Ewcs v1

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```
# Load packages ------------------------------------------------------------
library(haven)
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.0 --
```

```
## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.6     v dplyr   1.0.8
## v tidyr   1.1.2     v stringr 1.4.0
## v readr   1.4.0     v forcats 0.5.0
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(mice)
```

```
##
## Attaching package: 'mice'
```

```
## The following object is masked from 'package:stats':
##
##     filter
```

```
## The following objects are masked from 'package:base':
##
##     cbind, rbind
```

```
library(lavaan)
```

```
## Warning: package 'lavaan' was built under R version 4.0.5
```

```
## This is lavaan 0.6-11
## lavaan is FREE software! Please report any bugs.
```

```
# Import data --------------------------------------------------------------
df <- read_sav("../data/ewcs_2015.sav")

# Dataset: Germany,  employed, variables of interest -----------------------
df_ge <- df %>%
  filter(Country == 11, # Only Germany
         Q7 == 1) %>%   # Only employed
  select(Q61n,
         Q61d,
         Q61c,
         Q61i,
         Q61e,
```

```
        Q61h,
        Q61j,
        Q61k,
        Q61g,
        Q61l,
        Q61a,
        Q61b,
        Q87a,
        Q87b,
        Q87c,
        Q87d,
        Q87e,
        Q78a,
        Q78b,
        Q78c,
        Q78d,
        Q78e,
        Q78f,
        Q78g,
        Q78h,
        Q78i,
        Q78j,
        Q88)

# Exploratory Data Analysis ----------------------------------------------
glimpse(df_ge)
```

```
## Rows: 1,833
## Columns: 28
## $ Q61n <dbl+lbl> 2, 2, 4, 2, 2, 4, 3, 2, 4, 2, 3, 3, 3, 1, 2, 2, 2, 2, 1, 3, 5~
## $ Q61d <dbl+lbl> 2, 3, 2, 5, 1, 4, 2, 5, 5, 5, 3, 2, 5, 2, 2, 2, 2, 4, 2, 4, 4~
## $ Q61c <dbl+lbl> 1, 5, 2, 5, 1, 3, 2, 2, 2, 2, 2, 2, 5, 5, 1, 2, 1, 3, 1, 4, 5~
## $ Q61i <dbl+lbl> 2, 3, 2, 5, 1, 5, 3, 3, 4, 2, 4, 2, 3, 1, 2, 2, 1, 3, 2, 1, 5~
## $ Q61e <dbl+lbl> 3, 4, 5, 2, 1, 5, 3, 5, 3, 4, 3, 2, 4, 3, 1, 2, 1, 3, 4, 5, 4~
## $ Q61h <dbl+lbl> 2, 1, 2, 2, 1, 1, 3, 2, 2, 2, 3, 3, 4, 1, 2, 1, 2, 1, 1, 3, 5~
## $ Q61j <dbl+lbl> 1, 1, 1, 3, 1, 1, 3, 1, 2, 2, 3, 3, 2, 1, 2, 1, 2, 1, 1, 2, 2~
## $ Q61k <dbl+lbl> 1, 1, 1, 1, 1, 1, 2, 1, 3, 2, 3, 4, 2, 1, 1, 1, 1, 1, 1, 1, 1~
## $ Q61g <dbl+lbl> 2, 4, 4, 3, 2, 2, 2, 3, 3, 2, 2, 3, 4, 5, 2, 2, 2, 3, 1, 2, 3~
## $ Q61l <dbl+lbl> 2, 1, 1, 1, 1, 2, 3, 2, 2, 2, 3, 1, 3, 1, 1, 1, 3, 3, 1, 1, 1~
## $ Q61a <dbl+lbl> 2, 2, 3, 1, 1, 1, 2, 3, 2, 3, 2, 1, 2, 5, 1, 1, 2, 1, 1, 1, 5~
## $ Q61b <dbl+lbl> 2, 3, 3, 1, 2, 1, 2, 2, 2, 3, 3, 1, 3, 3, 1, 1, 4, 1, 1, 5, 5~
## $ Q87a <dbl+lbl> 2, 4, 2, 4, 2, 2, 4, 2, 3, 3, 3, 2, 3, 1, 2, 2, 2, 2, 3, 2, 1~
## $ Q87b <dbl+lbl> 2, 5, 2, 5, 2, 2, 3, 2, 3, 4, 3, 4, 3, 1, 2, 3, 2, 2, 4, 2, 1~
## $ Q87c <dbl+lbl> 2, 3, 4, 6, 3, 2, 3, 2, 3, 4, 2, 2, 3, 1, 2, 2, 2, 2, 5, 3, 2~
## $ Q87d <dbl+lbl> 2, 4, 4, 5, 2, 2, 3, 3, 3, 4, 3, 4, 3, 1, 2, 2, 2, 1, 5, 2, 2~
## $ Q87e <dbl+lbl> 1, 2, 3, 5, 2, 2, 3, 2, 3, 3, 4, 5, 2, 1, 2, 1, 2, 1, 1, 2, 2~
## $ Q78a <dbl+lbl> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2~
## $ Q78b <dbl+lbl> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, 2, 2, 2, 2, 2, 2~
## $ Q78c <dbl+lbl> 1, 1, 2, 1, 1, 1, 2, 1, 1, 2, 2, 2, 2, 1, 1, 1, 2, 1, 2, 1, 2~
## $ Q78d <dbl+lbl> 1, 1, 2, 1, 1, 2, 2, 2, 1, 2, 2, 2, 2, 2, 1, 2, 2, 1, 2, 1, 2~
## $ Q78e <dbl+lbl> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2~
## $ Q78f <dbl+lbl> 2, 2, 2, 1, 2, 2, 1, 1, 2, 1, 1, 2, 1, 2, 2, 2, 2, 2, 2, 2, 2~
## $ Q78g <dbl+lbl> 2, 2, 2, 2, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2~
## $ Q78h <dbl+lbl> 2, 2, 2, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, 2~
```

