Structural equations modeling

Pamela Inostroza

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Data

Write a report on the analysis (10 pages not including appendices & references)

- Theoretical framing of the research problem / Research questions / Hypotheses
- Short description of the dataset used
- Modeling strategy
- Results

```
setwd("C:/Users/pamel/Documents/ESS/")
load("ESS5-9Round.RData")

items_o <- c("iphlppl", "iplylfr", "ipeqopt", "ipudrst", "impenv")

vars <- c(items_o,
          "cntry", "dweight", "hhmmb", "gndr", "agea", "GINI","GDP", "HDI",
          "dvrcdeva", "domicil", "eisced","name","essround","idno")
cont <- c("hhmmb","agea")
cat <- vars[which(!(vars%in%c(cont,"name","essround","idno","cntry","dweight")))]
```

```
round <- c(8,9)
countries <- c("Austria","Belgium","Czechia","Estonia","France","Germany",
               "Ireland","Italy","Netherlands","Norway","Poland","Slovenia","Switzerland","United Kingdo
#"Hungary", "Finland"
ds_filtradaAll <- ds %>% filter(cntry %in% countries & essround %in% round) %>%
  select(vars)
ds_filtradaAll <- copy_labels(ds_filtradaAll, ds)

table(as_character(ds_filtradaAll$cntry),ds_filtradaAll$essround)
```

```
##
##                     8    9
##   Austria        2010 2499
##   Belgium        1766 1767
##   Czechia        2269 2398
##   Estonia        2019 1904
##   France         2070 2010
##   Germany        2852 2358
##   Ireland        2757 2216
##   Italy          2626 2745
##   Netherlands    1681 1673
##   Norway         1545 1406
##   Poland         1694 1500
##   Slovenia       1307 1318
##   Switzerland    1525 1542
##   United Kingdom 1959 2204
```

```
by(ds_filtradaAll, ds_filtradaAll$essround,function(x) describe(x))
```

```
## Warning in describe(x): NAs introduced by coercion

## Warning in NextMethod(): NAs introduced by coercion

## Warning in FUN(newX[, i], ...): no non-missing arguments to min; returning
## Inf

## Warning in FUN(newX[, i], ...): no non-missing arguments to min; returning
## Inf

## Warning in FUN(newX[, i], ...): no non-missing arguments to max; returning
## -Inf

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## Warning in FUN(newX[, i], ...): no non-missing arguments to min; returning
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## Inf

## Warning in FUN(newX[, i], ...): no non-missing arguments to max; returning
## -Inf

## Warning in FUN(newX[, i], ...): no non-missing arguments to max; returning
## -Inf

## ds_filtradaAll$essround: 8
##          vars     n        mean           sd  median    trimmed     mad
## iphlppl     1 27837        2.19         0.98    2.00       2.08    1.48
## iplylfr     2 27833        1.94         0.89    2.00       1.83    1.48
## ipeqopt     3 27810        2.19         1.06    2.00       2.06    1.48
## ipudrst     4 27780        2.35         1.04    2.00       2.26    1.48
## impenv      5 27849        2.17         1.03    2.00       2.05    1.48
## cntry*      6 28080         NaN           NA      NA        NaN      NA
## dweight     7 28080        1.00         0.36    1.00       0.97    0.08
## hhmmb       8 27962        2.58         1.34    2.00       2.44    1.48
## gndr        9 28078        1.52         0.50    2.00       1.52    0.00
## agea       10 27973       49.05        18.55   49.00      48.88   22.24
## GINI       11 28080       28.85         2.67   29.40      28.84    3.26
## GDP        12 28080        2.17         0.78    2.19       2.12    0.70
## HDI        13 28080        0.91         0.03    0.92       0.91    0.03
## dvrcdeva   14 27923        1.84         0.37    2.00       1.93    0.00
## domicil    15 28056        3.05         1.18    3.00       3.09    1.48
## eisced     16 27983        4.02         3.04    4.00       3.86    1.48
## name*      17 28080         NaN           NA      NA        NaN      NA
## essround   18 28080        8.00         0.00    8.00       8.00    0.00
## idno       19 28080 49857026.67 142092162.41 2917.00 9232455.03 3104.56
##             min          max        range  skew kurtosis        se
## iphlppl    1.00         6.00         5.00  0.81     0.67      0.01
## iplylfr    1.00         6.00         5.00  1.10     1.64      0.01
## ipeqopt    1.00         6.00         5.00  0.96     0.83      0.01
## ipudrst    1.00         6.00         5.00  0.83     0.63      0.01
```

```
## impenv    1.00         6.00         5.00  0.86     0.59      0.01
## cntry*     Inf         -Inf         -Inf    NA       NA        NA
## dweight   0.04         6.21         6.17  2.50    20.92      0.00
## hhmmb     1.00        12.00        11.00  0.88     0.79      0.01
## gndr      1.00         2.00         1.00 -0.07    -2.00      0.00
## agea     15.00       100.00        85.00  0.05    -0.90      0.11
## GINI     24.40        33.10         8.70 -0.03    -1.03      0.02
## GDP       1.07         3.68         2.61  0.38    -0.70      0.00
## HDI       0.86         0.95         0.09 -0.06    -1.43      0.00
## dvrcdeva  1.00         2.00         1.00 -1.86     1.47      0.00
## domicil   1.00         5.00         4.00 -0.43    -0.76      0.01
## eisced    1.00        55.00        54.00 10.75   177.06      0.02
## name*      Inf         -Inf         -Inf    NA       NA        NA
## essround  8.00         8.00         0.00   NaN      NaN      0.00
## idno      1.00 551603139.00 551603138.00  3.14     8.19 847952.59
## ------------------------------------------------------------
## ds_filtradaAll$essround: 9
##          vars     n     mean       sd   median  trimmed      mad   min
## iphlppl     1 27207     2.15     0.96     2.00     2.05     1.48  1.00
## iplylfr     2 27227     1.90     0.88     2.00     1.79     1.48  1.00
## ipeqopt     3 27145     2.18     1.05     2.00     2.04     1.48  1.00
## ipudrst     4 27124     2.33     1.03     2.00     2.24     1.48  1.00
## impenv      5 27228     2.00     0.99     2.00     1.87     1.48  1.00
## cntry*      6 27540      NaN       NA       NA      NaN       NA   Inf
## dweight     7 27540     1.00     0.32     1.00     0.98     0.03  0.31
## hhmmb       8 27466     2.58     1.34     2.00     2.44     1.48  1.00
## gndr        9 27540     1.52     0.50     2.00     1.53     0.00  1.00
## agea       10 27389    50.09    18.73    50.00    50.03    22.24 15.00
## GINI       11 27540    28.59     3.15    28.50    28.59     3.85 23.40
## GDP        12 27540     2.86     2.00     2.42     2.53     1.43  0.77
## HDI        13 27540     0.91     0.03     0.91     0.91     0.03  0.87
## dvrcdeva   14 27431     1.84     0.37     2.00     1.93     0.00  1.00
## domicil    15 27522     3.00     1.19     3.00     3.04     1.48  1.00
## eisced     16 27469     4.19     3.51     4.00     3.99     1.48  1.00
## name*      17 27540      NaN       NA       NA      NaN       NA   Inf
## essround   18 27540     9.00     0.00     9.00     9.00     0.00  9.00
## idno       19 27540 24377.60 14025.85 24418.00 24390.60 18015.81  1.00
##               max    range  skew kurtosis    se
## iphlppl      6.00     5.00  0.84     0.78  0.01
## iplylfr      6.00     5.00  1.15     1.94  0.01
## ipeqopt      6.00     5.00  1.00     0.97  0.01
## ipudrst      6.00     5.00  0.86     0.74  0.01
## impenv       6.00     5.00  1.06     1.11  0.01
## cntry*       -Inf     -Inf    NA       NA    NA
## dweight      5.13     4.82  2.91    23.82  0.00
## hhmmb       15.00    14.00  0.92     1.18  0.01
## gndr         2.00     1.00 -0.10    -1.99  0.00
## agea        90.00    75.00  0.01    -0.94  0.11
## GINI        33.50    10.10  0.08    -1.04  0.02
## GDP          8.17     7.40  1.43     1.35  0.01
## HDI          0.95     0.08  0.03    -1.38  0.00
## dvrcdeva     2.00     1.00 -1.87     1.49  0.00
## domicil      5.00     4.00 -0.39    -0.84  0.01
## eisced      55.00    54.00 10.57   150.23  0.02
```

```
## name*        -Inf     -Inf    NA       NA    NA
## essround     9.00     0.00   NaN      NaN  0.00
## idno     48636.00 48635.00 -0.01    -1.20 84.52
```

```
dat2 <- data.frame(reverse.code(keys = rep(-1,5), items = ds_filtradaAll[,items_o], mini = rep(1,5), ma
colnames(dat2) <- paste(items_o,"_r",sep = "")
labels = num_lab("
             1 Not like me at all
             2 Not like me
             3 A little like me
             4 Somewhat like me
             5 Like me
             6 Very much like me
")
val_lab(dat2$iphlppl_r) <- labels
val_lab(dat2$iplylfr_r) <- labels
val_lab(dat2$ipeqopt_r) <- labels
val_lab(dat2$ipudrst_r) <- labels
val_lab(dat2$impenv_r) <- labels
var_lab(dat2$iphlppl_r) <- var_lab(ds_filtradaAll$iphlppl)
var_lab(dat2$iplylfr_r) <- var_lab(ds_filtradaAll$iplylfr)
var_lab(dat2$ipeqopt_r) <- var_lab(ds_filtradaAll$ipeqopt)
var_lab(dat2$ipudrst_r) <- var_lab(ds_filtradaAll$ipudrst)
var_lab(dat2$impenv_r) <- var_lab(ds_filtradaAll$impenv)

ds_filtradaAll <- cbind(ds_filtradaAll,dat2)
items <- paste(items_o,"_r",sep = "")
for (j in round){
  for (i in items){
    print(paste(i,": ", var_lab(eval(parse(text=paste("ds_filtradaAll$",i))))))
    print(use_labels(ds_filtradaAll[ds_filtradaAll$essround == j,],
                     table(eval(parse(text=paste("ds_filtradaAll$",i))), as.character(ds_filtradaAll$cnt
    print(use_labels(ds_filtradaAll[ds_filtradaAll$essround == j,],
                     round(prop.table(table(eval(parse(text=paste("ds_filtradaAll$",i)))),as.character(ds
  }
}
```

```
## [1] "iphlppl_r :  Important to help people and care for others well-being"
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all       45       2      57       9     15      10
##   Not like me              66      29     202     115    107      73
##   A little like me        266      83     783     384    464     182
##   Somewhat like me        942     669    1616    1163    778     814
##   Like me                1837    1825    1428    1699   1424    2496
##   Very much like me      1308     914     521     539   1257    1586
##   <NA>                     45      11      60      14     35      49
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all       16    27           3      3      7        6
##   Not like me              89    63          32     24     66       21
##   A little like me        344   390          84    276    326       46
##   Somewhat like me        768  1765         640    550    814      290
##   Like me                2144  1999        1779   1338   1399     1472
##   Very much like me      1578  1000         793    737    510      766
```

```
##   <NA>                    34   127          23     23     72       24
##
##                       Switzerland United Kingdom
##   Not like me at all            4              5
##   Not like me                  21             39
##   A little like me             77            218
##   Somewhat like me            463            567
##   Like me                    1452           1844
##   Very much like me          1026           1455
##   <NA>                         24             35
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all    21.53    0.96   27.27    4.31   7.18    4.78
##   Not like me            6.97    3.06   21.33   12.14  11.30    7.71
##   A little like me       6.78    2.12   19.96    9.79  11.83    4.64
##   Somewhat like me       7.96    5.65   13.65    9.82   6.57    6.88
##   Like me                7.61    7.56    5.92    7.04   5.90   10.34
##   Very much like me      9.35    6.53    3.72    3.85   8.98   11.34
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all     7.66 12.92        1.44   1.44   3.35     2.87
##   Not like me            9.40  6.65        3.38   2.53   6.97     2.22
##   A little like me       8.77  9.94        2.14   7.04   8.31     1.17
##   Somewhat like me       6.49 14.91        5.41   4.65   6.88     2.45
##   Like me                8.88  8.28        7.37   5.54   5.80     6.10
##   Very much like me     11.28  7.15        5.67   5.27   3.65     5.48
##
##                       Switzerland United Kingdom
##   Not like me at all           1.91           2.39
##   Not like me                  2.22           4.12
##   A little like me             1.96           5.56
##   Somewhat like me             3.91           4.79
##   Like me                      6.02           7.64
##   Very much like me            7.33          10.40
## [1] "iplylfr_r :  Important to be loyal to friends and devote to people close"
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all       26       1      24      11     17      10
##   Not like me              37      13      88      44     44      20
##   A little like me        179      37     381     146    224      50
##   Somewhat like me        445     313    1262     594    566     278
##   Like me                1611    1895    1871    2218   1397    2204
##   Very much like me      2180    1264     979     897   1800    2598
##   <NA>                     31      10      62      13     32      50
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all       20    21           3      1      8        8
##   Not like me              87    43          37     12     29       58
##   A little like me        341   247          51     95    167       92
##   Somewhat like me        726  1389         434    253    483      366
##   Like me                2196  2282        1927   1447   1514     1383
##   Very much like me      1564  1273         875   1121    932      688
##   <NA>                     39   116          27     22     61       30
##
```

```
##                       Switzerland United Kingdom
##   Not like me at all            2              8
##   Not like me                  15             54
##   A little like me             27            212
##   Somewhat like me            204            473
##   Like me                    1331           1912
##   Very much like me          1461           1464
##   <NA>                         27             40
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all    16.25    0.62   15.00    6.88  10.62    6.25
##   Not like me            6.37    2.24   15.15    7.57   7.57    3.44
##   A little like me       7.96    1.65   16.94    6.49   9.96    2.22
##   Somewhat like me       5.72    4.02   16.21    7.63   7.27    3.57
##   Like me                6.40    7.52    7.43    8.81   5.55    8.75
##   Very much like me     11.42    6.62    5.13    4.70   9.43   13.60
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all    12.50 13.12        1.88   0.62   5.00     5.00
##   Not like me           14.97  7.40        6.37   2.07   4.99     9.98
##   A little like me      15.16 10.98        2.27   4.22   7.43     4.09
##   Somewhat like me       9.32 17.84        5.57   3.25   6.20     4.70
##   Like me                8.72  9.06        7.65   5.74   6.01     5.49
##   Very much like me      8.19  6.67        4.58   5.87   4.88     3.60
##
##                       Switzerland United Kingdom
##   Not like me at all         1.25           5.00
##   Not like me                2.58           9.29
##   A little like me           1.20           9.43
##   Somewhat like me           2.62           6.08
##   Like me                    5.28           7.59
##   Very much like me          7.65           7.67
## [1] "ipeqopt_r :  Important that people are treated equally and have equal opportunities"
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all       47       8      53      51     18      48
