Effect of Pre-Meeting Small Talk on Perceived Social Cohesion

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2023-06-04

Contents

Variables

```
str(data)
```

```
## tibble [165 x 12] (S3: tbl_df/tbl/data.frame)
##  $ c_1          : num [1:165] 5 6 7 5 6 5 6 6 5 3 ...
##  $ c_2          : num [1:165] 5 4 7 4 6 5 6 4 5 4 ...
##  $ c_3          : num [1:165] 4 6 7 6 6 5 5 5 5 4 ...
##  $ c_4          : num [1:165] 3 5 4 2 5 3 4 5 4 3 ...
##  $ c_5          : num [1:165] 4 6 7 5 6 5 5 7 5 3 ...
##  $ c_6          : num [1:165] 6 5 5 5 6 5 6 5 5 4 ...
##  $ manip_ch     : num [1:165] 6 1 5 4 3 3 5 3 3 4 ...
##  $ gender       : num [1:165] 2 2 2 2 2 2 3 2 2 2 ...
##  $ age          : num [1:165] 20 24 26 18 22 28 19 18 20 20 ...
##  $ exp          : num [1:165] 1 1 1 1 1 1 1 1 1 1 ...
##  $ exp_condition: Factor w/ 2 levels "0","1": 2 1 1 1 1 1 2 1 1 1 ...
##  $ cohesion_mean: num [1:165] 4.5 5.33 6.17 4.5 5.83 ...
```

Descriptive Statistics

Global Descriptive statistics whithout group mean.

```
library(psych)
psych::describe(data)
```

```
##                vars   n  mean    sd median trimmed  mad min max range  skew
## c_1               1 165  5.25  1.20      5    5.34 1.48   1   7     6 -0.82
## c_2               2 165  4.85  1.19      5    4.89 1.48   2   7     5 -0.20
## c_3               3 165  5.24  1.20      5    5.33 1.48   1   7     6 -0.81
## c_4               4 165  3.90  1.17      4    3.90 1.48   1   7     6 -0.10
## c_5               5 165  5.05  1.32      5    5.17 1.48   0   7     7 -0.95
## c_6               6 165  4.69  1.26      5    4.77 1.48   1   7     6 -0.36
## manip_ch          7 165  3.78  1.75      3    3.77 2.97   1   7     6  0.09
## gender            8 165  1.89  0.53      2    1.91 0.00   1   5     4  1.36
## age               9 165 29.30 11.31     25   27.33 7.41  18  66    48  1.40
## exp              10 165  1.03  0.17      1    1.00 0.00   1   2     1  5.43
## exp_condition*   11 165  1.52  0.50      2    1.53 0.00   1   2     1 -0.08
## cohesion_mean    12 165  4.83  0.99      5    4.89 0.99   2   7     5 -0.59
##                kurtosis   se
## c_1               0.42 0.09
## c_2              -0.33 0.09
## c_3               0.42 0.09
## c_4               0.36 0.09
## c_5               0.81 0.10
## c_6              -0.31 0.10
## manip_ch         -1.11 0.14
## gender            8.94 0.04
## age               1.21 0.88
## exp              27.66 0.01
## exp_condition*   -2.00 0.04
## cohesion_mean     0.09 0.08
```