```
## $ Q78i <dbl+lbl> 1, 1, 1, 1, 2, 2, 2, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 1, 2~
## $ Q78j <dbl+lbl> 2, 2, 2, 1, 2, 2, 2, 2, 2, 1, 1, 1, 1, 2, 2, 2, 2, 2, 1, 1, 2~
## $ Q88  <dbl+lbl> 1, 2, 2, 2, 1, 2, 2, 2, 2, 2, 2, 2, 2, 3, 1, 1, 1, 1, 1, 2, 2~
```

```
# Sample size
(dimen <- dim(df_ge))
```

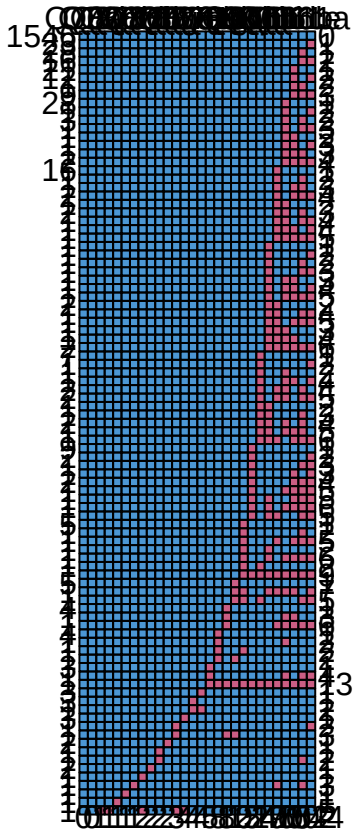
```
## [1] 1833   28
```

```
# Demographics



# * Missing data pattern ---------------------------------------------------

(pattern <- md.pattern(df_ge))
```



```
##      Q78a Q78j Q87c Q87d Q78c Q78d Q78f Q87b Q78b Q78g Q78i Q87a Q87e Q78e Q78h
## 1546    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 23      1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 28      1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 16      1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 21      1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 12      1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 9       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 28      1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 3       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
```

```
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 16          1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 7           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 9           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 2           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 5           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
## 1           1     1     1     1     1     1     1     1     1     1     1     1     1     1     1
```

```
## 5       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 4       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 4       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 3       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 3       1    1    1    1    1    1    1    1    1    1    1    1    1    1    0
## 3       1    1    1    1    1    1    1    1    1    1    1    1    1    0    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    0    0
## 3       1    1    1    1    1    1    1    1    1    1    1    1    0    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    0    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    0    1    1    1
## 2       1    1    1    1    1    1    1    1    1    1    0    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    0    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    0    1    1    1    1    1
## 2       1    1    1    1    1    1    1    1    0    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    0    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    0    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    0    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    0    1    1    1    1    1    1    1    1    1    1
## 1       1    1    0    0    1    1    1    0    1    1    1    0    0    1    1
##         0    0    1    1    1    1    1    2    2    2    2    3    4    4    4
##       Q61g Q61k Q88 Q61j Q61h Q61l Q61n Q61i Q61d Q61c Q61b Q61e Q61a
## 1546    1    1    1    1    1    1    1    1    1    1    1    1    1   0
## 23      1    1    1    1    1    1    1    1    1    1    1    1    0   1
## 28      1    1    1    1    1    1    1    1    1    1    1    0    1   1
## 16      1    1    1    1    1    1    1    1    1    1    1    0    0   2
## 21      1    1    1    1    1    1    1    1    1    1    0    1    1   1
## 12      1    1    1    1    1    1    1    1    1    1    0    1    0   2
## 1       1    1    1    1    1    1    1    1    1    1    0    0    1   2
## 9       1    1    1    1    1    1    1    1    1    1    0    0    0   3
## 28      1    1    1    1    1    1    1    1    1    0    1    1    1   1
## 1       1    1    1    1    1    1    1    1    1    0    1    1    0   2
## 3       1    1    1    1    1    1    1    1    1    0    1    0    1   2
## 1       1    1    1    1    1    1    1    1    1    0    1    0    0   3
## 1       1    1    1    1    1    1    1    1    1    0    0    1    1   2
## 1       1    1    1    1    1    1    1    1    1    0    0    1    0   3
## 1       1    1    1    1    1    1    1    1    1    0    0    0    1   3
## 2       1    1    1    1    1    1    1    1    1    0    0    0    0   4
## 16      1    1    1    1    1    1    1    1    0    1    1    1    1   1
## 1       1    1    1    1    1    1    1    1    0    1    1    0    1   2
## 1       1    1    1    1    1    1    1    1    0    1    0    0    1   3
## 2       1    1    1    1    1    1    1    1    0    1    0    0    0   4
## 1       1    1    1    1    1    1    1    1    0    0    1    1    1   2
## 2       1    1    1    1    1    1    1    1    0    0    1    0    1   3
## 1       1    1    1    1    1    1    1    1    0    0    1    0    0   4
## 1       1    1    1    1    1    1    1    1    0    0    0    1    0   4
```