##   Not like me              86      54     212     329     71     194
##   A little like me        296     117     568     420    271     240
##   Somewhat like me        902     699    1362    1059    644     750
##   Like me                1800    1680    1627    1627   1215    2340
##   Very much like me      1333     957     751     422   1825    1581
##   <NA>                     45      18      94      15     36      57
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all       34    31          11     12     20        8
##   Not like me             129   112          65    104     80       54
##   A little like me        438   402          77    292    223       48
##   Somewhat like me        854  1727         501    437    575      222
##   Like me                1937  1834        1871   1318   1425     1325
##   Very much like me      1542  1121         805    763    809      940
##   <NA>                     39   144          24     25     62       28
##
##                       Switzerland United Kingdom
##   Not like me at all           21             28
```

```
##   Not like me               102            139
##   A little like me          178            326
##   Somewhat like me          426            663
##   Like me                  1342           1661
##   Very much like me         962           1304
##   <NA>                       36             42
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all   12.05    2.05   13.59   13.08   4.62   12.31
##   Not like me           4.97    3.12   12.25   19.01   4.10   11.21
##   A little like me      7.60    3.00   14.58   10.78   6.96    6.16
##   Somewhat like me      8.34    6.46   12.59    9.79   5.95    6.93
##   Like me               7.83    7.30    7.07    7.07   5.28   10.17
##   Very much like me     8.82    6.33    4.97    2.79  12.07   10.46
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all    8.72  7.95        2.82   3.08   5.13     2.05
##   Not like me           7.45  6.47        3.76   6.01   4.62     3.12
##   A little like me     11.24 10.32        1.98   7.49   5.72     1.23
##   Somewhat like me      7.89 15.96        4.63   4.04   5.31     2.05
##   Like me               8.42  7.97        8.13   5.73   6.20     5.76
##   Very much like me    10.20  7.42        5.33   5.05   5.35     6.22
##
##                      Switzerland United Kingdom
##   Not like me at all        5.38           7.18
##   Not like me               5.89           8.03
##   A little like me          4.57           8.37
##   Somewhat like me          3.94           6.13
##   Like me                   5.83           7.22
##   Very much like me         6.36           8.63
## [1] "ipudrst_r :  Important to understand different people"
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all      63       9      96      15     37      18
##   Not like me            129      72     296     137    142     108
##   A little like me       360     170     815     343    482     223
##   Somewhat like me      1168     852    1628     956    823     787
##   Like me               1728    1811    1357    1899   1412    2707
##   Very much like me     1011     602     384     560   1150    1310
##   <NA>                    50      17      91      13     34      57
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all      33    37          11      4     19        8
##   Not like me            177   126         104     63    122       81
##   A little like me       530   583         178    319    382      116
##   Somewhat like me       940  1857         779    594    698      375
##   Like me               2166  1818        1765   1436   1427     1525
##   Very much like me     1088   770         489    512    461      495
##   <NA>                    39   180          28     23     85       25
##
##                      Switzerland United Kingdom
##   Not like me at all           7             26
##   Not like me                 55            126
##   A little like me           120            364
```

```
##   Somewhat like me           535            716
##   Like me                   1550           1945
##   Very much like me          768            944
##   <NA>                        32             42
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all    16.45    2.35   25.07    3.92   9.66    4.70
##   Not like me            7.42    4.14   17.03    7.88   8.17    6.21
##   A little like me       7.22    3.41   16.35    6.88   9.67    4.47
##   Somewhat like me       9.19    6.70   12.81    7.52   6.48    6.19
##   Like me                7.04    7.38    5.53    7.74   5.75   11.03
##   Very much like me      9.59    5.71    3.64    5.31  10.91   12.42
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all     8.62  9.66        2.87   1.04   4.96     2.09
##   Not like me           10.18  7.25        5.98   3.62   7.02     4.66
##   A little like me      10.63 11.70        3.57   6.40   7.66     2.33
##   Somewhat like me       7.40 14.61        6.13   4.67   5.49     2.95
##   Like me                8.82  7.41        7.19   5.85   5.81     6.21
##   Very much like me     10.32  7.30        4.64   4.86   4.37     4.69
##
##                       Switzerland United Kingdom
##   Not like me at all         1.83           6.79
##   Not like me                3.16           7.25
##   A little like me           2.41           7.30
##   Somewhat like me           4.21           5.63
##   Like me                    6.31           7.92
##   Very much like me          7.28           8.95
## [1] "impenv_r :  Important to care for nature and environment"
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all       34      10      27       5     33      16
##   Not like me              66      29     132      52    157     113
##   A little like me        253     158     432     180    491     274
##   Somewhat like me        757     717    1200     667    648     856
##   Like me                1636    1698    1638    1808   1275    2206
##   Very much like me      1732     910    1173    1198   1442    1697
##   <NA>                     31      11      65      13     34      48
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all       35    14          16     13      7        3
##   Not like me             131    51          68    132     55       25
##   A little like me        423   282         163    381    187       51
##   Somewhat like me        897  1223         730    631    569      231
##   Like me                1825  1921        1609   1207   1390     1198
##   Very much like me      1628  1759         745    563    928     1099
##   <NA>                     34   121          23     24     58       18
##
##                       Switzerland United Kingdom
##   Not like me at all            4             18
##   Not like me                  33            134
##   A little like me            120            350
##   Somewhat like me            460            713
##   Like me                    1269           1588
```

```
##   Very much like me         1156           1322
##   <NA>                        25             38
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all   14.47    4.26   11.49    2.13  14.04    6.81
##   Not like me           5.60    2.46   11.21    4.41  13.33    9.59
##   A little like me      6.76    4.22   11.54    4.81  13.11    7.32
##   Somewhat like me      7.35    6.96   11.65    6.48   6.29    8.31
##   Like me               7.35    7.63    7.36    8.12   5.73    9.91
##   Very much like me     9.98    5.24    6.76    6.90   8.31    9.78
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all   14.89  5.96        6.81   5.53   2.98     1.28
##   Not like me          11.12  4.33        5.77  11.21   4.67     2.12
##   A little like me     11.30  7.53        4.35  10.17   4.99     1.36
##   Somewhat like me      8.71 11.87        7.09   6.13   5.52     2.24
##   Like me               8.20  8.63        7.23   5.42   6.24     5.38
##   Very much like me     9.38 10.14        4.29   3.24   5.35     6.33
##
##                      Switzerland United Kingdom
##   Not like me at all        1.70           7.66
##   Not like me               2.80          11.38
##   A little like me          3.20           9.35
##   Somewhat like me          4.47           6.92
##   Like me                   5.70           7.13
##   Very much like me         6.66           7.62
## [1] "iphlppl_r :  Important to help people and care for others well-being"
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all      45       2      57       9     15      10
##   Not like me             66      29     202     115    107      73
##   A little like me       266      83     783     384    464     182
##   Somewhat like me       942     669    1616    1163    778     814
##   Like me               1837    1825    1428    1699   1424    2496
##   Very much like me     1308     914     521     539   1257    1586
##   <NA>                    45      11      60      14     35      49
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all      16    27           3      3      7        6
##   Not like me             89    63          32     24     66       21
##   A little like me       344   390          84    276    326       46
##   Somewhat like me       768  1765         640    550    814      290
##   Like me               2144  1999        1779   1338   1399     1472
##   Very much like me     1578  1000         793    737    510      766
##   <NA>                    34   127          23     23     72       24
##
##                      Switzerland United Kingdom
##   Not like me at all           4              5
##   Not like me                 21             39
##   A little like me            77            218
##   Somewhat like me           463            567
##   Like me                   1452           1844
##   Very much like me         1026           1455
##   <NA>                        24             35
```

```
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all   21.53    0.96   27.27    4.31   7.18    4.78
##   Not like me           6.97    3.06   21.33   12.14  11.30    7.71
##   A little like me      6.78    2.12   19.96    9.79  11.83    4.64
##   Somewhat like me      7.96    5.65   13.65    9.82   6.57    6.88
##   Like me               7.61    7.56    5.92    7.04   5.90   10.34
##   Very much like me     9.35    6.53    3.72    3.85   8.98   11.34
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all    7.66 12.92        1.44   1.44   3.35     2.87
##   Not like me           9.40  6.65        3.38   2.53   6.97     2.22
##   A little like me      8.77  9.94        2.14   7.04   8.31     1.17
##   Somewhat like me      6.49 14.91        5.41   4.65   6.88     2.45
##   Like me               8.88  8.28        7.37   5.54   5.80     6.10
##   Very much like me    11.28  7.15        5.67   5.27   3.65     5.48
##
##                      Switzerland United Kingdom
##   Not like me at all        1.91           2.39
##   Not like me               2.22           4.12
##   A little like me          1.96           5.56
##   Somewhat like me          3.91           4.79
##   Like me                   6.02           7.64
##   Very much like me         7.33          10.40
## [1] "iplylfr_r :  Important to be loyal to friends and devote to people close"
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all      26       1      24      11     17      10
##   Not like me             37      13      88      44     44      20
##   A little like me       179      37     381     146    224      50
##   Somewhat like me       445     313    1262     594    566     278
##   Like me               1611    1895    1871    2218   1397    2204
##   Very much like me     2180    1264     979     897   1800    2598
##   <NA>                    31      10      62      13     32      50
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all      20    21           3      1      8        8
##   Not like me             87    43          37     12     29       58
##   A little like me       341   247          51     95    167       92
##   Somewhat like me       726  1389         434    253    483      366
##   Like me               2196  2282        1927   1447   1514     1383
##   Very much like me     1564  1273         875   1121    932      688
##   <NA>                    39   116          27     22     61       30
##
##                      Switzerland United Kingdom
##   Not like me at all           2              8
##   Not like me                 15             54
##   A little like me            27            212
##   Somewhat like me           204            473
##   Like me                   1331           1912
##   Very much like me         1461           1464
##   <NA>                        27             40
##
##                      Austria Belgium Czechia Estonia France Germany
```

```
##   Not like me at all   16.25    0.62   15.00    6.88  10.62    6.25
##   Not like me           6.37    2.24   15.15    7.57   7.57    3.44
##   A little like me      7.96    1.65   16.94    6.49   9.96    2.22
##   Somewhat like me      5.72    4.02   16.21    7.63   7.27    3.57
##   Like me               6.40    7.52    7.43    8.81   5.55    8.75
##   Very much like me    11.42    6.62    5.13    4.70   9.43   13.60
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all   12.50 13.12        1.88   0.62   5.00     5.00
##   Not like me          14.97  7.40        6.37   2.07   4.99     9.98
##   A little like me     15.16 10.98        2.27   4.22   7.43     4.09
##   Somewhat like me      9.32 17.84        5.57   3.25   6.20     4.70
##   Like me               8.72  9.06        7.65   5.74   6.01     5.49
##   Very much like me     8.19  6.67        4.58   5.87   4.88     3.60
##
##                      Switzerland United Kingdom
##   Not like me at all        1.25           5.00
##   Not like me               2.58           9.29
##   A little like me          1.20           9.43
##   Somewhat like me          2.62           6.08
##   Like me                   5.28           7.59
##   Very much like me         7.65           7.67
## [1] "ipeqopt_r :  Important that people are treated equally and have equal opportunities"
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all      47       8      53      51     18      48
##   Not like me             86      54     212     329     71     194
##   A little like me       296     117     568     420    271     240
##   Somewhat like me       902     699    1362    1059    644     750
##   Like me               1800    1680    1627    1627   1215    2340
##   Very much like me     1333     957     751     422   1825    1581
##   <NA>                    45      18      94      15     36      57
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all      34    31          11     12     20        8
