     5     4     4     4     4     3     3
## 65     5     6     3     3     4     3     4     3
## 66     2     6     4     2     4     2     4     4
## 67     6     5     5     5     2     5     4     4
## 68     4     6     4     3     2     4     3     4
## 69     7     7     4     2     3     4     4     4
## 70     6     6     4     4     3     4     4     5
## 71     4     6     5     5     3     4     5     4
## 72     6     6     5     4     2     4     2     5
## 73     3     3     3     2     4     3     3     3
## 74     3     6     4     2     3     4     2     5
## 75     6     7     4     4     4     4     4     4
## 76     5     7     5     4     1     4     4     4
## 77     5     4     3     4     3     4     3     3
## 78     5     7     4     4     3     4     3     4
## 79     5     3     4     3     4     3     3     4
```

```
##    voice_q2 voice_q3 voice_q4 voice_q5 voice_q6 ovconf_q1h ovconf_q1l
## 1         4        4        4        3        4         33         25
## 2         4        4        3        4        4         30         20
## 3         4        5        4        5        4         33         27
## 4         5        5        5        5        4         35         30
## 5         5        5        5        5        5         31         30
## 6         4        5        3        4        2         40         32
## 7         4        4        5        2        4         60         45
## 8         2        1        4        4        2         35         32
## 9         4        3        3        4        4         25         20
## 10        2        4        3        2        2         35         33
## 11        4        4        4        4        4         36         31
## 12        5        5        4        4        5         32         31
## 13        4        4        3        2        2         40         36
## 14        5        5        5        5        5         40         20
## 15        4        5        5        5        5         40         20
## 16        5        5        5        5        5         25         15
## 17        4        4        4        3        4         35         30
## 18        3        3        4        3        3         30         23
## 19        4        4        4        4        4         34         24
## 20        4        3        3        3        5         35         30
## 21        5        4        4        5        5         31         30
## 22        4        4        4        4        5         32         30
## 23        3        4        4        3        3         35         28
## 24        5        5        4        3        4         38         30
## 25        2        2        2        4        1         33         28
## 26        5        4        3        4        4         33         30
## 27        4        5        4        3        4         33         30
## 28        4        4        4        4        4         28         28
## 29        5        5        5        5        5         31         31
## 30        3        5        3        4        5         32         28
## 31        4        4        4        4        3         29         27
## 32        5        4        4        4        5         35         25
## 33        5        3        4        5        5         31         30
## 34        4        4        3        4        4         31         31
## 35        5        5        4        4        4         33         30
## 36        5        4        4        4        5         36         30
## 37        4        3        4        4        4         32         31
## 38        4        5        4        4        4         34         31
## 39        5        4        4        4        4         32         30
## 40        4        4        4        5        5         34         30
## 41        4        5        4        4        5         35         31
## 42        4        4        4        4        3         35         30
## 43        5        5        4        4        5         34         31
## 44        4        4        4        3        4         35         30
## 45        4        4        4        5        5         33         30
## 46        5        4        4        5        4         37         32
## 47        5        5        5        5        5         34         28
## 48        3        4        4        3        4         32         31
## 49        2        2        3        4        2         40         30
## 50        4        4        4        4        4         35         30
## 51        4        4        3        2        3         35         30
## 52        5        5        4        3        5         30         28
## 53        4        3        4        4        3         33         28
```

```