```
## 1       1    1    1    1    1    1    1    1    0    0    0    0    0    5
## 1       1    1    1    1    1    1    1    0    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    0    1    1    1    1    0    2
## 1       1    1    1    1    1    1    1    0    1    1    1    0    1    2
## 1       1    1    1    1    1    1    1    0    1    1    1    0    0    3
## 1       1    1    1    1    1    1    1    0    1    0    0    1    1    3
## 1       1    1    1    1    1    1    1    0    1    0    0    1    0    4
## 1       1    1    1    1    1    1    1    0    1    0    0    0    0    5
## 2       1    1    1    1    1    1    1    0    0    1    1    1    1    2
## 1       1    1    1    1    1    1    1    0    0    1    1    0    0    4
## 1       1    1    1    1    1    1    1    0    0    1    0    0    0    5
## 1       1    1    1    1    1    1    1    0    0    0    1    1    1    3
## 1       1    1    1    1    1    1    1    0    0    0    0    1    1    4
## 2       1    1    1    1    1    1    1    0    0    0    0    0    0    6
## 7       1    1    1    1    1    1    0    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    0    1    1    1    1    1    0    2
## 1       1    1    1    1    1    1    0    1    1    0    1    1    1    2
## 1       1    1    1    1    1    1    0    1    1    0    0    1    0    4
## 2       1    1    1    1    1    1    0    1    0    0    1    0    1    4
## 2       1    1    1    1    1    1    0    1    0    0    1    0    0    5
## 1       1    1    1    1    1    1    0    0    1    1    1    1    1    2
## 1       1    1    1    1    1    1    0    0    1    1    1    0    1    3
## 2       1    1    1    1    1    1    0    0    1    0    1    0    1    4
## 1       1    1    1    1    1    1    0    0    1    0    0    0    1    5
## 1       1    1    1    1    1    1    0    0    0    1    0    0    0    6
## 9       1    1    1    1    1    0    1    1    1    1    1    1    1    1
## 2       1    1    1    1    1    0    1    1    1    1    1    1    0    2
## 1       1    1    1    1    1    1    0    1    1    1    1    1    0    0    3
## 1       1    1    1    1    1    1    0    1    1    1    1    0    1    0    3
## 2       1    1    1    1    1    1    0    1    1    1    1    0    0    0    4
## 1       1    1    1    1    1    1    0    1    1    1    0    0    0    0    5
## 1       1    1    1    1    1    1    0    1    0    1    1    0    0    0    5
## 1       1    1    1    1    1    1    0    1    0    1    0    0    0    0    6
## 1       1    1    1    1    1    1    0    1    0    0    1    1    0    0    5
## 5       1    1    1    1    0    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    0    1    1    1    1    1    1    0    1    2
## 1       1    1    1    1    0    1    1    1    0    1    0    0    0    5
## 1       1    1    1    1    0    1    1    0    1    1    1    1    1    2
## 1       1    1    1    1    0    1    1    0    1    0    0    0    0    6
## 1       1    1    1    1    0    1    0    1    1    1    1    1    1    2
## 1       1    1    1    1    0    0    0    0    0    0    0    0    0    9
## 5       1    1    1    0    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    0    0    1    1    0    0    0    0    1    0    7
## 1       1    1    1    0    0    1    0    1    1    1    1    0    0    5
## 4       1    1    0    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    0    1    1    1    1    1    1    0    0    1    1    3
## 1       1    1    0    1    1    1    1    1    0    0    0    0    0    6
## 4       1    0    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    0    1    1    1    1    1    1    1    0    1    1    1    2
## 1       1    0    1    1    0    1    1    1    1    1    1    1    1    2
## 1       1    0    1    0    1    1    1    1    1    1    1    1    1    2
## 3       0    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       0    1    1    1    1    1    1    1    1    0    1    0    0    4
## 1       0    0    0    0    0    0    0    0    0    0    0    0    0   13
```

```
## 3       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 3       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    2
## 3       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    0    2
## 1       1    1    0    0    1    1    1    1    1    1    1    1    1    3
## 2       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    0    1    2
## 2       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    0    1    1    0    1    3
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    1
## 1       1    1    1    1    1    1    1    1    1    1    1    1    1    5
##         5    8    8   10   15   21   24   29   46   70   76  102  102 544
```

```
## 1546 subjects have no missing data
## The variables with the highest amount of missing data (28) are Q61e and Q61c


## Percentage of missing data per variable
purrr::map(df_ge, ~(mean(is.na(.))*100))
```

```
## $Q61n
## [1] 1.309329
##
## $Q61d
## [1] 2.509547
##
## $Q61c
## [1] 3.818876
##
## $Q61i
## [1] 1.582106
##
## $Q61e
## [1] 5.564648
##
## $Q61h
## [1] 0.8183306
##
## $Q61j
## [1] 0.5455537
##
## $Q61k
## [1] 0.436443
##
## $Q61g
## [1] 0.2727769
##
## $Q61l
## [1] 1.145663
##
## $Q61a
```

```
## [1] 5.564648
##
## $Q61b
## [1] 4.146208
##
## $Q87a
## [1] 0.1636661
##
## $Q87b
## [1] 0.1091107
##
## $Q87c
## [1] 0.05455537
##
## $Q87d
## [1] 0.05455537
##
## $Q87e
## [1] 0.2182215
##
## $Q78a
## [1] 0
##
## $Q78b
## [1] 0.1091107
##
## $Q78c
## [1] 0.05455537
##
## $Q78d
## [1] 0.05455537
##
## $Q78e
## [1] 0.2182215
##
## $Q78f
## [1] 0.05455537
##
## $Q78g
## [1] 0.1091107
##
## $Q78h
## [1] 0.2182215
##
## $Q78i
## [1] 0.1091107
##
## $Q78j
## [1] 0
##
## $Q88
## [1] 0.436443
```

```r
# MODEL ------------------------------------------------------------------


# * CFA Psychological needs ----------------------------------------------
model_needs <- '
autonomy =~ Q61c + Q61d + Q61e + Q61i + Q61n
competence =~ Q61g + Q61h + Q61j + Q61k
relatedness =~ Q61a + Q61b + Q61l
'

fit_needs <- cfa(model_needs,
                 data = df_ge,
                 std.lv = TRUE,
                 #estimator = 'MLM',
                 missing = 'fiml')
```

