

# Effect of Pre-Meeting Small Talk on Perceived Social Cohesion

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## 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 without 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
```

## 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
```

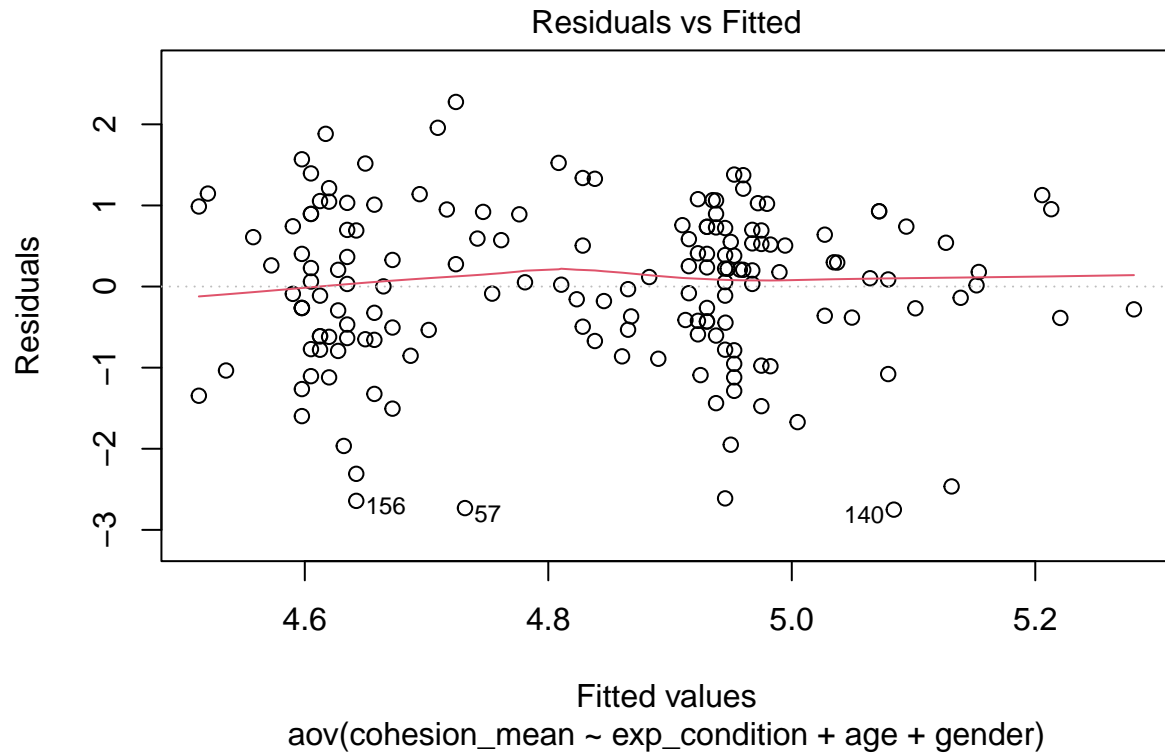
Neither gender nor age has a significant impact on team cohesion.