##   Not like me            129   112          65    104     80       54
##   A little like me       438   402          77    292    223       48
##   Somewhat like me       854  1727         501    437    575      222
##   Like me               1937  1834        1871   1318   1425     1325
##   Very much like me     1542  1121         805    763    809      940
##   <NA>                    39   144          24     25     62       28
##
##                      Switzerland United Kingdom
##   Not like me at all          21             28
##   Not like me                102            139
##   A little like me           178            326
##   Somewhat like me           426            663
##   Like me                   1342           1661
##   Very much like me          962           1304
##   <NA>                        36             42
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all   12.05    2.05   13.59   13.08   4.62   12.31
##   Not like me           4.97    3.12   12.25   19.01   4.10   11.21
```

```
##   A little like me      7.60    3.00   14.58   10.78   6.96    6.16
##   Somewhat like me      8.34    6.46   12.59    9.79   5.95    6.93
##   Like me               7.83    7.30    7.07    7.07   5.28   10.17
##   Very much like me     8.82    6.33    4.97    2.79  12.07   10.46
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all    8.72  7.95        2.82   3.08   5.13     2.05
##   Not like me           7.45  6.47        3.76   6.01   4.62     3.12
##   A little like me     11.24 10.32        1.98   7.49   5.72     1.23
##   Somewhat like me      7.89 15.96        4.63   4.04   5.31     2.05
##   Like me               8.42  7.97        8.13   5.73   6.20     5.76
##   Very much like me    10.20  7.42        5.33   5.05   5.35     6.22
##
##                       Switzerland United Kingdom
##   Not like me at all         5.38           7.18
##   Not like me                5.89           8.03
##   A little like me           4.57           8.37
##   Somewhat like me           3.94           6.13
##   Like me                    5.83           7.22
##   Very much like me          6.36           8.63
## [1] "ipudrst_r :  Important to understand different people"
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all       63       9      96      15     37      18
##   Not like me             129      72     296     137    142     108
##   A little like me        360     170     815     343    482     223
##   Somewhat like me       1168     852    1628     956    823     787
##   Like me                1728    1811    1357    1899   1412    2707
##   Very much like me      1011     602     384     560   1150    1310
##   <NA>                     50      17      91      13     34      57
##
##                       Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all       33    37          11      4     19        8
##   Not like me             177   126         104     63    122       81
##   A little like me        530   583         178    319    382      116
##   Somewhat like me        940  1857         779    594    698      375
##   Like me                2166  1818        1765   1436   1427     1525
##   Very much like me      1088   770         489    512    461      495
##   <NA>                     39   180          28     23     85       25
##
##                       Switzerland United Kingdom
##   Not like me at all            7             26
##   Not like me                  55            126
##   A little like me            120            364
##   Somewhat like me            535            716
##   Like me                    1550           1945
##   Very much like me           768            944
##   <NA>                         32             42
##
##                       Austria Belgium Czechia Estonia France Germany
##   Not like me at all   16.45    2.35   25.07    3.92   9.66    4.70
##   Not like me           7.42    4.14   17.03    7.88   8.17    6.21
##   A little like me      7.22    3.41   16.35    6.88   9.67    4.47
##   Somewhat like me      9.19    6.70   12.81    7.52   6.48    6.19
```

```
##   Like me               7.04    7.38    5.53    7.74   5.75   11.03
##   Very much like me     9.59    5.71    3.64    5.31  10.91   12.42
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all    8.62  9.66        2.87   1.04   4.96     2.09
##   Not like me          10.18  7.25        5.98   3.62   7.02     4.66
##   A little like me     10.63 11.70        3.57   6.40   7.66     2.33
##   Somewhat like me      7.40 14.61        6.13   4.67   5.49     2.95
##   Like me               8.82  7.41        7.19   5.85   5.81     6.21
##   Very much like me    10.32  7.30        4.64   4.86   4.37     4.69
##
##                      Switzerland United Kingdom
##   Not like me at all        1.83           6.79
##   Not like me               3.16           7.25
##   A little like me          2.41           7.30
##   Somewhat like me          4.21           5.63
##   Like me                   6.31           7.92
##   Very much like me         7.28           8.95
## [1] "impenv_r :  Important to care for nature and environment"
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all      34      10      27       5     33      16
##   Not like me             66      29     132      52    157     113
##   A little like me       253     158     432     180    491     274
##   Somewhat like me       757     717    1200     667    648     856
##   Like me               1636    1698    1638    1808   1275    2206
##   Very much like me     1732     910    1173    1198   1442    1697
##   <NA>                    31      11      65      13     34      48
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all      35    14          16     13      7        3
##   Not like me            131    51          68    132     55       25
##   A little like me       423   282         163    381    187       51
##   Somewhat like me       897  1223         730    631    569      231
##   Like me               1825  1921        1609   1207   1390     1198
##   Very much like me     1628  1759         745    563    928     1099
##   <NA>                    34   121          23     24     58       18
##
##                      Switzerland United Kingdom
##   Not like me at all           4             18
##   Not like me                 33            134
##   A little like me           120            350
##   Somewhat like me           460            713
##   Like me                   1269           1588
##   Very much like me         1156           1322
##   <NA>                        25             38
##
##                      Austria Belgium Czechia Estonia France Germany
##   Not like me at all   14.47    4.26   11.49    2.13  14.04    6.81
##   Not like me           5.60    2.46   11.21    4.41  13.33    9.59
##   A little like me      6.76    4.22   11.54    4.81  13.11    7.32
##   Somewhat like me      7.35    6.96   11.65    6.48   6.29    8.31
##   Like me               7.35    7.63    7.36    8.12   5.73    9.91
##   Very much like me     9.98    5.24    6.76    6.90   8.31    9.78
```

```
##
##                      Ireland Italy Netherlands Norway Poland Slovenia
##   Not like me at all   14.89  5.96        6.81   5.53   2.98     1.28
##   Not like me          11.12  4.33        5.77  11.21   4.67     2.12
##   A little like me     11.30  7.53        4.35  10.17   4.99     1.36
##   Somewhat like me      8.71 11.87        7.09   6.13   5.52     2.24
##   Like me               8.20  8.63        7.23   5.42   6.24     5.38
##   Very much like me     9.38 10.14        4.29   3.24   5.35     6.33
##
##                      Switzerland United Kingdom
##   Not like me at all        1.70           7.66
##   Not like me               2.80          11.38
##   A little like me          3.20           9.35
##   Somewhat like me          4.47           6.92
##   Like me                   5.70           7.13
##   Very much like me         6.66           7.62
```

```
#Assign weight and survey stucture for ESS data
ds_filtradaAll %>% group_by(essround,cntry) %>%
  summarise(pesos=round(sum(dweight),0), n=n(), diff=n-pesos) %>%
  summarise(Diff_Pesos_N=sum(diff))
```

```
## # A tibble: 2 x 2
##   essround   Diff_Pesos_N
##   <labelled>        <dbl>
## 1 8                     0
## 2 9                     0
```

```
ds_filtradaAll$gndrD <- ifelse(ds_filtradaAll$gndr == 1, 0,
                               ifelse(ds_filtradaAll$gndr == 2, 1,ds_filtradaAll$gndr))
var_lab(ds_filtradaAll$gndrD) <- "Gender (Female)"
use_labels(ds_filtradaAll,table(gndrD,as.character(cntry)))
```

```
##
## Gender (Female) Austria Belgium Czechia Estonia France Germany Ireland
##               0    2054    1755    2146    1762   1866    2720    2407
##               1    2455    1778    2521    2161   2214    2490    2566
##
## Gender (Female) Italy Netherlands Norway Poland Slovenia Switzerland
##               0  2581        1585   1607   1517     1208        1563
##               1  2790        1769   1344   1675     1417        1504
##
## Gender (Female) United Kingdom
##               0           1870
##               1           2293
```

```
val_lab(ds_filtradaAll$eisced)
```

```
##             Not possible to harmonise into ES-ISCED
##                                                   0
##              ES-ISCED I , less than lower secondary
##                                                   1
##                         ES-ISCED II, lower secondary
##                                                   2
##           ES-ISCED IIIb, lower tier upper secondary
##                                                   3
```

```
##           ES-ISCED IIIa, upper tier upper secondary
##                                                   4
##        ES-ISCED IV, advanced vocational, sub-degree
##                                                   5
##     ES-ISCED V1, lower tertiary education, BA level
##                                                   6
## ES-ISCED V2, higher tertiary education, >= MA level
##                                                   7
##                                               Other
##                                                  55
##                                             Refusal
##                                                  77
##                                          Don't know
##                                                  88
##                                           No answer
##                                                  99
```

```
ds_filtradaAll$eiscedT <- ifelse(ds_filtradaAll$eisced %in% c(1,2,3) , 1,
                            ifelse(ds_filtradaAll$eisced %in% c(4,5),2,
                                   ifelse(ds_filtradaAll$eisced %in% c(6,7), 3,NA)))
val_lab(ds_filtradaAll$eiscedT) = num_lab("
            1 Less than Upper secondary
            2 Upper secondary or vocational
            3 Bachelor or higher
")
var_lab(ds_filtradaAll$eiscedT) <- var_lab(ds_filtradaAll$eisced)
use_labels(ds_filtradaAll,table(eiscedT,as.character(cntry)))
```

```
##
## Highest level of education, ES - ISCED eiscedT Austria Belgium Czechia
##                   Less than Upper secondary        3097    1192    1952
##                   Upper secondary or vocational     807    1086    2022
##                   Bachelor or higher                594    1233     688
##
## Highest level of education, ES - ISCED eiscedT Estonia France Germany
##                   Less than Upper secondary         805   2006    2551
##                   Upper secondary or vocational    1987   1292    1308
##                   Bachelor or higher               1129    776    1324
##
## Highest level of education, ES - ISCED eiscedT Ireland Italy Netherlands
##                   Less than Upper secondary        1750  2812        1823
##                   Upper secondary or vocational    1886  1832         457
##                   Bachelor or higher               1311   677        1053
##
## Highest level of education, ES - ISCED eiscedT Norway Poland Slovenia
##                   Less than Upper secondary       1040   1628     1034
##                   Upper secondary or vocational    708    825     1061
##                   Bachelor or higher              1189    726      522
##
## Highest level of education, ES - ISCED eiscedT Switzerland United Kingdom
##                   Less than Upper secondary            1687           1605
##                   Upper secondary or vocational         744           1277
##                   Bachelor or higher                    624           1172
```

```
eiscedD <- as.dichotomy(ds_filtradaAll$eiscedT, prefix="eisced")
names(eiscedD)
```

```
## [1] "eisced1" "eisced2" "eisced3"
```

```
val_lab(ds_filtradaAll$domicil)
```

```
##                       A big city Suburbs or outskirts of big city
##                                1                                2
##               Town or small city                  Country village
##                                3                                4
##      Farm or home in countryside                          Refusal
##                                5                                7
##                       Don't know                         No answer
##                                8                                9
```

```
ds_filtradaAll$domicilT <- ifelse(ds_filtradaAll$domicil %in% c(4,5) , 1,
                                  ifelse(ds_filtradaAll$domicil %in% c(3) , 2,
                                         ifelse(ds_filtradaAll$domicil %in% c(2),3,
                                                ifelse(ds_filtradaAll$domicil %in% c(1),4,NA))))

val_lab(ds_filtradaAll$domicilT) <- num_lab("
             1 Countryside
             2 Town or small city
             3 Suburbs or outskirts of big city
             4 A big city
")
var_lab(ds_filtradaAll$domicilT) <- var_lab(ds_filtradaAll$domicil)
use_labels(ds_filtradaAll,table(domicilT,as.character(cntry)))
```

```
##
## Domicile, respondent's description domicilT Austria Belgium Czechia
##            Countryside                        2054    1790    1436
##            Town or small city                 1085     871    1510
##            Suburbs or outskirts of big city    358     310     179
##            A big city                         1012     562    1542
##
## Domicile, respondent's description domicilT Estonia France Germany Ireland
##            Countryside                        1127   1444    1719    2078
##            Town or small city                 1246   1441    1925    1444
##            Suburbs or outskirts of big city    369    512     778    1016
##            A big city                         1180    682     787     428
##
## Domicile, respondent's description domicilT Italy Netherlands Norway
##            Countryside                       2529        1530   1085
##            Town or small city                1880         879    915
##            Suburbs or outskirts of big city   322         312    494
##            A big city                         628         633    452
##
## Domicile, respondent's description domicilT Poland Slovenia Switzerland
##            Countryside                        1426     1441        1714
##            Town or small city                 1021      573         851
##            Suburbs or outskirts of big city     85      289         243
##            A big city                         655      318         259
##
```