```
## Warning in lav_data_full(data = data, group = group, cluster = cluster, : lavaan WARNING: some cases
##   538
```

```r
summary(fit_needs,
        standardized = TRUE,
        fit.measures = TRUE)
```

```
## lavaan 0.6-11 ended normally after 40 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of model parameters                        39
##
##                                                   Used       Total
##   Number of observations                          1832        1833
##   Number of missing patterns                        74
##
## Model Test User Model:
##
##   Test statistic                               870.937
##   Degrees of freedom                                51
##   P-value (Chi-square)                           0.000
##
## Model Test Baseline Model:
##
##   Test statistic                              6635.832
##   Degrees of freedom                                66
##   P-value                                        0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                    0.875
##   Tucker-Lewis Index (TLI)                       0.838
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)             -28571.674
##   Loglikelihood unrestricted model (H1)             NA
##
```

```
##   Akaike (AIC)                                57221.348
##   Bayesian (BIC)                              57436.361
##   Sample-size adjusted Bayesian (BIC)         57312.460
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.094
##   90 Percent confidence interval - lower         0.088
##   90 Percent confidence interval - upper         0.099
##   P-value RMSEA <= 0.05                          0.000
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.074
##
## Parameter Estimates:
##
##   Standard errors                             Standard
##   Information                                 Observed
##   Observed information based on                Hessian
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy =~
##     Q61c             0.954    0.030   31.422    0.000    0.954    0.700
##     Q61d             1.020    0.029   34.976    0.000    1.020    0.757
##     Q61e             0.740    0.031   24.041    0.000    0.740    0.571
##     Q61i             0.938    0.027   34.591    0.000    0.938    0.747
##     Q61n             0.954    0.026   36.710    0.000    0.954    0.780
##   competence =~
##     Q61g             0.396    0.025   15.938    0.000    0.396    0.412
##     Q61h             0.599    0.019   31.222    0.000    0.599    0.758
##     Q61j             0.625    0.021   29.960    0.000    0.625    0.728
##     Q61k             0.323    0.016   20.040    0.000    0.323    0.505
##   relatedness =~
##     Q61a             0.779    0.031   25.213    0.000    0.779    0.673
##     Q61b             0.936    0.036   26.055    0.000    0.936    0.727
##     Q61l             0.331    0.024   13.977    0.000    0.331    0.423
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy ~~
##     competence       0.471    0.025   19.174    0.000    0.471    0.471
##     relatedness      0.502    0.026   19.010    0.000    0.502    0.502
##   competence ~~
##     relatedness      0.502    0.033   15.326    0.000    0.502    0.502
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c             3.341    0.032  103.692    0.000    3.341    2.452
##    .Q61d             3.351    0.032  105.626    0.000    3.351    2.486
##    .Q61e             4.036    0.031  130.478    0.000    4.036    3.114
##    .Q61i             3.115    0.029  105.590    0.000    3.115    2.478
##    .Q61n             3.045    0.029  106.172    0.000    3.045    2.490
```

```
##    .Q61g              2.288    0.022  101.725    0.000    2.288    2.379
##    .Q61h              1.903    0.019  102.815    0.000    1.903    2.408
##    .Q61j              1.731    0.020   86.145    0.000    1.731    2.016
##    .Q61k              1.340    0.015   89.466    0.000    1.340    2.094
##    .Q61a              2.321    0.028   83.963    0.000    2.321    2.005
##    .Q61b              2.855    0.031   93.413    0.000    2.855    2.218
##    .Q61l              1.731    0.018   94.039    0.000    1.731    2.208
##     autonomy          0.000                              0.000    0.000
##     competence        0.000                              0.000    0.000
##     relatedness       0.000                              0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c              0.946    0.039   24.402    0.000    0.946    0.510
##    .Q61d              0.776    0.035   22.344    0.000    0.776    0.427
##    .Q61e              1.133    0.042   26.932    0.000    1.133    0.674
##    .Q61i              0.699    0.030   23.104    0.000    0.699    0.443
##    .Q61n              0.586    0.027   21.362    0.000    0.586    0.392
##    .Q61g              0.768    0.027   28.186    0.000    0.768    0.830
##    .Q61h              0.265    0.016   16.632    0.000    0.265    0.425
##    .Q61j              0.347    0.019   18.566    0.000    0.347    0.470
##    .Q61k              0.305    0.011   26.940    0.000    0.305    0.745
##    .Q61a              0.732    0.039   18.966    0.000    0.732    0.547
##    .Q61b              0.781    0.053   14.867    0.000    0.781    0.471
##    .Q61l              0.505    0.020   25.532    0.000    0.505    0.821
##     autonomy          1.000                              1.000    1.000
##     competence        1.000                              1.000    1.000
##     relatedness       1.000                              1.000    1.000
```

```
# * CFA Psychological wellbeing  ----------------------------------------

model_well <- '
psych_wellbeing =~ Q87a + Q87b + Q87c + Q87d + Q87e
'

fit_well <- cfa(model_well,
                data = df_ge,
                std.lv = TRUE,
                # estimator = 'MLM',
                missing = 'fiml')
```

```
## Warning in lav_data_full(data = data, group = group, cluster = cluster, : lavaan WARNING: some cases
##   275
```

```
summary(fit_needs,
        standardized = TRUE,
        fit.measures = TRUE)
```

```
## lavaan 0.6-11 ended normally after 40 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of model parameters                        39
##
##                                                   Used       Total
##   Number of observations                          1832        1833
```