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

## ANOVA Model Diagnostic

### 1. linearity assumption of predictors

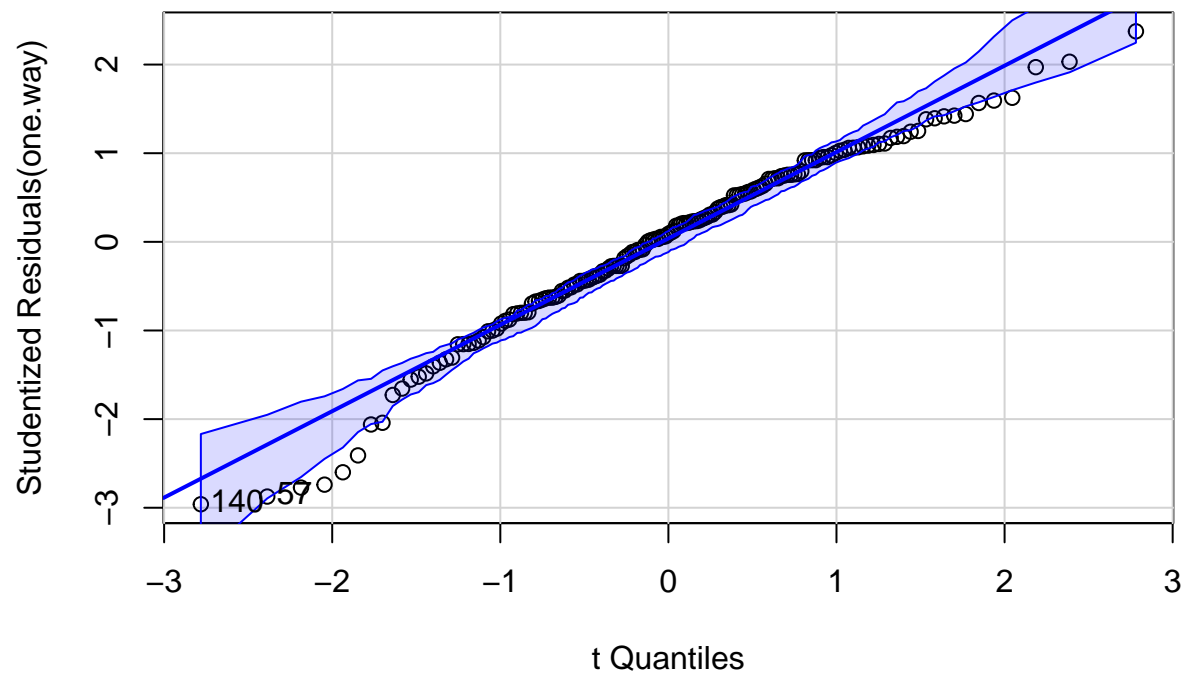
```
plot(one.way, 1)
```



Flat line. Looks good.