```
## Domicile, respondent's description domicilT United Kingdom
##            Countryside                                1076
##            Town or small city                         1893
##            Suburbs or outskirts of big city            817
##            A big city                                  373
```

```
domicilD <- as.dichotomy(ds_filtradaAll$domicilT, prefix="domicil")
names(domicilD)
```

```
## [1] "domicil1" "domicil2" "domicil3" "domicil4"
```

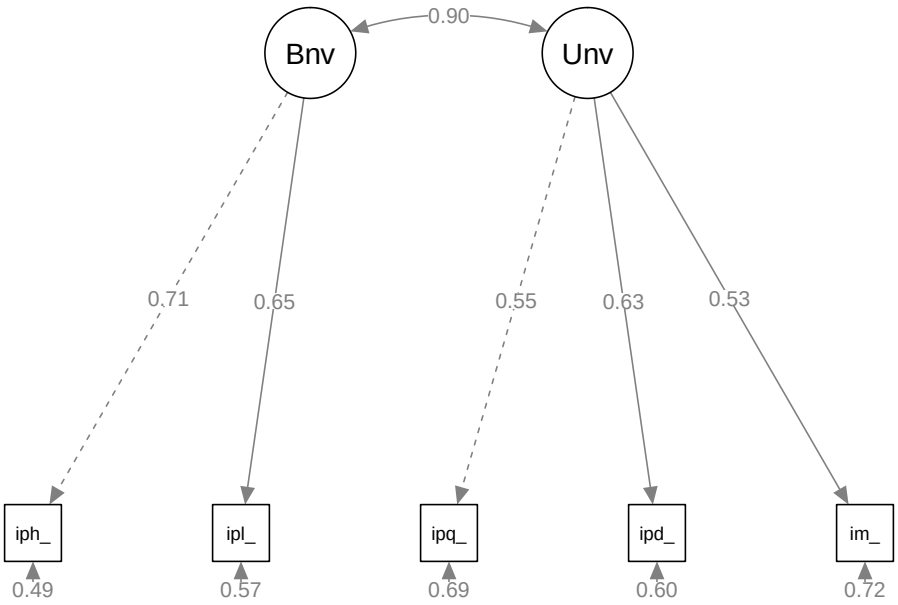
```
ds_filtradaAll <- cbind(ds_filtradaAll, eiscedD, domicilD)
ds_filtradaAll <- ds_filtradaAll[,!colnames(ds_filtradaAll) %in% c("eisced55")]


ds_filtradacntry <- ds_filtradaAll %>% group_by(essround,cntry) %>%
  summarise(n = n(),
            CntryAge = mean(agea, na.rm = TRUE),
            CntryFemale = sum(gndrD, na.rm = TRUE)/ n,
            CntryEisced1 = sum(eisced1,na.rm=TRUE)/ n,
            CntryEisced2 = sum(eisced2,na.rm=TRUE)/ n,
            CntryEisced3 = sum(eisced3,na.rm=TRUE)/ n,
            CntryDomici1 = sum(domicil1,na.rm=TRUE)/ n,
            CntryDomici2 = sum(domicil2,na.rm=TRUE)/ n,
            CntryDomici3 = sum(domicil3,na.rm=TRUE)/ n,
            CntryDomici4 = sum(domicil4,na.rm=TRUE)/ n) %>% select(-n)

ds_filtradaAll <- left_join(ds_filtradaAll,ds_filtradacntry, by=c("essround","cntry"))
```

Model CFA

```
model3<-'
Benev =~ iphlppl_r + iplylfr_r
Unive =~ ipeqopt_r + ipudrst_r +impenv_r
Benev ~~ Unive
'
for (r in c(8,9)) {
  ds_filtrada <- ds_filtradaAll %>% filter(essround == r)
  survey.design <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada)

  lavaan.fit3 <- lavaan(model3, data=ds_filtrada, auto.fix.first=TRUE,
                        auto.var=TRUE, int.ov.free=TRUE,
                        auto.cov.lv.x=TRUE,estimator="MLM",
                        cluster = "cntry", meanstructure=TRUE)
  survey.fit3 <- lavaan.survey(lavaan.fit=lavaan.fit3,survey.design=survey.design)
  assign(paste0("survey.fit3r",r),survey.fit3)

  print(paste("ESS round: ", r))
  print(fitMeasures(survey.fit3, c("chisq","pvalue","cfi", "tli","rmsea", "srmr",
  print(modindices(survey.fit3,sort=T)[1:10,])

  cov <- round(cov(ds_filtrada[,items], use="complete.obs"),3)
  print(lowerMat(cov, digits=3))
  print(round(colMeans(ds_filtrada[,items], na.rm = TRUE),3))
  print(fitted(survey.fit3))
```

```
  invisible(semPaths(survey.fit3,"model","std","lisrel", edge.label.cex = 0.8, intercepts = FALSE, optim
  print(summary(survey.fit3, standardized=T, rsquare=T, fit.measures=T))
}
```

```
## [1] "ESS round:  8"
##         chisq        pvalue           cfi           tli         rmsea
##       243.650         0.000         0.990         0.976         0.047
##          srmr  chisq.scaled pvalue.scaled    cfi.robust    tli.robust
##         0.014       119.625         0.000         0.991         0.976
##  rmsea.robust  srmr_bentler
##         0.046         0.014
##          lhs op       rhs      mi    epc sepc.lv sepc.all sepc.nox
## 32 iplylfr_r ~~  impenv_r 166.589  0.065   0.065    0.109    0.109
## 21     Benev =~ ipeqopt_r 130.387 -0.830  -0.583   -0.543   -0.543
## 35 ipudrst_r ~~  impenv_r 130.387 -0.075  -0.075   -0.106   -0.106
## 23     Benev =~  impenv_r  91.091  0.634   0.445    0.431    0.431
## 33 ipeqopt_r ~~ ipudrst_r  91.091  0.068   0.068    0.094    0.094
## 30 iplylfr_r ~~ ipeqopt_r  64.763 -0.043  -0.043   -0.070   -0.070
## 28 iphlppl_r ~~ ipudrst_r  29.456  0.034   0.034    0.060    0.060
## 31 iplylfr_r ~~ ipudrst_r  17.367 -0.023  -0.023   -0.041   -0.041
## 29 iphlppl_r ~~  impenv_r  12.375 -0.020  -0.020   -0.033   -0.033
## 27 iphlppl_r ~~ ipeqopt_r   5.289 -0.014  -0.014   -0.022   -0.022
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.944
## iplylfr_r 0.401  0.791
## ipeqopt_r 0.354  0.276  1.124
## ipudrst_r 0.409  0.329  0.398  1.069
## impenv_r  0.332  0.318  0.321  0.318  1.052
##  [1] 0.401 0.354 0.409 0.332 0.276 0.329 0.318 0.398 0.321 0.318
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##     4.813     5.062     4.806     4.645     4.827
## $cov
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.969
## iplylfr_r 0.413  0.814
## ipeqopt_r 0.375  0.314  1.154
## ipudrst_r 0.415  0.347  0.390  1.091
## impenv_r  0.345  0.289  0.324  0.358  1.069
##
## $mean
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##     4.808     5.062     4.797     4.642     4.830
```



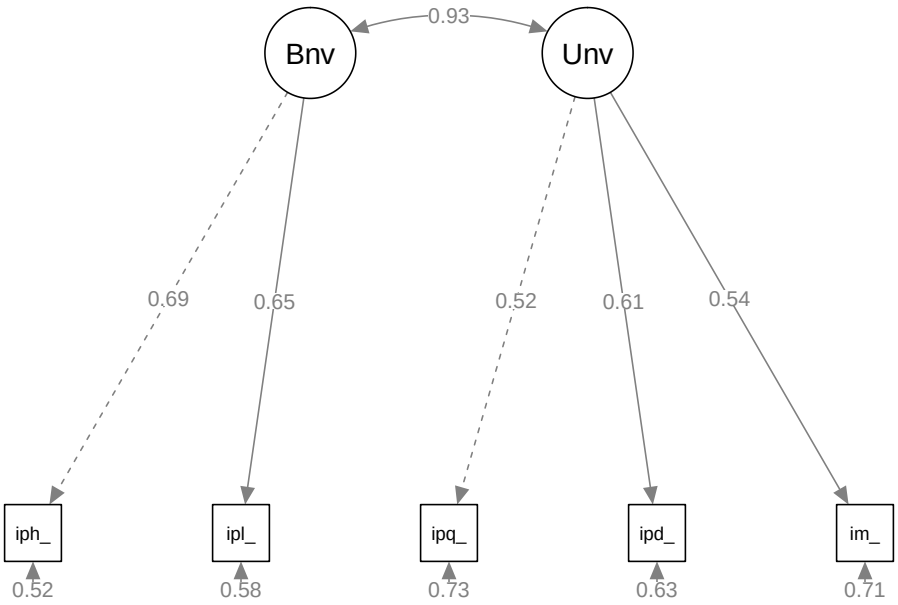

```
## lavaan 0.6-5 ended normally after 27 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         16
##
##   Number of observations                         27533
##
## Model Test User Model:
##                                                Standard      Robust
##   Test Statistic                                243.650     119.625
##   Degrees of freedom                                  4           4
##   P-value (Chi-square)                            0.000       0.000
##   Scaling correction factor                                   2.037
##     for the Satorra-Bentler correction
##
## Model Test Baseline Model:
##
##   Test statistic                             24987.290   12047.652
##   Degrees of freedom                                 10          10
##   P-value                                         0.000       0.000
##   Scaling correction factor                                   2.074
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                     0.990       0.990
```

```
##   Tucker-Lewis Index (TLI)                       0.976       0.976
##
##   Robust Comparative Fit Index (CFI)                         0.991
##   Robust Tucker-Lewis Index (TLI)                            0.976
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)           -183781.903 -183781.903
##   Loglikelihood unrestricted model (H1)   -183660.078 -183660.078
##
##   Akaike (AIC)                             367595.807  367595.807
##   Bayesian (BIC)                           367727.377  367727.377
##   Sample-size adjusted Bayesian (BIC)      367676.529  367676.529
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.047       0.032
##   90 Percent confidence interval - lower         0.042       0.029
##   90 Percent confidence interval - upper         0.052       0.036
##   P-value RMSEA <= 0.05                          0.859       1.000
##
##   Robust RMSEA                                               0.046
##   90 Percent confidence interval - lower                     0.039
##   90 Percent confidence interval - upper                     0.054
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.014       0.014
##
## Parameter Estimates:
##
##   Information                                 Expected
##   Information saturated (h1) model          Structured
##   Standard errors                Robust.cluster.sem
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev =~
##     iphlppl_r        1.000                               0.703    0.714
##     iplylfr_r        0.838    0.016   53.208    0.000    0.588    0.652
##   Unive =~
##     ipeqopt_r        1.000                               0.593    0.552
##     ipudrst_r        1.107    0.023   48.717    0.000    0.657    0.629
##     impenv_r         0.920    0.021   43.140    0.000    0.546    0.528
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev ~~
##     Unive            0.375    0.009   44.019    0.000    0.899    0.899
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        4.808    0.007  715.495    0.000    4.808    4.884
##    .iplylfr_r        5.062    0.006  782.361    0.000    5.062    5.611
```

```
##    .ipeqopt_r         4.797    0.008  595.994    0.000    4.797    4.467
##    .ipudrst_r         4.642    0.007  652.447    0.000    4.642    4.443
##    .impenv_r          4.830    0.007  659.223    0.000    4.830    4.672
##     Benev             0.000                              0.000    0.000
##     Unive             0.000                              0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         0.475    0.010   46.211    0.000    0.475    0.491
##    .iplylfr_r         0.468    0.009   50.853    0.000    0.468    0.575
##    .ipeqopt_r         0.802    0.014   59.144    0.000    0.802    0.695
##    .ipudrst_r         0.660    0.012   54.450    0.000    0.660    0.605
##    .impenv_r          0.771    0.013   60.015    0.000    0.771    0.721
##     Benev             0.494    0.012   40.924    0.000    1.000    1.000
##     Unive             0.352    0.012   29.780    0.000    1.000    1.000
##
## R-Square:
##                    Estimate
##     iphlppl_r         0.509
##     iplylfr_r         0.425
##     ipeqopt_r         0.305
##     ipudrst_r         0.395
##     impenv_r          0.279
##
## $FIT
##                          npar                          fmin
##                        16.000                         0.004
##                         chisq                           df
##                       243.650                         4.000
##                        pvalue                  chisq.scaled
##                         0.000                       119.625
##                    df.scaled                 pvalue.scaled
##                         4.000                         0.000
##          chisq.scaling.factor                baseline.chisq
##                         2.037                     24987.290
##                   baseline.df               baseline.pvalue
##                        10.000                         0.000
##         baseline.chisq.scaled            baseline.df.scaled
##                     12047.652                        10.000
##        baseline.pvalue.scaled baseline.chisq.scaling.factor
##                         0.000                         2.074
##                           cfi                           tli
##                         0.990                         0.976
##                    cfi.scaled                    tli.scaled
##                         0.990                         0.976
##                    cfi.robust                    tli.robust
##                         0.991                         0.976
##                          logl             unrestricted.logl
##                  -183781.903                   -183660.078
##                           aic                           bic
##                    367595.807                    367727.377
##                        ntotal                          bic2
##                     27533.000                    367676.529
##                         rmsea                rmsea.ci.lower
```

```
##                         0.047                         0.042
##                rmsea.ci.upper                  rmsea.pvalue
##                         0.052                         0.859
##                  rmsea.scaled         rmsea.ci.lower.scaled
##                         0.032                         0.029
##         rmsea.ci.upper.scaled           rmsea.pvalue.scaled
##                         0.036                         1.000
##                  rmsea.robust         rmsea.ci.lower.robust
##                         0.046                         0.039
##         rmsea.ci.upper.robust           rmsea.pvalue.robust
##                         0.054                            NA
##                          srmr
##                         0.014
##
## $PE
##          lhs op       rhs exo       est          se         z pvalue
## 1      Benev =~ iphlppl_r   0 1.0000000 0.000000000        NA     NA
## 2      Benev =~ iplylfr_r   0 0.8375965 0.015742027  53.20766      0
## 3      Unive =~ ipeqopt_r   0 1.0000000 0.000000000        NA     NA
## 4      Unive =~ ipudrst_r   0 1.1071194 0.022725711  48.71660      0
## 5      Unive =~  impenv_r   0 0.9200455 0.021326905  43.14013      0
## 6      Benev ~~     Unive   0 0.3745003 0.008507786  44.01854      0
## 7  iphlppl_r ~~ iphlppl_r   0 0.4754309 0.010288166  46.21143      0
## 8  iplylfr_r ~~ iplylfr_r   0 0.4676350 0.009195884  50.85264      0
## 9  ipeqopt_r ~~ ipeqopt_r   0 0.8017269 0.013555415  59.14440      0
## 10 ipudrst_r ~~ ipudrst_r   0 0.6598969 0.012119241  54.45035      0
## 11  impenv_r ~~  impenv_r   0 0.7708772 0.012844673  60.01533      0
## 12     Benev ~~     Benev   0 0.4936012 0.012061425  40.92395      0
## 13     Unive ~~     Unive   0 0.3518548 0.011815240  29.77974      0
## 14 iphlppl_r ~1             0 4.8077075 0.006719411 715.49538      0
## 15 iplylfr_r ~1             0 5.0621424 0.006470338 782.36142      0
## 16 ipeqopt_r ~1             0 4.7974581 0.008049511 595.99369      0
## 17 ipudrst_r ~1             0 4.6416159 0.007114163 652.44726      0
## 18  impenv_r ~1             0 4.8295550 0.007326130 659.22324      0
## 19     Benev ~1             0 0.0000000 0.000000000        NA     NA
## 20     Unive ~1             0 0.0000000 0.000000000        NA     NA
## 21 iphlppl_r r2 iphlppl_r   0 0.5093755          NA        NA     NA
## 22 iplylfr_r r2 iplylfr_r   0 0.4254602          NA        NA     NA
## 23 ipeqopt_r r2 ipeqopt_r   0 0.3050107          NA        NA     NA
## 24 ipudrst_r r2 ipudrst_r   0 0.3952391          NA        NA     NA
## 25  impenv_r r2  impenv_r   0 0.2786888          NA        NA     NA
##       std.lv   std.all   std.nox
## 1  0.7025676 0.7137055 0.7137055
## 2  0.5884681 0.6522731 0.6522731
## 3  0.5931735 0.5522778 0.5522778
## 4  0.6567138 0.6286805 0.6286805
## 5  0.5457466 0.5279099 0.5279099
## 6  0.8986330 0.8986330 0.8986330
## 7  0.4754309 0.4906245 0.4906245
## 8  0.4676350 0.5745398 0.5745398
## 9  0.8017269 0.6949893 0.6949893
## 10 0.6598969 0.6047609 0.6047609
## 11 0.7708772 0.7213112 0.7213112
## 12 1.0000000 1.0000000 1.0000000
```

```
## 13 1.0000000 1.0000000 1.0000000
## 14 4.8077075 4.8839248 4.8839248
## 15 5.0621424 5.6110083 5.6110083
## 16 4.7974581 4.4667024 4.4667024
## 17 4.6416159 4.4434777 4.4434777
## 18 4.8295550 4.6717095 4.6717095
## 19 0.0000000 0.0000000 0.0000000
## 20 0.0000000 0.0000000 0.0000000
## 21        NA        NA        NA
## 22        NA        NA        NA
## 23        NA        NA        NA
## 24        NA        NA        NA
## 25        NA        NA        NA
##
## [1] "ESS round:  9"
##         chisq        pvalue           cfi           tli         rmsea
##       367.163         0.000         0.985         0.961         0.058
##          srmr  chisq.scaled pvalue.scaled    cfi.robust    tli.robust
##         0.017       227.806         0.000         0.985         0.962
##  rmsea.robust  srmr_bentler
##         0.058         0.017
##          lhs op       rhs      mi    epc sepc.lv sepc.all sepc.nox
## 32 iplylfr_r ~~  impenv_r 343.794  0.093   0.093    0.166    0.166
## 33 ipeqopt_r ~~ ipudrst_r 135.389  0.079   0.079    0.107    0.107
## 23     Benev =~  impenv_r 135.388  1.202   0.807    0.815    0.815
## 30 iplylfr_r ~~ ipeqopt_r  94.716 -0.051  -0.051   -0.085   -0.085
## 35 ipudrst_r ~~  impenv_r  86.516 -0.061  -0.061   -0.089   -0.089
## 21     Benev =~ ipeqopt_r  86.515 -0.983  -0.660   -0.625   -0.625
## 31 iplylfr_r ~~ ipudrst_r  72.357 -0.047  -0.047   -0.086   -0.086
## 29 iphlppl_r ~~  impenv_r  58.934 -0.043  -0.043   -0.074   -0.074
## 28 iphlppl_r ~~ ipudrst_r  40.168  0.040   0.040    0.069    0.069
## 22     Benev =~ ipudrst_r   5.674 -0.304  -0.204   -0.198   -0.198
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.917