Means depending on the treatment (group: 1) vs control (group: 0)

```
psych::describeBy(data, data$exp_condition)
```

```
##
##  Descriptive statistics by group
## group: 0
##                vars  n  mean    sd median trimmed  mad min max range  skew
## c_1               1 79  5.10  1.33   5.00    5.18 1.48   1   7     6 -0.80
## c_2               2 79  4.58  1.20   4.00    4.60 1.48   2   7     5 -0.04
## c_3               3 79  5.14  1.28   5.00    5.23 1.48   1   7     6 -0.91
## c_4               4 79  3.85  1.21   4.00    3.86 1.48   1   7     6 -0.05
## c_5               5 79  4.94  1.48   5.00    5.05 1.48   0   7     7 -0.95
## c_6               6 79  4.41  1.34   4.00    4.43 1.48   2   7     5 -0.07
## manip_ch          7 79  2.94  1.39   3.00    2.86 1.48   1   7     6  0.56
## gender            8 79  1.91  0.43   2.00    1.95 0.00   1   4     3  0.46
## age               9 79 29.92 12.27  25.00   27.86 7.41  18  66    48  1.43
## exp              10 79  1.04  0.19   1.00    1.00 0.00   1   2     1  4.74
## exp_condition*   11 79  1.00  0.00   1.00    1.00 0.00   1   1     0   NaN
## cohesion_mean    12 79  4.67  1.05   4.67    4.71 0.99   2   7     5 -0.33
##                kurtosis   se
## c_1               0.18 0.15
```

```
## c_2               -0.42 0.14
## c_3                0.55 0.14
## c_4                0.40 0.14
## c_5                0.61 0.17
## c_6               -0.73 0.15
## manip_ch          -0.20 0.16
## gender             7.18 0.05
## age                1.12 1.38
## exp               20.76 0.02
## exp_condition*      NaN 0.00
## cohesion_mean     -0.12 0.12
## ------------------------------------------------------------
## group: 1
##                vars  n  mean    sd median trimmed  mad   min   max range  skew
## c_1               1 86  5.38  1.05   6.00    5.44 1.48  3.00  7.00     4 -0.62
## c_2               2 86  5.10  1.12   5.00    5.10 1.48  2.00  7.00     5 -0.30
## c_3               3 86  5.34  1.11   6.00    5.41 1.48  3.00  7.00     4 -0.58
## c_4               4 86  3.94  1.13   4.00    3.96 0.00  1.00  6.00     5 -0.13
## c_5               5 86  5.16  1.16   5.00    5.26 1.48  2.00  7.00     5 -0.72
## c_6               6 86  4.95  1.12   5.00    5.00 1.48  1.00  7.00     6 -0.56
## manip_ch          7 86  4.55  1.71   5.00    4.63 1.48  1.00  7.00     6 -0.54
## gender            8 86  1.87  0.61   2.00    1.86 0.00  1.00  5.00     4  1.61
## age               9 86 28.72 10.39  24.50   27.17 6.67 18.00 59.00    41  1.24
## exp              10 86  1.02  0.15   1.00    1.00 0.00  1.00  2.00     1  6.22
## exp_condition*   11 86  2.00  0.00   2.00    2.00 0.00  2.00  2.00     0   NaN
## cohesion_mean    12 86  4.98  0.91   5.17    5.06 0.74  2.33  6.33     4 -0.82
##                kurtosis   se
## c_1               -0.19 0.11
## c_2               -0.17 0.12
## c_3               -0.34 0.12
## c_4                0.21 0.12
## c_5               -0.01 0.12
## c_6                0.48 0.12
## manip_ch          -0.75 0.18
## gender             7.93 0.07
## age                0.69 1.12
## exp               37.08 0.02
## exp_condition*      NaN 0.00
## cohesion_mean      0.40 0.10
```

Mean difference between group: 5.03 - 4.62 = 0.41

Requirement: Manipulation Check

```
t.test(manip_ch ~ exp_condition, data=data) # Ho: mu = 39000
```

```
##
##  Welch Two Sample t-test
##
## data:  manip_ch by exp_condition
## t = -6.6679, df = 160.76, p-value = 3.956e-10
```

```
## alternative hypothesis: true difference in means between group 0 and group 1 is not equal to 0
## 95 percent confidence interval:
##  -2.086576 -1.133030
## sample estimates:
## mean in group 0 mean in group 1
##        2.936709        4.546512
```

Manipulation check is significantly higher in the experimental group, t(160) = -6.67, p < .001

Analysis of a variance

Without Control Variables

```
one.way <- aov(cohesion_mean ~ exp_condition, data = data)
summary(one.way)
```

```
##                Df Sum Sq Mean Sq F value Pr(>F)
## exp_condition   1    4.0   4.004   4.187 0.0423 *
## Residuals     163  155.9   0.956
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

So far the F(1,163) = 4.19, p = .04 is significant.

With Age and Gender Controlled

```
one.way <- aov(cohesion_mean ~ exp_condition + age + gender, data = data)
summary(one.way)
```

```
##                Df Sum Sq Mean Sq F value Pr(>F)
## exp_condition   1   4.00   4.004   4.175 0.0427 *
## age             1   0.88   0.881   0.919 0.3393
## gender          1   0.58   0.583   0.608 0.4368
## Residuals     161 154.42   0.959
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