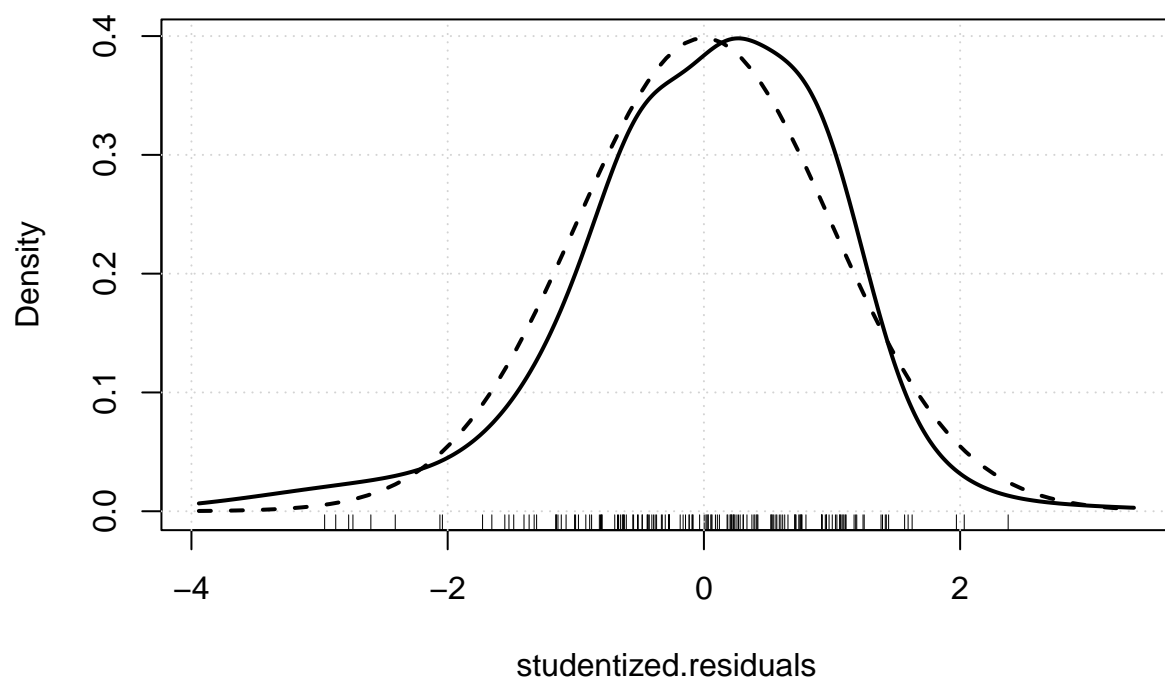
## 2. Normalverteilung der Residuen

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



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

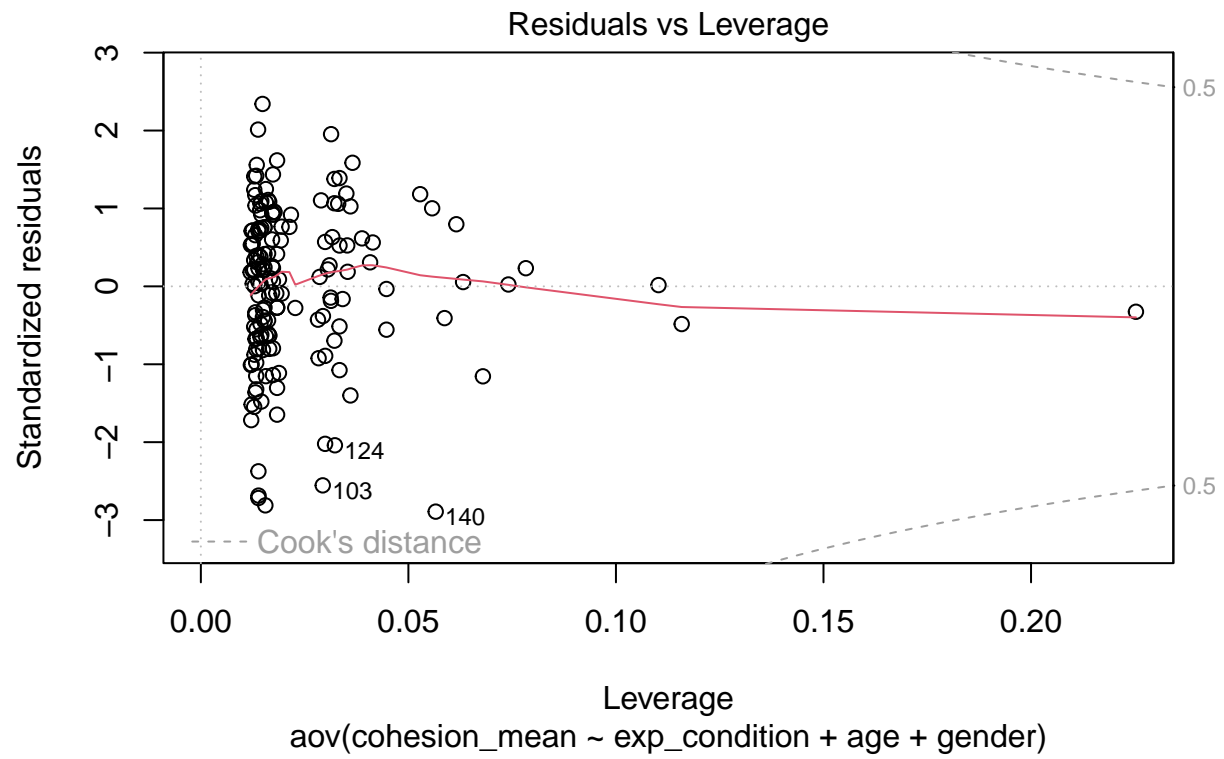
```
studentized.residuals <- rstudent(one.way)
car::densityPlot(studentized.residuals) # Dichtekurve der Residuen
df <- one.way$df.residual
curve(dt(x, df= df), # theor. Kurve zum Vergleich
      add= TRUE, lwd= 2, lty= 2
) # graph. Parameter
```