## iplylfr_r 0.373  0.763
## ipeqopt_r 0.337  0.257  1.100
## ipudrst_r 0.389  0.306  0.366  1.044
## impenv_r  0.315  0.321  0.280  0.305  0.974
##  [1] 0.373 0.337 0.389 0.315 0.257 0.306 0.321 0.366 0.280 0.305
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##     4.847     5.099     4.821     4.667     4.996
## $cov
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.938
## iplylfr_r 0.386  0.781
## ipeqopt_r 0.344  0.294  1.116
## ipudrst_r 0.392  0.335  0.347  1.065
## impenv_r  0.334  0.285  0.295  0.337  0.981
##
## $mean
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##     4.848     5.105     4.826     4.666     5.007
```




```
## lavaan 0.6-5 ended normally after 25 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         16
##
##   Number of observations                         26814
##
## Model Test User Model:
##                                              Standard      Robust
##   Test Statistic                              367.163     227.806
##   Degrees of freedom                                4           4
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 1.612
##     for the Satorra-Bentler correction
##
## Model Test Baseline Model:
##
##   Test statistic                            23474.216   11990.070
##   Degrees of freedom                               10          10
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 1.958
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.985       0.981
```

```
##   Tucker-Lewis Index (TLI)                       0.961       0.953
##
##   Robust Comparative Fit Index (CFI)                         0.985
##   Robust Tucker-Lewis Index (TLI)                            0.962
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)           -176575.647 -176575.647
##   Loglikelihood unrestricted model (H1)   -176392.065 -176392.065
##
##   Akaike (AIC)                             353183.294  353183.294
##   Bayesian (BIC)                           353314.441  353314.441
##   Sample-size adjusted Bayesian (BIC)      353263.593  353263.593
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.058       0.046
##   90 Percent confidence interval - lower         0.053       0.042
##   90 Percent confidence interval - upper         0.063       0.050
##   P-value RMSEA <= 0.05                          0.003       0.961
##
##   Robust RMSEA                                               0.058
##   90 Percent confidence interval - lower                     0.052
##   90 Percent confidence interval - upper                     0.065
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.017       0.017
##
## Parameter Estimates:
##
##   Information                                 Expected
##   Information saturated (h1) model          Structured
##   Standard errors                Robust.cluster.sem
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev =~
##     iphlppl_r        1.000                               0.672    0.693
##     iplylfr_r        0.855    0.015   58.342    0.000    0.574    0.650
##   Unive =~
##     ipeqopt_r        1.000                               0.551    0.522
##     ipudrst_r        1.141    0.022   51.315    0.000    0.629    0.610
##     impenv_r         0.971    0.021   47.048    0.000    0.535    0.540
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev ~~
##     Unive            0.344    0.008   44.355    0.000    0.928    0.928
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        4.848    0.006  768.075    0.000    4.848    5.005
##    .iplylfr_r        5.105    0.006  890.481    0.000    5.105    5.777
```

```
##    .ipeqopt_r         4.826    0.007  704.125    0.000    4.826    4.569
##    .ipudrst_r         4.666    0.007  694.312    0.000    4.666    4.521
##    .impenv_r          5.007    0.006  778.267    0.000    5.007    5.054
##     Benev             0.000                              0.000    0.000
##     Unive             0.000                              0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         0.487    0.010   50.255    0.000    0.487    0.519
##    .iplylfr_r         0.451    0.009   52.311    0.000    0.451    0.577
##    .ipeqopt_r         0.812    0.012   65.039    0.000    0.812    0.727
##    .ipudrst_r         0.669    0.011   58.960    0.000    0.669    0.628
##    .impenv_r          0.695    0.011   65.595    0.000    0.695    0.708
##     Benev             0.451    0.011   41.020    0.000    1.000    1.000
##     Unive             0.304    0.010   30.659    0.000    1.000    1.000
##
## R-Square:
##                    Estimate
##     iphlppl_r         0.481
##     iplylfr_r         0.423
##     ipeqopt_r         0.273
##     ipudrst_r         0.372
##     impenv_r          0.292
##
## $FIT
##                          npar                          fmin
##                        16.000                         0.007
##                         chisq                           df
##                       367.163                         4.000
##                        pvalue                  chisq.scaled
##                         0.000                       227.806
##                     df.scaled                 pvalue.scaled
##                         4.000                         0.000
##          chisq.scaling.factor                 baseline.chisq
##                         1.612                      23474.216
##                   baseline.df               baseline.pvalue
##                        10.000                         0.000
##         baseline.chisq.scaled            baseline.df.scaled
##                     11990.070                        10.000
##        baseline.pvalue.scaled baseline.chisq.scaling.factor
##                         0.000                         1.958
##                           cfi                           tli
##                         0.985                         0.961
##                     cfi.scaled                    tli.scaled
##                         0.981                         0.953
##                     cfi.robust                    tli.robust
##                         0.985                         0.962
##                          logl             unrestricted.logl
##                    -176575.647                   -176392.065
##                           aic                           bic
##                     353183.294                    353314.441
##                         ntotal                          bic2
##                      26814.000                    353263.593
##                          rmsea                rmsea.ci.lower
```

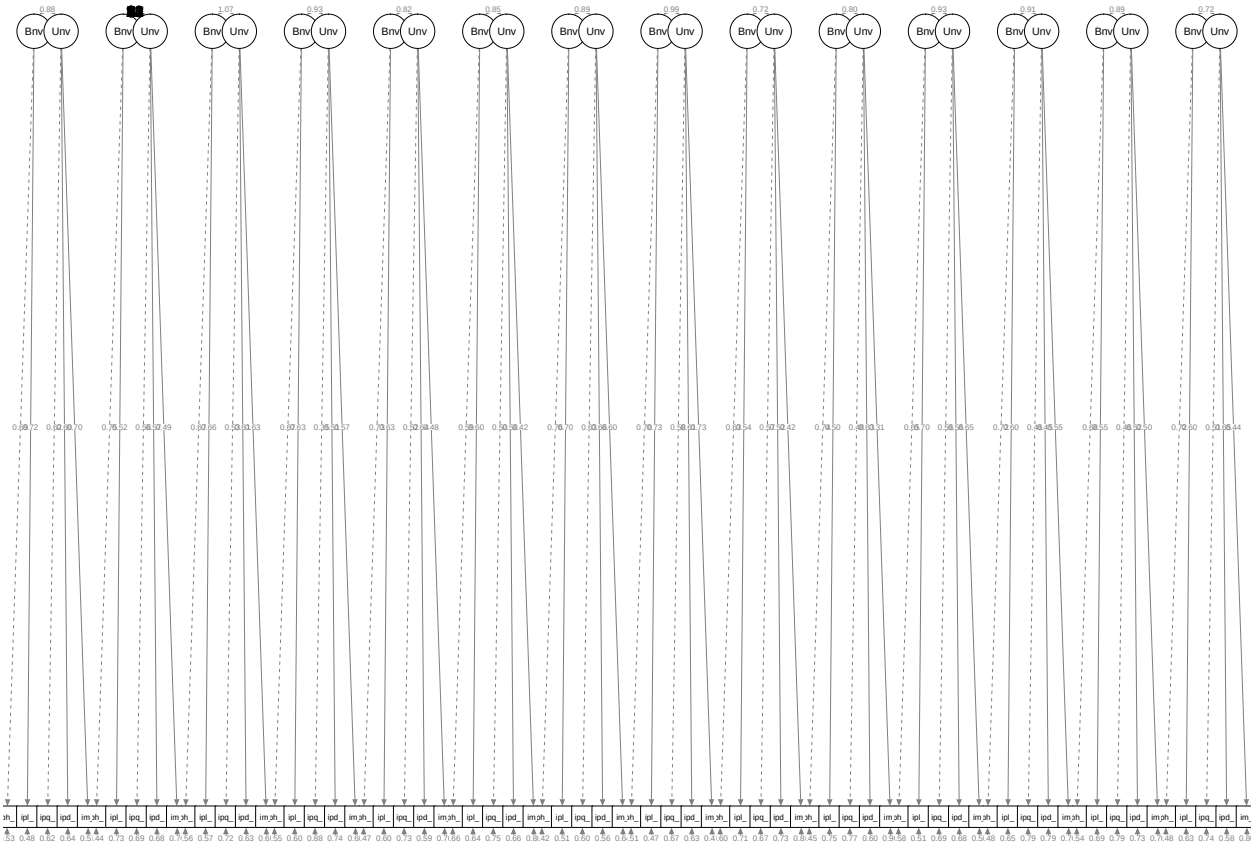
```
##                         0.058                         0.053
##                rmsea.ci.upper                  rmsea.pvalue
##                         0.063                         0.003
##                  rmsea.scaled         rmsea.ci.lower.scaled
##                         0.046                         0.042
##         rmsea.ci.upper.scaled           rmsea.pvalue.scaled
##                         0.050                         0.961
##                  rmsea.robust         rmsea.ci.lower.robust
##                         0.058                         0.052
##         rmsea.ci.upper.robust           rmsea.pvalue.robust
##                         0.065                            NA
##                          srmr
##                         0.017
##
## $PE
##          lhs op       rhs exo       est          se         z pvalue
## 1      Benev =~ iphlppl_r   0 1.0000000 0.000000000        NA     NA
## 2      Benev =~ iplylfr_r   0 0.8554005 0.014661767  58.34225      0
## 3      Unive =~ ipeqopt_r   0 1.0000000 0.000000000        NA     NA
## 4      Unive =~ ipudrst_r   0 1.1414073 0.022243268  51.31473      0
## 5      Unive =~  impenv_r   0 0.9708569 0.020635435  47.04804      0
## 6      Benev ~~     Unive   0 0.3435793 0.007746056  44.35539      0
## 7  iphlppl_r ~~ iphlppl_r   0 0.4872041 0.009694643  50.25498      0
## 8  iplylfr_r ~~ iplylfr_r   0 0.4509434 0.008620465  52.31080      0
## 9  ipeqopt_r ~~ ipeqopt_r   0 0.8116107 0.012478894  65.03867      0
## 10 ipudrst_r ~~ ipudrst_r   0 0.6690088 0.011346803  58.96012      0
## 11  impenv_r ~~  impenv_r   0 0.6947964 0.010592142  65.59546      0
## 12     Benev ~~     Benev   0 0.4510340 0.010995537  41.01973      0
## 13     Unive ~~     Unive   0 0.3040488 0.009917178  30.65880      0
## 14 iphlppl_r ~1             0 4.8478393 0.006311677 768.07474      0
## 15 iplylfr_r ~1             0 5.1052255 0.005733113 890.48052      0
## 16 ipeqopt_r ~1             0 4.8255051 0.006853192 704.12516      0
## 17 ipudrst_r ~1             0 4.6657476 0.006719958 694.31198      0
## 18  impenv_r ~1             0 5.0071978 0.006433781 778.26672      0
## 19     Benev ~1             0 0.0000000 0.000000000        NA     NA
## 20     Unive ~1             0 0.0000000 0.000000000        NA     NA
## 21 iphlppl_r r2 iphlppl_r   0 0.4807245          NA        NA     NA
## 22 iplylfr_r r2 iplylfr_r   0 0.4225851          NA        NA     NA
## 23 ipeqopt_r r2 ipeqopt_r   0 0.2725283          NA        NA     NA
## 24 ipudrst_r r2 ipudrst_r   0 0.3718975          NA        NA     NA
## 25  impenv_r r2  impenv_r   0 0.2920221          NA        NA     NA
##       std.lv   std.all   std.nox
## 1  0.6715906 0.6933430 0.6933430
## 2  0.5744790 0.6500655 0.6500655
## 3  0.5514062 0.5220425 0.5220425
## 4  0.6293791 0.6098340 0.6098340
## 5  0.5353365 0.5403907 0.5403907
## 6  0.9277923 0.9277923 0.9277923
## 7  0.4872041 0.5192755 0.5192755
## 8  0.4509434 0.5774149 0.5774149
## 9  0.8116107 0.7274717 0.7274717
## 10 0.6690088 0.6281025 0.6281025
## 11 0.6947964 0.7079779 0.7079779
## 12 1.0000000 1.0000000 1.0000000
```

```
## 13 1.0000000 1.0000000 1.0000000
## 14 4.8478393 5.0048572 5.0048572
## 15 5.1052255 5.7769405 5.7769405
## 16 4.8255051 4.5685349 4.5685349
## 17 4.6657476 4.5208549 4.5208549
## 18 5.0071978 5.0544719 5.0544719
## 19 0.0000000 0.0000000 0.0000000
## 20 0.0000000 0.0000000 0.0000000
## 21         NA         NA         NA
## 22         NA         NA         NA
## 23         NA         NA         NA
## 24         NA         NA         NA
## 25         NA         NA         NA
```

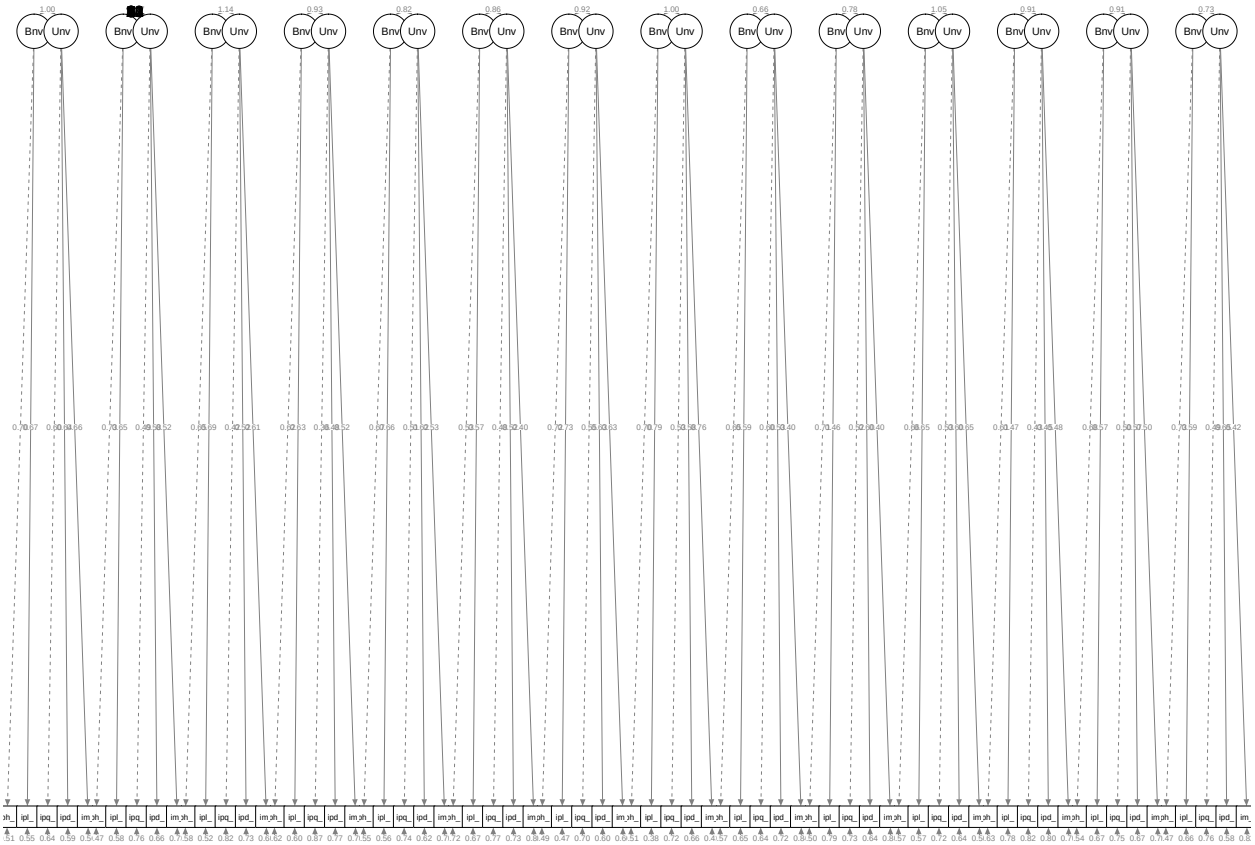
```r
for (r in c(8,9)) {
  ds_filtrada <- ds_filtradaAll %>% filter(essround == r)
  survey.design <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada)

  # 1. CONFIGURAL EQUIVALENCE
  ## Add the "meanstructure" argument to add means/intercepts
  lavaan.conffit3 <- lavaan(model3, data=ds_filtrada,
                            auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                            int.ov.free=TRUE,     #intercepts not fixed to 0
                            meanstructure=TRUE,   #the means of the observed variables enter the model,
                            auto.var=TRUE,        #residual variances and variances of exogeneous laten
                            auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are inclu
                            estimator="MLM",
                            group = "cntry",
                            group.label = countries
                            #group.equal = ...    #vector for multigroup analysis specify the pattern o
                            )
  survey.conffit3 <- lavaan.survey(lavaan.fit=lavaan.conffit3,survey.design=survey.design)
  assign(paste0("survey.conffit3r",r),survey.conffit3)
  # 2. METRIC EQUIVALENCE: set the factor loadings equal across groups

  lavaan.metrfit3 <- lavaan(model3, data=ds_filtrada,
                            auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                            int.ov.free=TRUE,     #intercepts not fixed to 0
                            meanstructure=TRUE,   #the means of the observed variables enter the model, n
                            auto.var=TRUE,        #residual variances and variances of exogeneous latent
                            auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                            estimator="MLM",
                            group = "cntry",
                            group.label = countries,
                            group.equal=c("loadings") #vector for multigroup analysis specify the pattern
                            )
  survey.metrfit3 <- lavaan.survey(lavaan.fit=lavaan.metrfit3,survey.design=survey.design)

  # 3. SCALAR EQUIVALENCE: set the factor loadings and the intercepts equal across groups

  lavaan.scalfit3 <- lavaan(model3, data=ds_filtrada,
                            auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                            int.ov.free=TRUE,     #intercepts not fixed to 0
                            meanstructure=TRUE,   #the means of the observed variables enter the model, n
```

```
                          auto.var=TRUE,         #residual variances and variances of exogeneous latent
                          auto.cov.lv.x=TRUE,    #covariances of exogeneous latent variables are include
                          estimator="MLM",
                          group = "cntry",
                          group.label = countries,
                          group.equal=c("loadings","intercepts"))
  survey.scalfit3 <- lavaan.survey(lavaan.fit=lavaan.scalfit3,survey.design=survey.design)


  # 4. check whether factor variances are equal across groups
  lavaan.varianfit3 <- lavaan(model3, data=ds_filtrada,
                          auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                          int.ov.free=TRUE,     #intercepts not fixed to 0
                          meanstructure=TRUE,   #the means of the observed variables enter the model, n
                          auto.var=TRUE,         #residual variances and variances of exogeneous latent
                          auto.cov.lv.x=TRUE,    #covariances of exogeneous latent variables are include
                          estimator="MLM",
                          group = "cntry",
                          group.label = countries,
                          group.equal=c("loadings","intercepts","lv.variances"))
  survey.varianfit3 <- lavaan.survey(lavaan.fit=lavaan.varianfit3,survey.design=survey.design)


  invar <- data.frame(round(rbind(Configural = fitMeasures(survey.conffit3, c("cfi.robust","tli.robust"
  Metric = fitMeasures(survey.metrfit3, c("cfi.robust","tli.robust", "rmsea.scaled", "srmr_bentler")),
  Scalar = fitMeasures(survey.scalfit3, c("cfi.robust","tli.robust", "rmsea.scaled", "srmr_bentler")),
  Strict = fitMeasures(survey.varianfit3, c("cfi.robust","tli.robust", "rmsea.scaled", "srmr_bentler"))
  dif <- invar %>%
      mutate_all(funs(. - lag(.)))