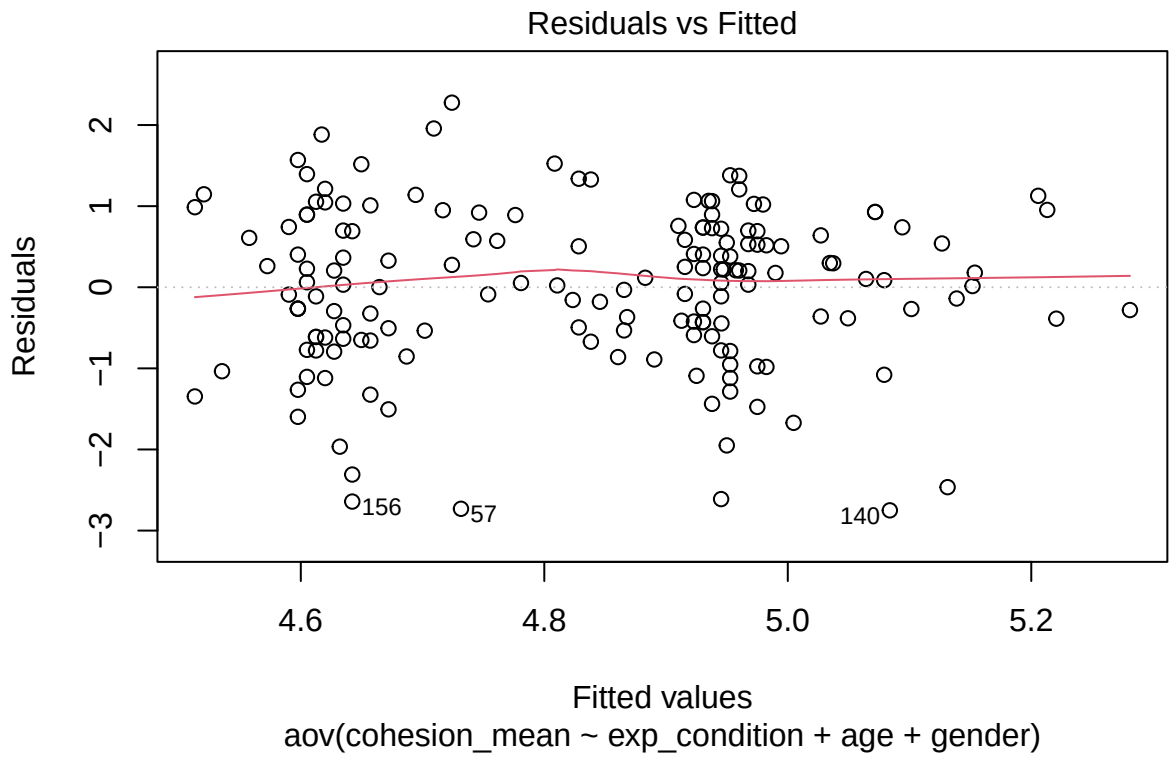
Neither gender nor age has a significant impact on team cohesion.

So far the F(1,161) = 4.18, p = .04 is significant.