## 54        2        2        3        2        2         32         30
## 55        4        4        4        3        4         31         30
## 56        5        5        5        3        4         33         30
## 57        5        5        4        5        5         33         29
## 58        3        3        1        3        2          9          9
## 59        5        4        4        3        4         33         32
## 60        4        3        3        4        3         35         32
## 61        3        4        3        3        4         33         32
## 62        3        3        3        4        3         40         35
## 63        4        3        4        3        5         32         28
## 64        4        5        4        3        3         40         30
## 65        5        4        4        4        4        100         50
## 66        3        4        4        4        3         50         40
## 67        4        4        4        4        4         32         31
## 68        4        4        4        4        4         37         29
## 69        5        4        4        5        4         34         30
## 70        4        5        5        5        4         40         30
## 71        4        5        4        5        3         34         30
## 72        5        4        3        3        5         32         31
## 73        2        1        3        2        2         32         30
## 74        5        5        4        5        5         30         23
## 75        4        4        4        4        4         31         30
## 76        4        4        3        4        4         33         32
## 77        3        4        3        4        3         33         33
## 78        4        4        4        4        4         33         30
## 79        4        4        3        3        4         35         31
##    ovconf_q2h ovconf_q2l ovconf_q3h ovconf_q3l ovconf_q4h ovconf_q4l ovconf_q5h
## 1        2008       2005         10          5       2003       2000         30
## 2        2000       1992         50         20       2019       2000         10
## 3        2000       1990         50         10       2000       1990        100
## 4        2009       2007         45         20       2005       2000         50
## 5        1995       1990         30         20       2000       1990         20
## 6        2010       2009         45         35       2005       2000         56
## 7        2010       2000         50         40       2000       1995         45
## 8        2000       1950         30         15       2000       1950          5
## 9        1970       1950         25         20       1890       1870         53
## 10       2010       2005         68         56       2005       2002         35
## 11       2005       2002         35         20       2003       2000         30
## 12       2005       1990         10          5       2000       1980         10
## 13       2010       2007         60         30       2002       2000         30
## 14       2000       1990         20         10       2000       1995         20
## 15       2005       1990         20         10       2005       1995         40
## 16       2005       1995         20         10       2000       1996         40
## 17       2000       1980         50         30       2010       1990         35
## 18       2008       2005         22         12       2003       2000         28
## 19       2010       2002         30         20       2010       2000         30
## 20       2012       2010        120         50       2000       1997         15
## 21       2008       2007         60         50       2002       2000          3
## 22       2010       2005         50         30       2005       2000         13
## 23       2011       2010        100         20       2000       1900        100
## 24       2005       1990         40         20       2005       2000          4
## 25       2008       2006         50         30       2004       2000          6
## 26       2005       2003         60         40       2001       1999          2
## 27       2008       2006         40         20       2005       2001          3
```

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## 28       2008       2004         30         20       2001       2001          5
## 29       2007       2007         25         20       2010       2005          5
## 30       1970       1950         15         10       1980       1970          5
## 31       2008       2006         50         30       2003       2000         20
## 32       2005       2000         80         50       2003       2001        130
## 33       2006       2004         39         10       2000       1996          4
## 34       2010       2005         50         45       2001       2000         25
## 35       2008       2006         30         25       2002       2000         25
## 36       2000       1990         60         40       2005       2000          7
## 37       2008       2007         44         44       2001       2000         23
## 38       2000       1995         15         10       1995       1985          5
## 39       2008       2004         25         15       2004       1998         20
## 40       2007       2007        100         80       2004       2002          4
## 41       2005       2000         80         50       2005       2000         30
## 42       1390       1384        100         40       1385       1378          5
## 43       2010       1998         45         35       2005       1990          7
## 44       2010       2005         30         20       2010       2000         15
## 45       2002       2000         20         10       2012       2008         15
## 46       2004       2002         10          5       2002       2000        250
## 47       2005       2002         24         17       2002       2000          4
## 48       2008       2007         30         20       2004       2002          7
## 49       2010       2000         60         10       2002       1990         40
## 50       2002       2000        150        100       2000       1995         30
## 51       2011       2007         40         30       2003       1998         