  print(paste("ESS round: ", r))
  print(cbind(invar,dif))


  invisible(semPaths(survey.conffit3,"equality","std","lisrel", edge.label.cex = 0.8, intercepts = FALS
                     levels = c(1, 2, 4),mar = c(rep(1,14)), optimizeLatRes = TRUE))

}
```

```
## [1] "ESS round:  8"
##            cfi.robust tli.robust rmsea.scaled cfi.robust tli.robust
## Configural      0.983      0.959        0.046         NA         NA
## Metric          0.976      0.965        0.043     -0.007      0.006
## Scalar          0.888      0.883        0.083     -0.088     -0.082
## Strict          0.854      0.872        0.087     -0.034     -0.011
##            rmsea.scaled
## Configural           NA
## Metric           -0.003
## Scalar            0.040
## Strict            0.004
```




```
## [1] "ESS round:  9"
##            cfi.robust tli.robust rmsea.scaled cfi.robust tli.robust
## Configural      0.980      0.951        0.052         NA         NA
## Metric          0.970      0.955        0.051     -0.010      0.004
## Scalar          0.871      0.865        0.093     -0.099     -0.090
## Strict          0.840      0.860        0.094     -0.031     -0.005
##            rmsea.scaled
## Configural           NA
## Metric           -0.001
## Scalar            0.042
## Strict            0.001
```

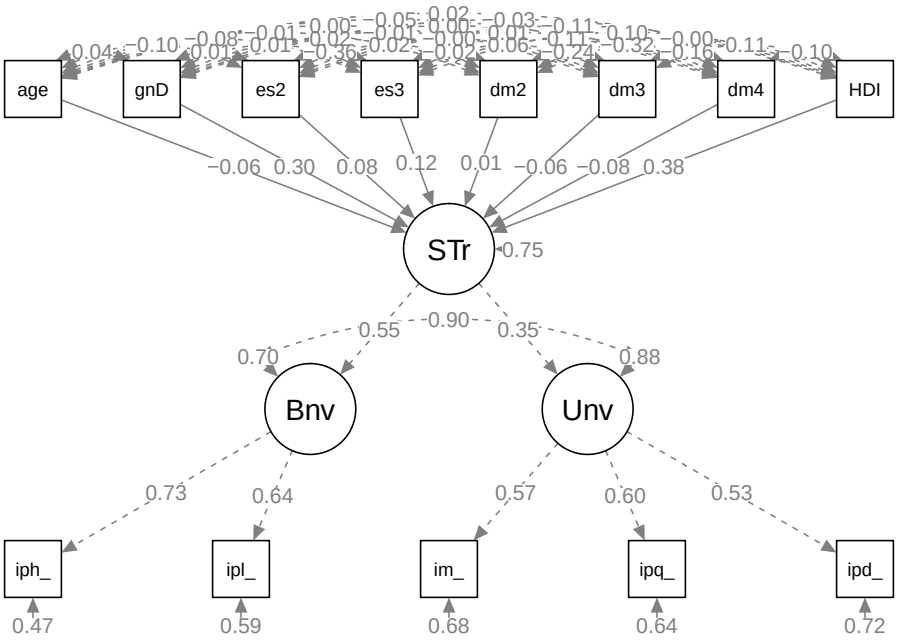


Model SEM

```
semmodel <-'
Benev =~ 1*iphlppl_r + 0.8*iplylfr_r
Unive =~ 1*impenv_r + 1.1*ipeqopt_r + 0.9*ipudrst_r
Unive ~~ 0.3*Benev
STrasc =~ 1*Unive + 1.9*Benev
STrasc ~  agea + gndrD + eisced2 + eisced3 + domicil2 + domicil3 + domicil4 + HDI
'

for (r in c(8,9)) {
  ds_filtrada2 <- ds_filtradaAll %>% filter(essround == r)
  survey.design2 <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada2)

  lavaan.semfit <- lavaan(semmodel, data=ds_filtrada2,
                          auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                          int.ov.free=TRUE,     #intercepts not fixed to 0
                          meanstructure=TRUE,   #the means of the observed variables enter the model, n
                          auto.var=TRUE,        #residual variances and variances of exogeneous latent
                          auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                          estimator="MLM",
                          cluster = "cntry")
  survey.semfit <- lavaan.survey(lavaan.fit=lavaan.semfit,survey.design=survey.design2)
  assign(paste0("survey.semfit",r),survey.semfit)
```

```
  print(paste("ESS round: ", r))
  print(fitMeasures(survey.semfit, c("chisq","pvalue","cfi", "tli","rmsea", "srmr",
  print(modindices(survey.semfit,sort=T)[1:10,])
  invisible(semPaths(survey.semfit,"model","std","lisrel", edge.label.cex = 0.8, intercepts = FALSE, op

  print(summary(survey.semfit, standardized=T, rsquare=T, fit.measures=T))

}
```

```
## [1] "ESS round:  8"
##         chisq        pvalue           cfi           tli         rmsea
##      2885.261         0.000         0.899         0.871         0.052
##          srmr  chisq.scaled pvalue.scaled    cfi.robust    tli.robust
##         0.029      1015.678         0.000         0.902         0.874
##  rmsea.robust  srmr_bentler
##         0.051         0.029
##          lhs op       rhs      mi    epc sepc.lv sepc.all sepc.nox
## 79     Benev =~ ipudrst_r 503.880  0.225   0.161    0.160    0.160
## 86    STrasc =~ ipudrst_r 494.449  0.999   0.207    0.206    0.206
## 5      Unive =~ ipudrst_r 449.591  0.274   0.162    0.162    0.162
## 84    STrasc =~  impenv_r 256.311 -0.745  -0.155   -0.147   -0.147
## 78     Benev =~ ipeqopt_r 150.009 -0.138  -0.099   -0.090   -0.090
## 4      Unive =~ ipeqopt_r 137.892 -0.173  -0.103   -0.094   -0.094
## 91 iplylfr_r ~~  impenv_r 136.323  0.054   0.054    0.090    0.090
## 96 ipeqopt_r ~~ ipudrst_r 127.261  0.069   0.069    0.092    0.092
## 90 iphlppl_r ~~ ipudrst_r 104.305  0.049   0.049    0.085    0.085
## 92 iplylfr_r ~~ ipeqopt_r  96.582 -0.047  -0.047   -0.078   -0.078
```




```
## lavaan 0.6-5 ended normally after 39 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         21
##
##   Number of observations                         27310
##
## Model Test User Model:
##                                              Standard      Robust
##   Test Statistic                             2885.261    1015.678
##   Degrees of freedom                               39          39
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.841
##     for the Satorra-Bentler correction
##
## Model Test Baseline Model:
##
##   Test statistic                            28331.529   10978.076
##   Degrees of freedom                               50          50
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 2.581
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.899       0.911
```

```
##   Tucker-Lewis Index (TLI)                       0.871       0.885
##
##   Robust Comparative Fit Index (CFI)                         0.902
##   Robust Tucker-Lewis Index (TLI)                            0.874
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)           -322326.161 -322326.161
##   Loglikelihood unrestricted model (H1)   -320883.531 -320883.531
##
##   Akaike (AIC)                             644694.322  644694.322
##   Bayesian (BIC)                           644866.837  644866.837
##   Sample-size adjusted Bayesian (BIC)      644800.100  644800.100
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.052       0.030
##   90 Percent confidence interval - lower         0.050       0.029
##   90 Percent confidence interval - upper         0.053       0.031
##   P-value RMSEA <= 0.05                          0.040       1.000
##
##   Robust RMSEA                                               0.051
##   90 Percent confidence interval - lower                     0.048
##   90 Percent confidence interval - upper                     0.054
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.029       0.029
##
## Parameter Estimates:
##
##   Information                                 Expected
##   Information saturated (h1) model          Structured
##   Standard errors                Robust.cluster.sem
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev =~
##     iphlppl_r        1.000                               0.717    0.726
##     iplylfr_r        0.800                               0.573    0.639
##   Unive =~
##     impenv_r         1.000                               0.594    0.566
##     ipeqopt_r        1.100                               0.653    0.596
##     ipudrst_r        0.900                               0.534    0.531
##   STrasc =~
##     Unive            1.000                               0.350    0.350
##     Benev            1.900                               0.550    0.550
##
## Regressions:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   STrasc ~
##     agea            -0.001    0.000   -3.488    0.000   -0.003   -0.055
##     gndrD            0.124    0.006   19.088    0.000    0.597    0.298
##     eisced2          0.034    0.008    4.431    0.000    0.165    0.076
```

```
##     eisced3           0.061    0.008    7.789    0.000    0.292    0.122
##     domicil2          0.005    0.007    0.629    0.530    0.022    0.011
##     domicil3         -0.044    0.011   -4.065    0.000   -0.210   -0.065
##     domicil4         -0.042    0.010   -4.172    0.000   -0.204   -0.077
##     HDI               2.960    0.115   25.788    0.000   14.260    0.376
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##  .Benev ~~
##    .Unive             0.300                               0.902    0.902
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        -0.393    0.199   -1.971    0.049   -0.393   -0.398
##    .iplylfr_r         0.904    0.159    5.668    0.000    0.904    1.007
##    .impenv_r          2.094    0.105   19.934    0.000    2.094    1.995
##    .ipeqopt_r         1.789    0.116   15.482    0.000    1.789    1.634
##    .ipudrst_r         2.179    0.095   23.045    0.000    2.179    2.167
##    .Benev             0.000                               0.000    0.000
##    .Unive             0.000                               0.000    0.000
##    .STrasc            0.000                               0.000    0.000
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         0.460    0.009   50.701    0.000    0.460    0.472
##    .iplylfr_r         0.476    0.008   56.401    0.000    0.476    0.592
##    .impenv_r          0.749    0.012   60.583    0.000    0.749    0.680
##    .ipeqopt_r         0.773    0.013   57.234    0.000    0.773    0.644
##    .ipudrst_r         0.726    0.011   67.276    0.000    0.726    0.718
##    .Benev             0.358    0.009   38.371    0.000    0.697    0.697
##    .Unive             0.309    0.005   62.776    0.000    0.878    0.878
##    .STrasc            0.032    0.003    9.655    0.000    0.749    0.749
##
## R-Square:
##                   Estimate
##     iphlppl_r         0.528
##     iplylfr_r         0.408
##     impenv_r          0.320
##     ipeqopt_r         0.356
##     ipudrst_r         0.282
##     Benev             0.303
##     Unive             0.122
##     STrasc            0.251
##
## $FIT
##                         npar                         fmin
##                       21.000                        0.053
##                        chisq                           df
##                     2885.261                       39.000
##                       pvalue                 chisq.scaled
##                        0.000                     1015.678
##                   df.scaled                pvalue.scaled
##                       39.000                        0.000
##          chisq.scaling.factor               baseline.chisq
```

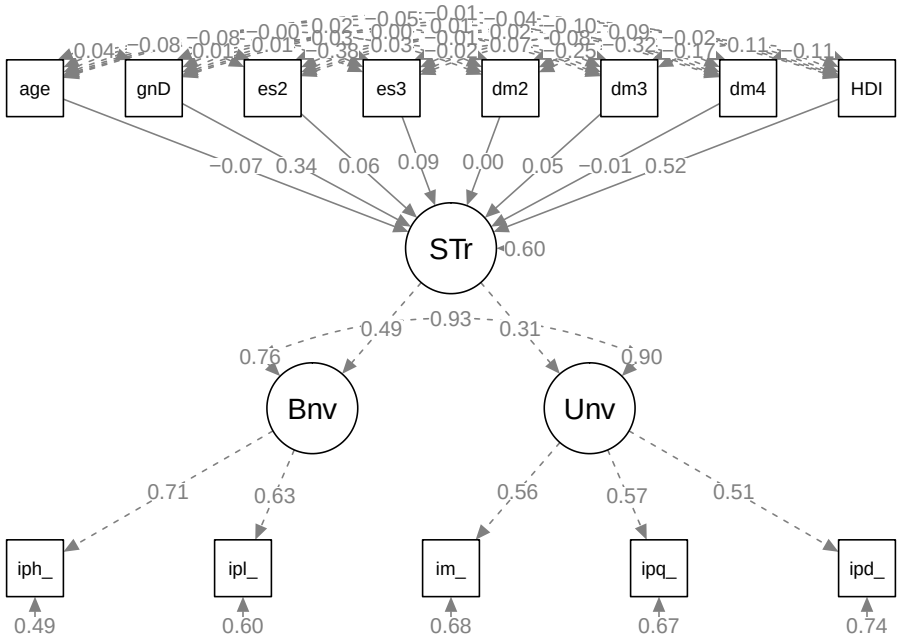
```
##                         2.841                     28331.529
##                   baseline.df                baseline.pvalue
##                        50.000                         0.000
##         baseline.chisq.scaled            baseline.df.scaled
##                     10978.076                        50.000
##        baseline.pvalue.scaled baseline.chisq.scaling.factor
##                         0.000                         2.581
##                           cfi                           tli
##                         0.899                         0.871
##                     cfi.scaled                    tli.scaled
##                         0.911                         0.885
##                     cfi.robust                    tli.robust
##                         0.902                         0.874
##                          logl              unrestricted.logl
##                  -322326.161                   -320883.531
##                           aic                           bic
##                   644694.322                    644866.837
##                       ntotal                          bic2
##                    27310.000                    644800.100
##                         rmsea                rmsea.ci.lower
##                         0.052                         0.050
##                rmsea.ci.upper                   rmsea.pvalue
##                         0.053                         0.040
##                  rmsea.scaled         rmsea.ci.lower.scaled
##                         0.030                         0.029
##         rmsea.ci.upper.scaled           rmsea.pvalue.scaled
##                         0.031                         1.000
##                  rmsea.robust         rmsea.ci.lower.robust
##                         0.051                         0.048
##         rmsea.ci.upper.robust           rmsea.pvalue.robust
##                         0.054                            NA
##                          srmr
##                         0.029
##
## $PE
##          lhs op       rhs exo           est           se          z
## 1      Benev =~ iphlppl_r   0  1.000000e+00 0.0000000000         NA
## 2      Benev =~ iplylfr_r   0  8.000000e-01 0.0000000000         NA
## 3      Unive =~  impenv_r   0  1.000000e+00 0.0000000000         NA
## 4      Unive =~ ipeqopt_r   0  1.100000e+00 0.0000000000         NA
## 5      Unive =~ ipudrst_r   0  9.000000e-01 0.0000000000         NA
## 6      Benev ~~     Unive   0  3.000000e-01 0.0000000000         NA
## 7     STrasc =~     Unive   0  1.000000e+00 0.0000000000         NA
## 8     STrasc =~     Benev   0  1.900000e+00 0.0000000000         NA
## 9     STrasc  ~      agea   0 -6.171642e-04 0.0001769634 -3.4875236
## 10    STrasc  ~     gndrD   0  1.238165e-01 0.0064867175 19.0877000
## 11    STrasc  ~   eisced2   0  3.420031e-02 0.0077180713  4.4311993
## 12    STrasc  ~   eisced3   0  6.065927e-02 0.0077877940  7.7890188
## 13    STrasc  ~  domicil2   0  4.653452e-03 0.0074018455  0.6286881
## 14    STrasc  ~  domicil3   0 -4.364952e-02 0.0107372615 -4.0652372
## 15    STrasc  ~  domicil4   0 -4.232094e-02 0.0101444914 -4.1718148
## 16    STrasc  ~       HDI   0  2.959793e+00 0.1147753046 25.7877202
## 17 iphlppl_r ~~ iphlppl_r   0  4.599150e-01 0.0090710974 50.7011387
## 18 iplylfr_r ~~ iplylfr_r   0  4.764750e-01 0.0084479407 56.4013146
```