ANOVA Model Diagnostic

1. linearity assumption of predictors

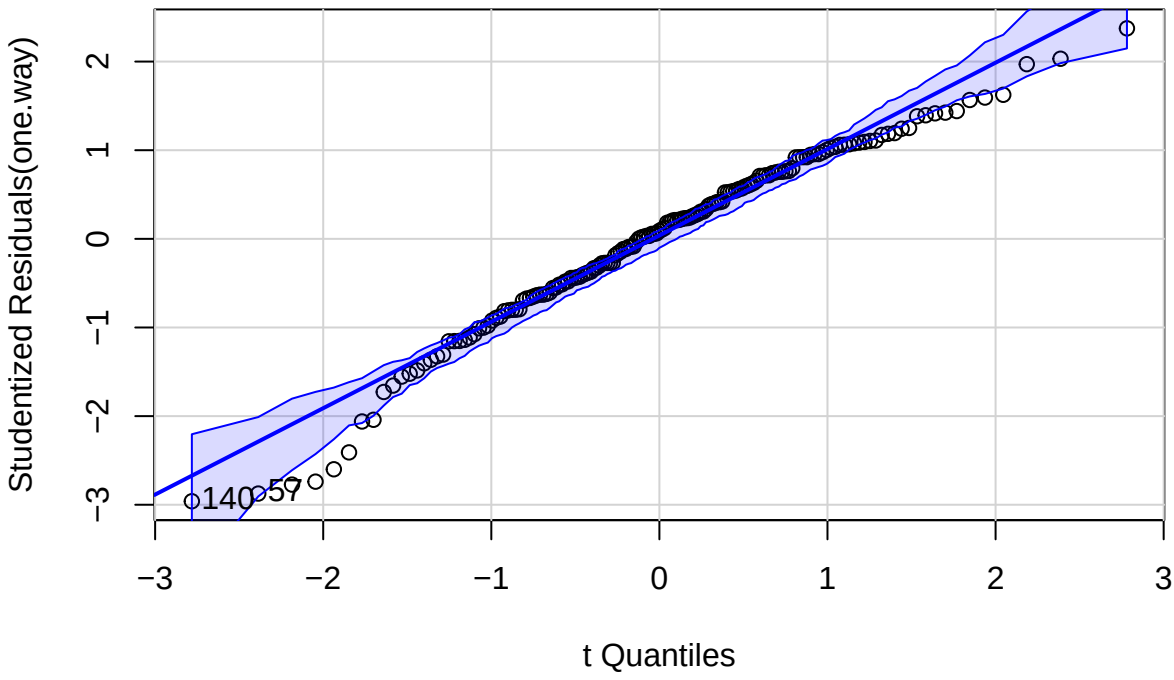
```
plot(one.way, 1)
```



Flat line. Looks good.

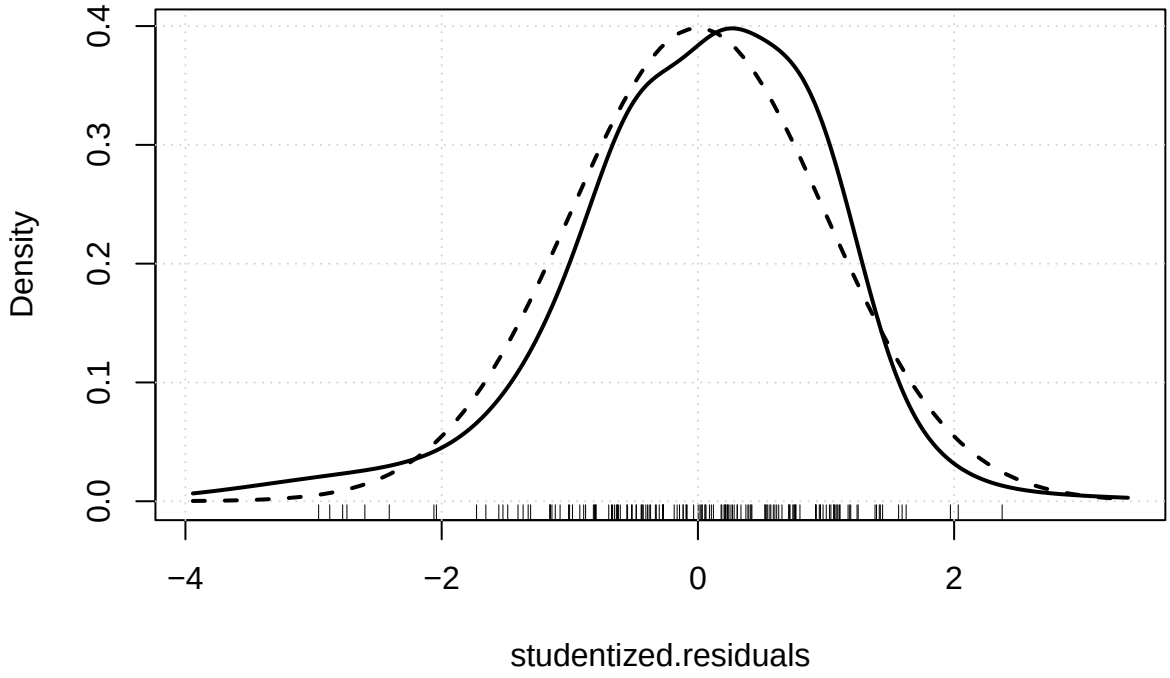
2. Normalverteilung der Residuen

```
car::qqPlot(one.way)
```




```
## [1]  57 140
```