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

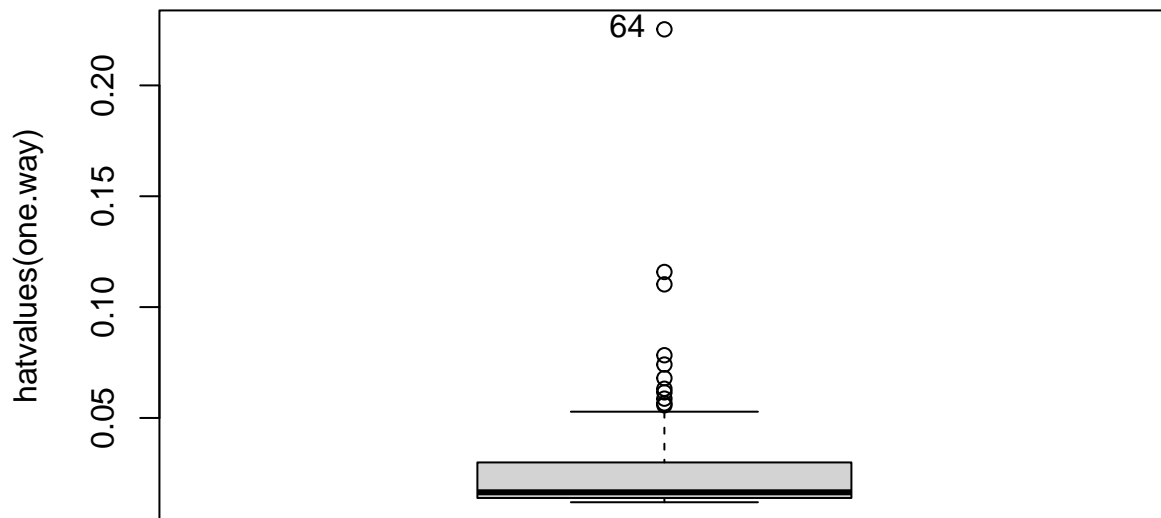
### 3. Outliers & leverage points

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



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





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

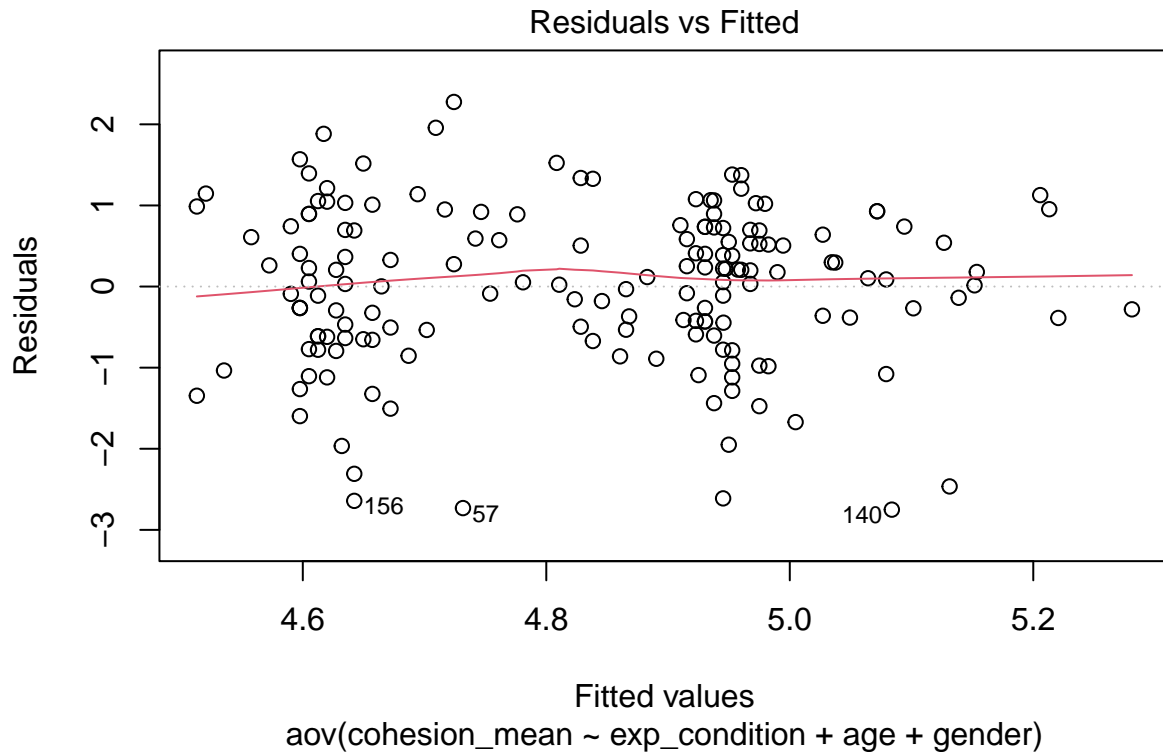
```
car::outlierTest(one.way)
```

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

Individual 140 seems 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.