```
## 19  impenv_r ~~  impenv_r   0  7.487554e-01 0.0123591599 60.5830353
## 20 ipeqopt_r ~~ ipeqopt_r   0  7.725692e-01 0.0134983624 57.2342908
## 21 ipudrst_r ~~ ipudrst_r   0  7.260320e-01 0.0107917649 67.2764834
## 22     Benev ~~     Benev   0  3.580164e-01 0.0093304905 38.3705906
## 23     Unive ~~     Unive   0  3.092653e-01 0.0049265020 62.7758329
## 24    STrasc ~~    STrasc   0  3.228137e-02 0.0033434243  9.6551813
## 25      agea ~~      agea   1  3.427142e+02 0.0000000000         NA
## 26      agea ~~     gndrD   1  3.514386e-01 0.0000000000         NA
## 27      agea ~~   eisced2   1 -8.641592e-01 0.0000000000         NA
## 28      agea ~~   eisced3   1 -5.996190e-01 0.0000000000         NA
## 29      agea ~~  domicil2   1 -1.137346e-01 0.0000000000         NA
## 30      agea ~~  domicil3   1  1.829517e-02 0.0000000000         NA
## 31      agea ~~  domicil4   1 -3.808200e-01 0.0000000000         NA
## 32      agea ~~       HDI   1  1.074974e-02 0.0000000000         NA
## 33     gndrD ~~     gndrD   1  2.495591e-01 0.0000000000         NA
## 34     gndrD ~~   eisced2   1  1.601448e-03 0.0000000000         NA
## 35     gndrD ~~   eisced3   1  1.828659e-03 0.0000000000         NA
## 36     gndrD ~~  domicil2   1  4.841410e-03 0.0000000000         NA
## 37     gndrD ~~  domicil3   1 -1.962916e-03 0.0000000000         NA
## 38     gndrD ~~  domicil4   1  5.687496e-04 0.0000000000         NA
## 39     gndrD ~~       HDI   1 -4.143478e-04 0.0000000000         NA
## 40   eisced2 ~~   eisced2   1  2.117499e-01 0.0000000000         NA
## 41   eisced2 ~~   eisced3   1 -6.869942e-02 0.0000000000         NA
## 42   eisced2 ~~  domicil2   1  4.305092e-03 0.0000000000         NA
## 43   eisced2 ~~  domicil3   1 -5.878843e-07 0.0000000000         NA
## 44   eisced2 ~~  domicil4   1  1.699807e-03 0.0000000000         NA
## 45   eisced2 ~~       HDI   1 -1.290770e-03 0.0000000000         NA
## 46   eisced3 ~~   eisced3   1  1.747430e-01 0.0000000000         NA
## 47   eisced3 ~~  domicil2   1 -4.430363e-03 0.0000000000         NA
## 48   eisced3 ~~  domicil3   1  7.532168e-03 0.0000000000         NA
## 49   eisced3 ~~  domicil4   1  1.751050e-02 0.0000000000         NA
## 50   eisced3 ~~       HDI   1  1.084568e-03 0.0000000000         NA
## 51  domicil2 ~~  domicil2   1  2.196542e-01 0.0000000000         NA
## 52  domicil2 ~~  domicil3   1 -3.463694e-02 0.0000000000         NA
## 53  domicil2 ~~  domicil4   1 -5.555368e-02 0.0000000000         NA
## 54  domicil2 ~~       HDI   1 -1.246387e-05 0.0000000000         NA
## 55  domicil3 ~~  domicil3   1  9.501091e-02 0.0000000000         NA
## 56  domicil3 ~~  domicil4   1 -1.812802e-02 0.0000000000         NA
## 57  domicil3 ~~       HDI   1  9.243921e-04 0.0000000000         NA
## 58  domicil4 ~~  domicil4   1  1.414393e-01 0.0000000000         NA
## 59  domicil4 ~~       HDI   1 -1.005859e-03 0.0000000000         NA
## 60       HDI ~~       HDI   1  6.960898e-04 0.0000000000         NA
## 61 iphlppl_r ~1             0 -3.925518e-01 0.1992042310 -1.9705996
## 62 iplylfr_r ~1             0  9.035526e-01 0.1594064325  5.6682318
## 63  impenv_r ~1             0  2.093869e+00 0.1050421051 19.9336148
## 64 ipeqopt_r ~1             0  1.788818e+00 0.1155414075 15.4820487
## 65 ipudrst_r ~1             0  2.179400e+00 0.0945732595 23.0445741
## 66      agea ~1             1  5.015694e+01 0.0000000000         NA
## 67     gndrD ~1             1  5.209922e-01 0.0000000000         NA
## 68   eisced2 ~1             1  3.044242e-01 0.0000000000         NA
## 69   eisced3 ~1             1  2.256703e-01 0.0000000000         NA
## 70  domicil2 ~1             1  3.258001e-01 0.0000000000         NA
## 71  domicil3 ~1             1  1.063136e-01 0.0000000000         NA
## 72  domicil4 ~1             1  1.705148e-01 0.0000000000         NA
```

```
## 73       HDI ~1             1  9.089486e-01 0.0000000000         NA
## 74     Benev ~1             0  0.000000e+00 0.0000000000         NA
## 75     Unive ~1             0  0.000000e+00 0.0000000000         NA
## 76    STrasc ~1             0  0.000000e+00 0.0000000000         NA
## 77 iphlppl_r r2 iphlppl_r   0  5.275464e-01           NA         NA
## 78 iplylfr_r r2 iplylfr_r   0  4.082116e-01           NA         NA
## 79  impenv_r r2  impenv_r   0  3.199955e-01           NA         NA
## 80 ipeqopt_r r2 ipeqopt_r   0  3.556072e-01           NA         NA
## 81 ipudrst_r r2 ipudrst_r   0  2.821756e-01           NA         NA
## 82     Benev r2     Benev   0  3.028537e-01           NA         NA
## 83     Unive r2     Unive   0  1.222736e-01           NA         NA
## 84    STrasc r2    STrasc   0  2.507146e-01           NA         NA
##          pvalue        std.lv       std.all       std.nox
## 1            NA  7.166210e-01  7.263239e-01  7.263239e-01
## 2            NA  5.732968e-01  6.389144e-01  6.389144e-01
## 3            NA  5.935892e-01  5.656814e-01  5.656814e-01
## 4            NA  6.529481e-01  5.963281e-01  5.963281e-01
## 5            NA  5.342303e-01  5.312020e-01  5.312020e-01
## 6            NA  9.015799e-01  9.015799e-01  9.015799e-01
## 7            NA  3.496764e-01  3.496764e-01  3.496764e-01
## 8            NA  5.503214e-01  5.503214e-01  5.503214e-01
## 9  4.875159e-04 -2.973366e-03 -5.504456e-02 -2.973366e-03
## 10 0.000000e+00  5.965217e-01  2.979977e-01  5.965217e-01
## 11 9.371043e-06  1.647699e-01  7.582097e-02  1.647699e-01
## 12 6.661338e-15  2.922435e-01  1.221644e-01  2.922435e-01
## 13 5.295533e-01  2.241934e-02  1.050734e-02  2.241934e-02
## 14 4.798363e-05 -2.102941e-01 -6.482072e-02 -2.102941e-01
## 15 3.021832e-05 -2.038933e-01 -7.668106e-02 -2.038933e-01
## 16 0.000000e+00  1.425966e+01  3.762199e-01  1.425966e+01
## 17 0.000000e+00  4.599150e-01  4.724536e-01  4.724536e-01
## 18 0.000000e+00  4.764750e-01  5.917884e-01  5.917884e-01
## 19 0.000000e+00  7.487554e-01  6.800045e-01  6.800045e-01
## 20 0.000000e+00  7.725692e-01  6.443928e-01  6.443928e-01
## 21 0.000000e+00  7.260320e-01  7.178244e-01  7.178244e-01
## 22 0.000000e+00  6.971463e-01  6.971463e-01  6.971463e-01
## 23 0.000000e+00  8.777264e-01  8.777264e-01  8.777264e-01
## 24 0.000000e+00  7.492854e-01  7.492854e-01  7.492854e-01
## 25           NA  3.427142e+02  1.000000e+00  3.427142e+02
## 26           NA  3.514386e-01  3.800115e-02  3.514386e-01
## 27           NA -8.641592e-01 -1.014416e-01 -8.641592e-01
## 28           NA -5.996190e-01 -7.748354e-02 -5.996190e-01
## 29           NA -1.137346e-01 -1.310861e-02 -1.137346e-01
## 30           NA  1.829517e-02  3.206149e-03  1.829517e-02
## 31           NA -3.808200e-01 -5.469765e-02 -3.808200e-01
## 32           NA  1.074974e-02  2.200894e-02  1.074974e-02
## 33           NA  2.495591e-01  1.000000e+00  2.495591e-01
## 34           NA  1.601448e-03  6.966499e-03  1.601448e-03
## 35           NA  1.828659e-03  8.756814e-03  1.828659e-03
## 36           NA  4.841410e-03  2.067833e-02  4.841410e-03
## 37           NA -1.962916e-03 -1.274759e-02 -1.962916e-03
## 38           NA  5.687496e-04  3.027257e-03  5.687496e-04
## 39           NA -4.143478e-04 -3.143734e-02 -4.143478e-04
## 40           NA  2.117499e-01  1.000000e+00  2.117499e-01
## 41           NA -6.869942e-02 -3.571425e-01 -6.869942e-02
```

```
## 42           NA  4.305092e-03  1.996187e-02  4.305092e-03
## 43           NA -5.878843e-07 -4.144704e-06 -5.878843e-07
## 44           NA  1.699807e-03  9.822065e-03  1.699807e-03
## 45           NA -1.290770e-03 -1.063175e-01 -1.290770e-03
## 46           NA  1.747430e-01  1.000000e+00  1.747430e-01
## 47           NA -4.430363e-03 -2.261360e-02 -4.430363e-03
## 48           NA  7.532168e-03  5.845657e-02  7.532168e-03
## 49           NA  1.751050e-02  1.113816e-01  1.751050e-02
## 50           NA  1.084568e-03  9.833867e-02  1.084568e-03
## 51           NA  2.196542e-01  1.000000e+00  2.196542e-01
## 52           NA -3.463694e-02 -2.397635e-01 -3.463694e-02
## 53           NA -5.555368e-02 -3.151795e-01 -5.555368e-02
## 54           NA -1.246387e-05 -1.007976e-03 -1.246387e-05
## 55           NA  9.501091e-02  1.000000e+00  9.501091e-02
## 56           NA -1.812802e-02 -1.563790e-01 -1.812802e-02
## 57           NA  9.243921e-04  1.136676e-01  9.243921e-04
## 58           NA  1.414393e-01  1.000000e+00  1.414393e-01
## 59           NA -1.005859e-03 -1.013723e-01 -1.005859e-03
## 60           NA  6.960898e-04  1.000000e+00  6.960898e-04
## 61 4.876969e-02 -3.925518e-01 -3.978669e-01 -3.978669e-01
## 62 1.442787e-08  9.035526e-01  1.006970e+00  1.006970e+00
## 63 0.000000e+00  2.093869e+00  1.995425e+00  1.995425e+00
## 64 0.000000e+00  1.788818e+00  1.633702e+00  1.633702e+00
## 65 0.000000e+00  2.179400e+00  2.167047e+00  2.167047e+00
## 66           NA  5.015694e+01  2.709350e+00  5.015694e+01
## 67           NA  5.209922e-01  1.042905e+00  5.209922e-01
## 68           NA  3.044242e-01  6.615574e-01  3.044242e-01
## 69           NA  2.256703e-01  5.398517e-01  2.256703e-01
## 70           NA  3.258001e-01  6.951548e-01  3.258001e-01
## 71           NA  1.063136e-01  3.449070e-01  1.063136e-01
## 72           NA  1.705148e-01  4.533952e-01  1.705148e-01
## 73           NA  9.089486e-01  3.445139e+01  9.089486e-01
## 74           NA  0.000000e+00  0.000000e+00  0.000000e+00
## 75           NA  0.000000e+00  0.000000e+00  0.000000e+00
## 76           NA  0.000000e+00  0.000000e+00  0.000000e+00
## 77           NA            NA            NA            NA
## 78           NA            NA            NA            NA
## 79           NA            NA            NA            NA
## 80           NA            NA            NA            NA
## 81           NA            NA            NA            NA
## 82           NA            NA            NA            NA
## 83           NA            NA            NA            NA
## 84           NA            NA            NA            NA
##
## [1] "ESS round:  9"
##         chisq        pvalue           cfi           tli         rmsea
##      2521.567         0.000         0.906         0.880         0.049
##          srmr  chisq.scaled pvalue.scaled    cfi.robust    tli.robust
##         0.028      1090.818         0.000         0.908         0.882
##  rmsea.robust  srmr_bentler
##         0.048         0.028
##          lhs op       rhs      mi    epc sepc.lv sepc.all sepc.nox
## 79     Benev =~ ipudrst_r 507.855  0.236   0.164    0.165    0.165
## 86    STrasc =~ ipudrst_r 472.916  1.021   0.181    0.182    0.182
```

```