```
##   Number of missing patterns                         74
##
## Model Test User Model:
##
##   Test statistic                                870.937
##   Degrees of freedom                                 51
##   P-value (Chi-square)                            0.000
##
## Model Test Baseline Model:
##
##   Test statistic                               6635.832
##   Degrees of freedom                                 66
##   P-value                                         0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                     0.875
##   Tucker-Lewis Index (TLI)                        0.838
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)             -28571.674
##   Loglikelihood unrestricted model (H1)             NA
##
##   Akaike (AIC)                               57221.348
##   Bayesian (BIC)                             57436.361
##   Sample-size adjusted Bayesian (BIC)        57312.460
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                           0.094
##   90 Percent confidence interval - lower          0.088
##   90 Percent confidence interval - upper          0.099
##   P-value RMSEA <= 0.05                           0.000
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                            0.074
##
## Parameter Estimates:
##
##   Standard errors                             Standard
##   Information                                 Observed
##   Observed information based on                Hessian
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy =~
##     Q61c              0.954    0.030   31.422    0.000    0.954    0.700
##     Q61d              1.020    0.029   34.976    0.000    1.020    0.757
##     Q61e              0.740    0.031   24.041    0.000    0.740    0.571
##     Q61i              0.938    0.027   34.591    0.000    0.938    0.747
##     Q61n              0.954    0.026   36.710    0.000    0.954    0.780
##   competence =~
```

```
##     Q61g              0.396    0.025   15.938    0.000    0.396    0.412
##     Q61h              0.599    0.019   31.222    0.000    0.599    0.758
##     Q61j              0.625    0.021   29.960    0.000    0.625    0.728
##     Q61k              0.323    0.016   20.040    0.000    0.323    0.505
##   relatedness =~
##     Q61a              0.779    0.031   25.213    0.000    0.779    0.673
##     Q61b              0.936    0.036   26.055    0.000    0.936    0.727
##     Q61l              0.331    0.024   13.977    0.000    0.331    0.423
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy ~~
##     competence       0.471    0.025   19.174    0.000    0.471    0.471
##     relatedness      0.502    0.026   19.010    0.000    0.502    0.502
##   competence ~~
##     relatedness      0.502    0.033   15.326    0.000    0.502    0.502
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c             3.341    0.032  103.692    0.000    3.341    2.452
##    .Q61d             3.351    0.032  105.626    0.000    3.351    2.486
##    .Q61e             4.036    0.031  130.478    0.000    4.036    3.114
##    .Q61i             3.115    0.029  105.590    0.000    3.115    2.478
##    .Q61n             3.045    0.029  106.172    0.000    3.045    2.490
##    .Q61g             2.288    0.022  101.725    0.000    2.288    2.379
##    .Q61h             1.903    0.019  102.815    0.000    1.903    2.408
##    .Q61j             1.731    0.020   86.145    0.000    1.731    2.016
##    .Q61k             1.340    0.015   89.466    0.000    1.340    2.094
##    .Q61a             2.321    0.028   83.963    0.000    2.321    2.005
##    .Q61b             2.855    0.031   93.413    0.000    2.855    2.218
##    .Q61l             1.731    0.018   94.039    0.000    1.731    2.208
##     autonomy         0.000                              0.000    0.000
##     competence       0.000                              0.000    0.000
##     relatedness      0.000                              0.000    0.000
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c             0.946    0.039   24.402    0.000    0.946    0.510
##    .Q61d             0.776    0.035   22.344    0.000    0.776    0.427
##    .Q61e             1.133    0.042   26.932    0.000    1.133    0.674
##    .Q61i             0.699    0.030   23.104    0.000    0.699    0.443
##    .Q61n             0.586    0.027   21.362    0.000    0.586    0.392
##    .Q61g             0.768    0.027   28.186    0.000    0.768    0.830
##    .Q61h             0.265    0.016   16.632    0.000    0.265    0.425
##    .Q61j             0.347    0.019   18.566    0.000    0.347    0.470
##    .Q61k             0.305    0.011   26.940    0.000    0.305    0.745
##    .Q61a             0.732    0.039   18.966    0.000    0.732    0.547
##    .Q61b             0.781    0.053   14.867    0.000    0.781    0.471
##    .Q61l             0.505    0.020   25.532    0.000    0.505    0.821
##     autonomy         1.000                              1.000    1.000
##     competence       1.000                              1.000    1.000
##     relatedness      1.000                              1.000    1.000
```

```r
# * CFA Pulled  ----------------------------------------

model_pulled <- '
autonomy =~ Q61c + Q61d + Q61e + Q61i + Q61n
competence =~ Q61g + Q61h + Q61j + Q61k
relatedness =~ Q61a + Q61b + Q61l
psych_wellbeing =~ Q87a + Q87b + Q87c + Q87d + Q87e
psych_wellbeing ~~ 0*autonomy
psych_wellbeing ~~ 0*competence
psych_wellbeing ~~ 0*relatedness
'

fit_pulled <- cfa(model_pulled,
                  data = df_ge,
                  std.lv = TRUE,
                  # estimator = 'MLM',
                  missing = 'fiml')
summary(fit_pulled,
        standardized = TRUE,
        fit.measures = TRUE)
```

```
## lavaan 0.6-11 ended normally after 50 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of model parameters                        54
##
##   Number of observations                          1833
##   Number of missing patterns                        80
##
## Model Test User Model:
##
##   Test statistic                              1546.278
##   Degrees of freedom                               116
##   P-value (Chi-square)                           0.000
##
## Model Test Baseline Model:
##
##   Test statistic                             11547.449
##   Degrees of freedom                               136
##   P-value                                        0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                    0.875
##   Tucker-Lewis Index (TLI)                       0.853
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)             -39975.014
##   Loglikelihood unrestricted model (H1)             NA
##
##   Akaike (AIC)                               80058.028
##   Bayesian (BIC)                             80355.768
```