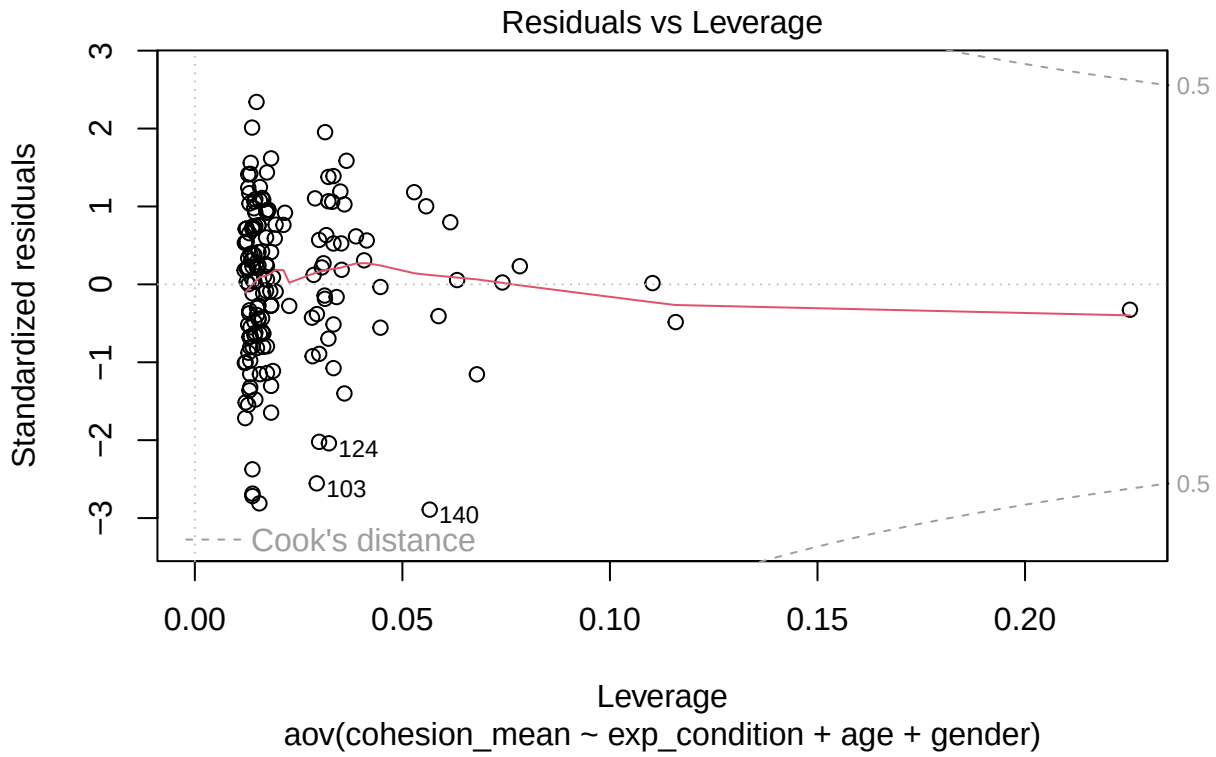
```
studentized.residuals <- rstudent(one.way)
car::densityPlot(studentized.residuals) # Dichtekurve der Residuen
df <- one.way$df.residual
curve(dt(x, df= df), # theor. Kurve zum Vergleich
      add= TRUE, lwd= 2, lty= 2
) # graph. Parameter
```



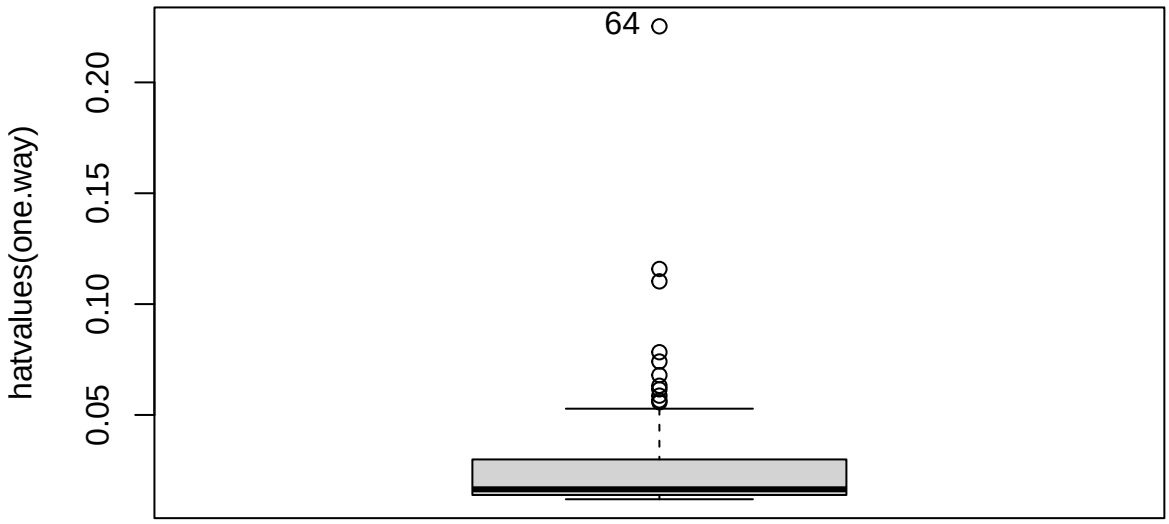
There are observations out of the CI e.g. 57.