10
## 52       2010       2005         14         10       2000       1990         15
## 53       2006       2002         21         15       2000       1995          3
## 54       2012       2010         50         30       2005       2000         50
## 55       2011       2009         50         40       2002       2000         23
## 56       2007       2007         70         50       2003       2002          7
## 57       2010       2005         60         40       2010       2005         30
## 58          8          8          9          9          9          9          9
## 59       2000       1990         60         50       2000       1990         60
## 60       2010       2000         15         10       2010       2000          8
## 61       2005       2000         12          9       2002       1996          3
## 62       2009       2006         30         20       2003       2000          3
## 63       2008       2005         35         25       2000       1999          5
## 64       2000       1990         25         15       1389       1385         12
## 65       1998       1994         10          5       2000       1985          4
## 66       2012       2005         60         40       2000       1990         12
## 67       2005       2000         15          7       2005       1997          3
## 68       2008       2004         50         30       2002       1998         12
## 69       2009       2005         50         40       2005       1990          2
## 70       2015       2000         40         25       2008       2000          4
## 71       2005       1995        180        100       1999       1995         18
## 72       2002       2000         25         22       2003       2001         10
## 73       2009       2005        120         90       2005       2002         25
## 74       2005       2000         25         20       2000       1998         50
## 75       2007       2006          8          5       2000       1995         30
## 76       1980       1960          6          5       2000       1996          2
## 77       2008       2007         27         26       2011       2002         23
## 78       2004       2000        110         60       2000       1996         15
## 79       2005       1998        100         50       2005       1998          4
##    ovconf_q5l ovconf_q6h ovconf_q6l ovconf_q7h ovconf_q7l ovconf_q8h ovconf_q8l
## 1          20       2000       1960       2005       1990         33         20
```

```
## 2     3 2000 1993 2000 1993 35 29
## 3    10 2000 1980 2005 1990 33 28
## 4    20 1990 1980 2008 2000 32 28
## 5    10 1970 1960 1980 1960 32 30
## 6    44 2000 1996 2000 1990 33 23
## 7    35 1970 1960 2000 1990 35 25
## 8     2 2000 1950 2000 1950 34 30
## 9    47 1900 1890 1990 1980 32 28
## 10   25 2000 1994 1999 1996 33 30
## 11   20 1985 1970 1985 1970 36 30
## 12    5 1990 1980 1995 1980 36 32
## 13   20 1970 1940 1990 1970 34 34
## 14   10 2000 1980 2000 1990 34 30
## 15   20 1990 1970 2005 1990 34 30
## 16   20 1990 1970 2000 1990 34 30
## 17   25 2000 1980 2000 1980 32 28
## 18   20 1990 1980 1995 1990 32 20
## 19   20 1990 1980 1985 1980 34 28
## 20   10 1990 1950 1990 1960 33 30
## 21    2 2000 1990 1998 1995 32 28
## 22   10 2000 1995 2005 2000 34 32
## 23   40 2000 1990 2000 1980 35 25
## 24    2 2000 1980 1999 1997 30 26
## 25    2 1996 1980 1996 1980 32 28
## 26    2 2000 1998 2000 1990 35 30
## 27    2 2000 1998 2000 1995 35 30
## 28    3 1980 1950 1998 1998 32 32
## 29    2 1960 1950 1990 1980 32 28
## 30    1 1920 1910 1990 1980 32  1
## 31   10 1995 1990 1997 1990 34 32
## 32   60 1930 1850 1965 1950 34 30
## 33    2 1990 1970 2030 1971 34 27
## 34   15 2000 1990 1990 1985 33 30
## 35   20 1990 1985 1995 1990 32 28
## 36    3 1990 1980 1995 1985 34 30
## 37   20 1992 1991 1994 1993 32 32
## 38    3 1990 1950 2000 1990 38 34
## 39   10 1970 1950 1980 1970 32 28
## 40    2 1995 1990 1998 1995 32 28
## 41   20 1960 1930 1990 1980 32 30
## 42    2 1385 1378 1385 1378 32 26
## 43    3 2005 1985 2000 1985 34 30
## 44   10 2000 1980 2010 2000 32 32
## 45   10 1998 1980 1998 1980 35 30
## 46  150 19900 1970 2000 1995 32 30
## 47    2 1980 1960 1985 1980 38 34
## 48    4 1995 1985 2000 1998 32 28
## 49   10 1980 1940 2000 1990 35 30
## 50   20 1950 1950 1950 1950 32 32
## 51    4 2000 1990 2000 1990 32 28
## 52    8 1980 1950 1990 1970 24 20
## 53    2 1990 1980 2001 1987 34 30
## 54   40 2000 1990 2000 1990 32 32
## 55   20 1990 1989 1993 1992 32 30
```

```
## 56          5       1986       1985       1999       1996         32         28
## 57         20       1995       1985       1995       1990         32         28
## 58          9          9          8          9          9          9          9
## 59         50       2000       1980       1900       1880         32         32
## 60          5       2000       1990       1985       1980         32         30
## 61          2       1990       1987       1996       1984         33         32
## 62          2       2000       1995       2002       1995         30         15
## 63          4       1996       1990       1998       1990         32         32
## 64          8       1978       1975       1967       1960         32         31
## 65          2       2001       1990       2000       1950         35         30
## 66          8       2000       1990       2000       1990         36         36
## 67          2       1987       1980       1995       1988         34         32
## 68          3       1990       