```
##   Sample-size adjusted Bayesian (BIC)        80184.212
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.082
##   90 Percent confidence interval - lower         0.078
##   90 Percent confidence interval - upper         0.086
##   P-value RMSEA <= 0.05                          0.000
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.131
##
## Parameter Estimates:
##
##   Standard errors                             Standard
##   Information                                 Observed
##   Observed information based on                Hessian
##
## Latent Variables:
##                     Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy =~
##     Q61c               0.954    0.030   31.422    0.000    0.954    0.700
##     Q61d               1.020    0.029   34.976    0.000    1.020    0.757
##     Q61e               0.740    0.031   24.041    0.000    0.740    0.571
##     Q61i               0.938    0.027   34.591    0.000    0.938    0.747
##     Q61n               0.954    0.026   36.710    0.000    0.954    0.780
##   competence =~
##     Q61g               0.396    0.025   15.938    0.000    0.396    0.412
##     Q61h               0.599    0.019   31.222    0.000    0.599    0.758
##     Q61j               0.625    0.021   29.960    0.000    0.625    0.728
##     Q61k               0.323    0.016   20.040    0.000    0.323    0.505
##   relatedness =~
##     Q61a               0.779    0.031   25.213    0.000    0.779    0.673
##     Q61b               0.936    0.036   26.055    0.000    0.936    0.727
##     Q61l               0.331    0.024   13.977    0.000    0.331    0.423
##   psych_wellbeing =~
##     Q87a               0.735    0.020   37.480    0.000    0.735    0.776
##     Q87b               0.846    0.023   36.621    0.000    0.846    0.763
##     Q87c               0.861    0.022   39.044    0.000    0.861    0.798
##     Q87d               0.852    0.023   37.746    0.000    0.852    0.780
##     Q87e               0.755    0.023   32.453    0.000    0.755    0.698
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy ~~
##     psych_wellbeng    0.000                               0.000    0.000
##   competence ~~
##     psych_wellbeng    0.000                               0.000    0.000
##   relatedness ~~
##     psych_wellbeng    0.000                               0.000    0.000
##   autonomy ~~
##     competence        0.471    0.025   19.174    0.000    0.471    0.471
##     relatedness       0.502    0.026   19.010    0.000    0.502    0.502
```

```
##   competence ~~
##     relatedness       0.502    0.033   15.326    0.000    0.502    0.502
##
## Intercepts:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c              3.341    0.032  103.692    0.000    3.341    2.452
##    .Q61d              3.351    0.032  105.626    0.000    3.351    2.486
##    .Q61e              4.036    0.031  130.478    0.000    4.036    3.114
##    .Q61i              3.115    0.029  105.590    0.000    3.115    2.478
##    .Q61n              3.045    0.029  106.172    0.000    3.045    2.490
##    .Q61g              2.288    0.022  101.725    0.000    2.288    2.379
##    .Q61h              1.903    0.019  102.815    0.000    1.903    2.408
##    .Q61j              1.731    0.020   86.145    0.000    1.731    2.016
##    .Q61k              1.340    0.015   89.466    0.000    1.340    2.094
##    .Q61a              2.321    0.028   83.963    0.000    2.321    2.005
##    .Q61b              2.855    0.031   93.413    0.000    2.855    2.218
##    .Q61l              1.731    0.018   94.039    0.000    1.731    2.208
##    .Q87a              2.340    0.022  105.795    0.000    2.340    2.472
##    .Q87b              2.525    0.026   97.566    0.000    2.525    2.280
##    .Q87c              2.510    0.025   99.560    0.000    2.510    2.326
##    .Q87d              2.542    0.026   99.588    0.000    2.542    2.327
##    .Q87e              2.474    0.025   97.847    0.000    2.474    2.287
##     autonomy          0.000                              0.000    0.000
##     competence        0.000                              0.000    0.000
##     relatedness       0.000                              0.000    0.000
##     psych_wellbeng    0.000                              0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c              0.946    0.039   24.402    0.000    0.946    0.510
##    .Q61d              0.776    0.035   22.344    0.000    0.776    0.427
##    .Q61e              1.133    0.042   26.932    0.000    1.133    0.674
##    .Q61i              0.699    0.030   23.104    0.000    0.699    0.443
##    .Q61n              0.586    0.027   21.362    0.000    0.586    0.392
##    .Q61g              0.768    0.027   28.186    0.000    0.768    0.830
##    .Q61h              0.265    0.016   16.632    0.000    0.265    0.425
##    .Q61j              0.347    0.019   18.566    0.000    0.347    0.470
##    .Q61k              0.305    0.011   26.940    0.000    0.305    0.745
##    .Q61a              0.732    0.039   18.966    0.000    0.732    0.547
##    .Q61b              0.781    0.053   14.867    0.000    0.781    0.471
##    .Q61l              0.505    0.020   25.532    0.000    0.505    0.821
##    .Q87a              0.356    0.015   23.507    0.000    0.356    0.397
##    .Q87b              0.512    0.021   24.018    0.000    0.512    0.417
##    .Q87c              0.423    0.019   22.492    0.000    0.423    0.363
##    .Q87d              0.468    0.020   23.388    0.000    0.468    0.392
##    .Q87e              0.600    0.023   26.136    0.000    0.600    0.513
##     autonomy          1.000                              1.000    1.000
##     competence        1.000                              1.000    1.000
##     relatedness       1.000                              1.000    1.000
##     psych_wellbeng    1.000                              1.000    1.000
```