3. Outliers & leverage points

```
plot(one.way, 5)
```




```
car::Boxplot(hatvalues(one.way), id= list(n=1)) # Hebelwerte
```




```
## [1] 64
```

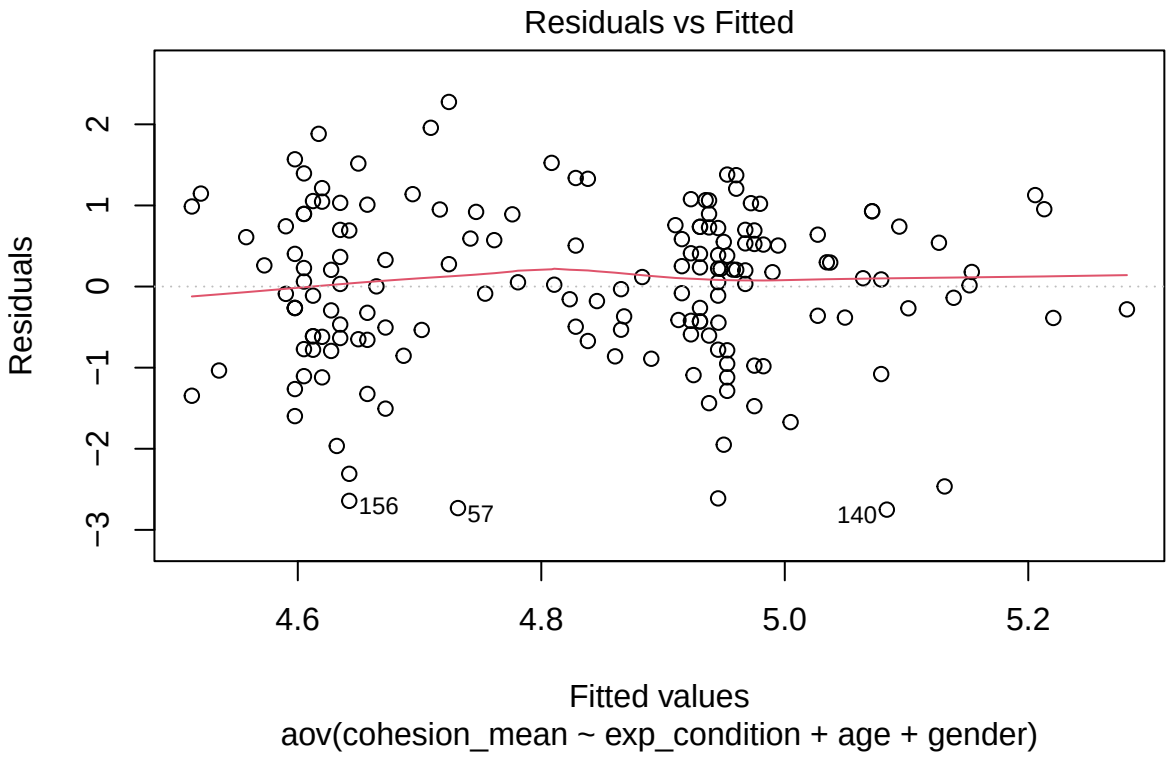
```
car::outlierTest(one.way)
```

```
## No Studentized residuals with Bonferroni p < 0.05
## Largest |rstudent|:
##      rstudent unadjusted p-value Bonferroni p
## 140 -2.960377          0.0035403      0.58415
```

Invdividual 140 seams to be an outlier. Still not over Cooks Distance. Would leave the subject within the sample.

4. Homoscedacity

```
## Residuals vs Fitted Plot to observe homoscedacity
plot(one.way, which = 1)
```



Variance looks "rather" constant across level of predictor.

5. multicollinearity

```
# "discovering statistics using R" p. 293
# If the largest VIF is greater than 10 then there is cause for concern (Bowerman & O'Connell, 1990; My
car::vif(one.way)
```

```
## exp_condition           age        gender
##      1.005097      1.035314      1.033799
```

Predictors are not correlated. All variance inflation factors are close to 1.