1960       1985       1970         32         32
## 69          2       2000       1990       1996       1980         32         30
## 70          3       2005       1990       2010       1990         32         28
## 71         10       1980       1890       1998       1960         33         27
## 72          5       1995       1990       1995       1990         32         32
## 73         10       1990       1970       1990       1975         32         28
## 74         40       2000       1995       1990       1980         32         32
## 75         20       2000       1991       1970       1960         32         29
## 76          2       1960       1950       1960       1960         36         32
## 77         10       1991       1989       1963       1960         32         28
## 78          5       1996       1990       1996       1990         32         30
## 79          2       2005       2000       2003       1990         32         28
##    ovconf_q9h ovconf_q9l ovconf_q10h ovconf_q10l
## 1         700        600          15           8
## 2        1000        700          50          40
## 3        1500       1000          70          40
## 4        1200        800          60          40
## 5         800        600          15          10
## 6        3000       2000          26          25
## 7        1400       1000          90          80
## 8        1200        900         250         150
## 9         990        870          45          30
## 10       4000       3000          28          25
## 11       1300       1000          80          60
## 12       1000        900          30          20
## 13        800        700          20          15
## 14       1000        800          50          40
## 15       1000        800          50          40
## 16       1000        800          50          40
## 17       1200       1000          60          40
## 18       1000        800          54          18
## 19        900        700          56          46
## 20       1200        700          30          20
## 21       1600       1400          70          60
## 22       1100       1000          50          40
## 23       1500        720         100          40
## 24       1200        800          70          50
## 25      10000        800          75          45
## 26       1100       1000          60          50
## 27       1200        900          55          45
## 28        950        900          60          50
## 29        700        650          50          40
```

```
## 30       1200        900         80          70
## 31       1200        900         60          50
## 32       1000        600         45          30
## 33       1000        900         50          40
## 34       1200        800         55          50
## 35       1000        800         45          40
## 36       1200        800        110          70
## 37       1000        500         60          50
## 38       2200       1900         65          45
## 39       1200       1100         70          50
## 40       1000        800         60          50
## 41       1000        900        100          70
## 42        250        120         80          50
## 43       1100        900         95          80
## 44       1800       1500         50          40
## 45       1000         80        120          80
## 46      25000      20000        100          80
## 47        650        400         55          43
## 48       1000        800         60          50
## 49      13000        900         60          40
## 50       1000        900         50          45
## 51       1200        900         55          45
## 52        500        100          8           3
## 53        900        700         50          40
## 54        900        800         50          40
## 55       1000        998         55          45
## 56       1000        900         60          50
## 57        950        900         53          48
## 58          9          9          9           9
## 59       1000        999         60          59
## 60        900        800        150         100
## 61        650        400         50          40
## 62        600        400         60          50
## 63       1000        900         17          16
## 64       1000        700        100          90
## 65      30000       5000       1400          89
## 66       1200        700         60          50
## 67       1000        900         62          59
## 68       1200        800         75          50
## 69       1100        950         60          50
## 70       1000        900        100          40
## 71       1100        950        130          70
## 72       1000        900         50          40
## 73        950        890         80          50
## 74       1000        999         60          50
## 75        920        850         52          45
## 76        750        700         40          30
## 77        900        890         55          52
## 78        990        900         55          40
## 79       1800       1200         85          75
```

# Appendix C: R Version

```
##                _
## platform       x86_64-pc-linux-gnu
## arch           x86_64
## os             linux-gnu
## system         x86_64, linux-gnu
## status
## major          3
## minor          6.3
## year           2020
## month          02
## day            29
## svn rev        77875
## language       R
## version.string R version 3.6.3 (2020-02-29)
## nickname       Holding the Windsock
```

# Appendix D: R Packages