```
# * Full SEM: Mediation ---------------------------------------------------

med_model <- '
```

```
autonomy =~ Q61c + Q61d + Q61e + Q61i + Q61n
competence =~ Q61g + Q61h + Q61j + Q61k
relatedness =~ Q61a + Q61b + Q61l
psych_wellbeing =~ Q87a + Q87b + Q87c + Q87d + Q87e
Q88 ~ a1*autonomy + a2*competence + a3*relatedness
psych_wellbeing ~ autonomy + competence + relatedness + b1*Q88
i_1 := a1*b1
i_2 := a2*b1
i_3 := a3*b1
'
med_fit <- sem(med_model,
               data = df_ge,
               std.lv = TRUE,
               # estimator = 'MLM',
               missing = 'fiml',
               se = "bootstrap")
summary(med_fit,
        standardized = TRUE,
        fit.measures = TRUE)
```

```
## lavaan 0.6-11 ended normally after 65 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of model parameters                        63
##
##   Number of observations                          1833
##   Number of missing patterns                        83
##
## Model Test User Model:
##
##   Test statistic                              1360.894
##   Degrees of freedom                               126
##   P-value (Chi-square)                           0.000
##
## Model Test Baseline Model:
##
##   Test statistic                             12434.863
##   Degrees of freedom                               153
##   P-value                                        0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                    0.899
##   Tucker-Lewis Index (TLI)                       0.878
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)             -41255.015
##   Loglikelihood unrestricted model (H1)             NA
##
##   Akaike (AIC)                               82636.030
##   Bayesian (BIC)                             82983.394
##   Sample-size adjusted Bayesian (BIC)        82783.245
```

```
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.073
##   90 Percent confidence interval - lower         0.070
##   90 Percent confidence interval - upper         0.077
##   P-value RMSEA <= 0.05                          0.000
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.058
##
## Parameter Estimates:
##
##   Standard errors                             Bootstrap
##   Number of requested bootstrap draws             1000
##   Number of successful bootstrap draws            1000
##
## Latent Variables:
##                     Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy =~
##     Q61c               0.956    0.027   34.897    0.000    0.956    0.702
##     Q61d               1.014    0.026   38.322    0.000    1.014    0.753
##     Q61e               0.739    0.033   22.395    0.000    0.739    0.570
##     Q61i               0.939    0.024   39.939    0.000    0.939    0.747
##     Q61n               0.956    0.024   39.652    0.000    0.956    0.782
##   competence =~
##     Q61g               0.447    0.033   13.591    0.000    0.447    0.464
##     Q61h               0.583    0.025   23.389    0.000    0.583    0.738
##     Q61j               0.615    0.025   24.161    0.000    0.615    0.716
##     Q61k               0.323    0.030   10.863    0.000    0.323    0.505
##   relatedness =~
##     Q61a               0.507    0.095    5.343    0.000    0.507    0.438
##     Q61b               0.646    0.115    5.597    0.000    0.646    0.502
##     Q61l               0.521    0.064    8.157    0.000    0.521    0.664
##   psych_wellbeing =~
##     Q87a               0.607    0.022   27.416    0.000    0.739    0.780
##     Q87b               0.699    0.023   30.026    0.000    0.851    0.769
##     Q87c               0.703    0.025   28.412    0.000    0.856    0.793
##     Q87d               0.693    0.025   27.634    0.000    0.844    0.772
##     Q87e               0.624    0.024   26.040    0.000    0.760    0.703
##
## Regressions:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Q88 ~
##     autonomy  (a1)    0.045    0.027    1.678    0.093    0.045    0.069
##     competenc (a2)   -0.073    0.116   -0.629    0.529   -0.073   -0.111
##     relatdnss (a3)    0.442    0.120    3.674    0.000    0.442    0.676
##   psych_wellbeing ~
##     autonomy         -0.031    0.039   -0.802    0.422   -0.026   -0.026
##     competenc         0.294    0.106    2.786    0.005    0.241    0.241
##     relatdnss         0.184    0.143    1.288    0.198    0.151    0.151
##     Q88       (b1)    0.540    0.076    7.083    0.000    0.443    0.290
##
```

```
## Covariances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   autonomy ~~
##     competence        0.473    0.025   18.972    0.000    0.473    0.473
##     relatedness       0.528    0.034   15.370    0.000    0.528    0.528
##   competence ~~
##     relatedness       0.786    0.105    7.492    0.000    0.786    0.786
##
## Intercepts:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c              3.340    0.032  102.926    0.000    3.340    2.451
##    .Q61d              3.350    0.031  108.929    0.000    3.350    2.486
##    .Q61e              4.035    0.032  126.774    0.000    4.035    3.113
##    .Q61i              3.114    0.030  104.286    0.000    3.114    2.478
##    .Q61n              3.044    0.029  106.125    0.000    3.044    2.489
##    .Q61g              2.287    0.022  102.406    0.000    2.287    2.379
##    .Q61h              1.902    0.019  101.845    0.000    1.902    2.408
##    .Q61j              1.731    0.021   84.382    0.000    1.731    2.016
##    .Q61k              1.339    0.015   91.357    0.000    1.339    2.093
##    .Q61a              2.321    0.028   81.754    0.000    2.321    2.005
##    .Q61b              2.856    0.032   90.338    0.000    2.856    2.219
##    .Q61l              1.731    0.019   92.502    0.000    1.731    2.208
##    .Q87a              1.723    0.090   19.171    0.000    1.723    1.820
##    .Q87b              1.814    0.104   17.416    0.000    1.814    1.638
##    .Q87c              1.795    0.106   16.944    0.000    1.795    1.663
##    .Q87d              1.837    0.105   17.573    0.000    1.837    1.681
##    .Q87e              1.839    0.094   19.638    0.000    1.839    1.700
##    .Q88               1.884    0.015  123.640    0.000    1.884    2.877
##     autonomy          0.000                               0.000    0.000
##     competence        0.000                               0.000    0.000
##     relatedness       0.000                               0.000    0.000
##    .psych_wellbeng    0.000                               0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Q61c              0.942    0.047   20.042    0.000    0.942    0.508
##    .Q61d              0.788    0.044   17.787    0.000    0.788    0.434
##    .Q61e              1.134    0.041   27.891    0.000    1.134    0.675
##    .Q61i              0.697    0.032   21.642    0.000    0.697    0.441
##    .Q61n              0.581    0.033   17.410    0.000    0.581    0.389
##    .Q61g              0.725    0.034   21.638    0.000    0.725    0.784
##    .Q61h              0.285    0.022   12.812    0.000    0.285    0.456
##    .Q61j              0.359    0.023   15.502    0.000    0.359    0.487
##    .Q61k              0.305    0.022   14.181    0.000    0.305    0.745
##    .Q61a              1.083    0.120    9.016    0.000    1.083    0.808
##    .Q61b              1.240    0.175    7.095    0.000    1.240    0.748
##    .Q61l              0.344    0.051    6.699    0.000    0.344    0.559
##    .Q87a              0.350    0.022   15.937    0.000    0.350    0.391
##    .Q87b              0.502    0.033   15.077    0.000    0.502    0.409
##    .Q87c              0.432    0.028   15.236    0.000    0.432    0.371
##    .Q87d              0.482    0.027   18.079    0.000    0.482    0.403
##    .Q87e              0.593    0.029   20.459    0.000    0.593    0.506
##    .Q88               0.258    0.024   10.780    0.000    0.258    0.603
##     autonomy          1.000                               1.000    1.000
```

```
##     competence        1.000                                1.000    1.000
##     relatedness       1.000                                1.000    1.000
##    .psych_wellbeng    1.000                                0.674    0.674
##
## Defined Parameters:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     i_1               0.024    0.016    1.562    0.118    0.020    0.020
##     i_2              -0.039    0.063   -0.624    0.532   -0.032   -0.032
##     i_3               0.239    0.064    3.706    0.000    0.196    0.196
```

```
modificationIndices(med_fit, minimum.value=20)
```

```
##                 lhs op  rhs      mi    epc sepc.lv sepc.all sepc.nox
## 78         autonomy =~ Q61k  64.160 -0.147  -0.147   -0.229   -0.229
## 80         autonomy =~ Q61b  40.186  0.277   0.277    0.215    0.215
## 81         autonomy =~ Q61l  80.852 -0.280  -0.280   -0.357   -0.357
## 85         autonomy =~ Q87d  28.842 -0.112  -0.112   -0.103   -0.103
## 86         autonomy =~ Q87e  53.634  0.163   0.163    0.150    0.150
## 89       competence =~ Q61e  35.750 -0.219  -0.219   -0.169   -0.169
## 92       competence =~ Q61a  22.857 -0.359  -0.359   -0.311   -0.311
## 93       competence =~ Q61b  65.391 -0.694  -0.694   -0.539   -0.539
## 94       competence =~ Q61l 125.033  0.700   0.700    0.893    0.893
## 102     relatedness =~ Q61e  23.399 -0.193  -0.193   -0.149   -0.149
## 105     relatedness =~ Q61g 167.682  0.742   0.742    0.772    0.772
## 106     relatedness =~ Q61h  26.679 -0.276  -0.276   -0.349   -0.349
## 108     relatedness =~ Q61k  23.257 -0.184  -0.184   -0.287   -0.287
## 119 psych_wellbeing =~ Q61g  38.273  0.138   0.168    0.175    0.175
## 125 psych_wellbeing =~ Q61l  30.404  0.135   0.165    0.210    0.210
## 126            Q61c ~~ Q61d  30.661  0.159   0.159    0.184    0.184
## 128            Q61c ~~ Q61i  31.553 -0.150  -0.150   -0.185   -0.185
## 145            Q61d ~~ Q61n  26.154 -0.134  -0.134   -0.198   -0.198
## 150            Q61d ~~ Q61a  22.270  0.121   0.121    0.131    0.131
## 151            Q61d ~~ Q61b  29.211  0.150   0.150    0.152    0.152
## 174            Q61i ~~ Q61n  44.941  0.163   0.163    0.256    0.256
## 202            Q61g ~~ Q61j  83.480 -0.144  -0.144   -0.282   -0.282
## 206            Q61g ~~ Q61l  46.343  0.094   0.094    0.188    0.188
## 212            Q61g ~~  Q88  70.401  0.099   0.099    0.228    0.228
## 235            Q61k ~~ Q61b  33.572 -0.093  -0.093   -0.152   -0.152
## 236            Q61k ~~ Q61l  90.591  0.086   0.086    0.266    0.266
## 242            Q61k ~~  Q88  35.271 -0.046  -0.046   -0.164   -0.164
## 243            Q61a ~~ Q61b 378.504  0.625   0.625    0.540    0.540
## 244            Q61a ~~ Q61l  42.274 -0.138  -0.138   -0.226   -0.226
## 250            Q61a ~~  Q88  35.007 -0.097  -0.097   -0.184   -0.184
## 251            Q61b ~~ Q61l  84.333 -0.242  -0.242   -0.371   -0.371
## 263            Q61l ~~  Q88  27.514  0.071   0.071    0.237    0.237
## 266            Q87a ~~ Q87d  28.694 -0.073  -0.073   -0.177   -0.177
## 269            Q87b ~~ Q87c  33.091 -0.090  -0.090   -0.193   -0.193
## 273            Q87c ~~ Q87d  21.872  0.072   0.072    0.158    0.158
```