## 5      Unive =~ ipudrst_r 458.670  0.292   0.165    0.166    0.166
## 91 iplylfr_r ~~  impenv_r 305.031  0.077   0.077    0.138    0.138
## 84    STrasc =~  impenv_r 209.970 -0.674  -0.119   -0.119   -0.119
## 4      Unive =~ ipeqopt_r 173.067 -0.204  -0.115   -0.106   -0.106
## 78     Benev =~ ipeqopt_r 164.402 -0.150  -0.104   -0.096   -0.096
## 96 ipeqopt_r ~~ ipudrst_r 137.990  0.071   0.071    0.095    0.095
## 92 iplylfr_r ~~ ipeqopt_r 130.095 -0.054  -0.054   -0.091   -0.091
## 90 iphlppl_r ~~ ipudrst_r  87.714  0.045   0.045    0.078    0.078
```




```
## lavaan 0.6-5 ended normally after 39 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         21
##
##   Number of observations                         26525
##
## Model Test User Model:
##                                                Standard      Robust
##   Test Statistic                             2521.567    1090.818
##   Degrees of freedom                               39          39
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.312
##     for the Satorra-Bentler correction
##
## Model Test Baseline Model:
```

```
##
##   Test statistic                                26486.419   12297.479
##   Degrees of freedom                                   50          50
##   P-value                                           0.000       0.000
##   Scaling correction factor                                     2.154
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                       0.906       0.914
##   Tucker-Lewis Index (TLI)                          0.880       0.890
##
##   Robust Comparative Fit Index (CFI)                            0.908
##   Robust Tucker-Lewis Index (TLI)                               0.882
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)            -310494.282 -310494.282
##   Loglikelihood unrestricted model (H1)    -309233.498 -309233.498
##
##   Akaike (AIC)                              621030.564  621030.564
##   Bayesian (BIC)                            621202.467  621202.467
##   Sample-size adjusted Bayesian (BIC)       621135.729  621135.729
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                             0.049       0.032
##   90 Percent confidence interval - lower            0.047       0.031
##   90 Percent confidence interval - upper            0.051       0.033
##   P-value RMSEA <= 0.05                             0.845       1.000
##
##   Robust RMSEA                                                  0.048
##   90 Percent confidence interval - lower                        0.046
##   90 Percent confidence interval - upper                        0.051
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                              0.028       0.028
##
## Parameter Estimates:
##
##   Information                                 Expected
##   Information saturated (h1) model          Structured
##   Standard errors                Robust.cluster.sem
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev =~
##     iphlppl_r         1.000                               0.692    0.712
##     iplylfr_r         0.800                               0.554    0.632
##   Unive =~
##     impenv_r          1.000                               0.563    0.564
##     ipeqopt_r         1.100                               0.620    0.575
##     ipudrst_r         0.900                               0.507    0.511
##   STrasc =~
```

```
##     Unive             1.000                           0.314    0.314
##     Benev             1.900                           0.486    0.486
##
## Regressions:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   STrasc ~
##     agea            -0.001    0.000   -3.957    0.000   -0.004   -0.068
##     gndrD            0.119    0.006   20.097    0.000    0.675    0.337
##     eisced2          0.021    0.007    2.971    0.003    0.118    0.055
##     eisced3          0.038    0.007    5.168    0.000    0.214    0.091
##     domicil2         0.000    0.007    0.020    0.984    0.001    0.000
##     domicil3         0.027    0.010    2.734    0.006    0.154    0.049
##     domicil4        -0.006    0.009   -0.726    0.468   -0.035   -0.014
##     HDI              3.731    0.116   32.078    0.000   21.093    0.521
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##  .Benev ~~
##    .Unive            0.300                           0.927    0.927
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r       -1.713    0.204   -8.382    0.000   -1.713   -1.762
##    .iplylfr_r       -0.141    0.164   -0.863    0.388   -0.141   -0.161
##    .impenv_r         1.556    0.108   14.443    0.000    1.556    1.557
##    .ipeqopt_r        1.030    0.118    8.691    0.000    1.030    0.955
##    .ipudrst_r        1.559    0.097   16.070    0.000    1.559    1.571
##    .Benev            0.000                           0.000    0.000
##    .Unive            0.000                           0.000    0.000
##    .STrasc           0.000                           0.000    0.000
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.467    0.009   52.313    0.000    0.467    0.494
##    .iplylfr_r        0.460    0.008   57.150    0.000    0.460    0.600
##    .impenv_r         0.681    0.010   67.119    0.000    0.681    0.682
##    .ipeqopt_r        0.778    0.012   64.619    0.000    0.778    0.670
##    .ipudrst_r        0.728    0.010   72.499    0.000    0.728    0.739
##    .Benev            0.366    0.009   41.387    0.000    0.764    0.764
##    .Unive            0.286    0.005   59.319    0.000    0.901    0.901
##    .STrasc           0.019    0.003    5.663    0.000    0.603    0.603
##
## R-Square:
##                   Estimate
##     iphlppl_r        0.506
##     iplylfr_r        0.400
##     impenv_r         0.318
##     ipeqopt_r        0.330
##     ipudrst_r        0.261
##     Benev            0.236
##     Unive            0.099
##     STrasc           0.397
##
## $FIT
```

```
##                          npar                          fmin
##                        21.000                         0.048
##                         chisq                           df
##                      2521.567                        39.000
##                        pvalue                  chisq.scaled
##                         0.000                      1090.818
##                    df.scaled                 pvalue.scaled
##                        39.000                         0.000
##          chisq.scaling.factor                baseline.chisq
##                         2.312                      26486.419
##                   baseline.df               baseline.pvalue
##                        50.000                         0.000
##         baseline.chisq.scaled            baseline.df.scaled
##                     12297.479                        50.000
##        baseline.pvalue.scaled baseline.chisq.scaling.factor
##                         0.000                         2.154
##                           cfi                           tli
##                         0.906                         0.880
##                    cfi.scaled                    tli.scaled
##                         0.914                         0.890
##                    cfi.robust                    tli.robust
##                         0.908                         0.882
##                          logl             unrestricted.logl
##                    -310494.282                   -309233.498
##                           aic                           bic
##                    621030.564                    621202.467
##                        ntotal                          bic2
##                     26525.000                    621135.729
##                         rmsea                rmsea.ci.lower
##                         0.049                         0.047
##                rmsea.ci.upper                   rmsea.pvalue
##                         0.051                         0.845
##                   rmsea.scaled         rmsea.ci.lower.scaled
##                         0.032                         0.031
##         rmsea.ci.upper.scaled           rmsea.pvalue.scaled
##                         0.033                         1.000
##                   rmsea.robust         rmsea.ci.lower.robust
##                         0.048                         0.046
##         rmsea.ci.upper.robust           rmsea.pvalue.robust
##                         0.051                            NA
##                          srmr
##                         0.028
##
## $PE
##          lhs op       rhs exo           est           se           z
## 1      Benev =~ iphlppl_r   0  1.000000e+00 0.0000000000          NA
## 2      Benev =~ iplylfr_r   0  8.000000e-01 0.0000000000          NA
## 3      Unive =~  impenv_r   0  1.000000e+00 0.0000000000          NA
## 4      Unive =~ ipeqopt_r   0  1.100000e+00 0.0000000000          NA
## 5      Unive =~ ipudrst_r   0  9.000000e-01 0.0000000000          NA
## 6      Benev ~~     Unive   0  3.000000e-01 0.0000000000          NA
## 7     STrasc =~     Unive   0  1.000000e+00 0.0000000000          NA
## 8     STrasc =~     Benev   0  1.900000e+00 0.0000000000          NA
## 9     STrasc  ~      agea   0 -6.382680e-04 0.0001613044 -3.95691696
```

```
## 10    STrasc  ~     gndrD   0  1.193560e-01 0.0059389967 20.09699711
## 11    STrasc  ~   eisced2   0  2.094008e-02 0.0070481944  2.97098461
## 12    STrasc  ~   eisced3   0  3.785252e-02 0.0073241437  5.16818420
## 13    STrasc  ~  domicil2   0  1.382691e-04 0.0070498111  0.01961317
## 14    STrasc  ~  domicil3   0  2.727434e-02 0.0099763492  2.73389943
## 15    STrasc  ~  domicil4   0 -6.263984e-03 0.0086256889 -0.72620106
## 16    STrasc  ~       HDI   0  3.731046e+00 0.1163105952 32.07829882
## 17 iphlppl_r ~~ iphlppl_r   0  4.668259e-01 0.0089236239 52.31349415
## 18 iplylfr_r ~~ iplylfr_r   0  4.601874e-01 0.0080522379 57.15024603
## 19  impenv_r ~~  impenv_r   0  6.813417e-01 0.0101512852 67.11876210
## 20 ipeqopt_r ~~ ipeqopt_r   0  7.783080e-01 0.0120446144 64.61875778
## 21 ipudrst_r ~~ ipudrst_r   0  7.281014e-01 0.0100428939 72.49916437
## 22     Benev ~~     Benev   0  3.660667e-01 0.0088450256 41.38672860
## 23     Unive ~~     Unive   0  2.861742e-01 0.0048242956 59.31936483
## 24    STrasc ~~    STrasc   0  1.887137e-02 0.0033321083  5.66349316
## 25      agea ~~      agea   1  3.512025e+02 0.0000000000          NA
## 26      agea ~~     gndrD   1  3.753336e-01 0.0000000000          NA
## 27      agea ~~   eisced2   1 -7.056186e-01 0.0000000000          NA
## 28      agea ~~   eisced3   1 -6.766041e-01 0.0000000000          NA
## 29      agea ~~  domicil2   1 -2.465282e-02 0.0000000000          NA
## 30      agea ~~  domicil3   1  1.011899e-01 0.0000000000          NA
## 31      agea ~~  domicil4   1 -3.280675e-01 0.0000000000          NA
## 32      agea ~~       HDI   1 -5.391844e-03 0.0000000000          NA
## 33     gndrD ~~     gndrD   1  2.488967e-01 0.0000000000          NA
## 34     gndrD ~~   eisced2   1  2.946780e-03 0.0000000000          NA
## 35     gndrD ~~   eisced3   1  1.490203e-03 0.0000000000          NA
## 36     gndrD ~~  domicil2   1  6.028328e-03 0.0000000000          NA
## 37     gndrD ~~  domicil3   1  3.920998e-04 0.0000000000          NA
## 38     gndrD ~~  domicil4   1  1.157523e-03 0.0000000000          NA
## 39     gndrD ~~       HDI   1 -5.210685e-04 0.0000000000          NA
## 40   eisced2 ~~   eisced2   1  2.161873e-01 0.0000000000          NA
## 41   eisced2 ~~   eisced3   1 -7.523850e-02 0.0000000000          NA
## 42   eisced2 ~~  domicil2   1  6.072798e-03 0.0000000000          NA
## 43   eisced2 ~~  domicil3   1 -1.758815e-03 0.0000000000          NA
## 44   eisced2 ~~  domicil4   1  3.915938e-03 0.0000000000          NA
## 45   eisced2 ~~       HDI   1 -1.109088e-03 0.0000000000          NA
## 46   eisced3 ~~   eisced3   1  1.813597e-01 0.0000000000          NA
## 47   eisced3 ~~  domicil2   1 -3.350745e-03 0.0000000000          NA
## 48   eisced3 ~~  domicil3   1  9.776459e-03 0.0000000000          NA
## 49   eisced3 ~~  domicil4   1  1.321128e-02 0.0000000000          NA
## 50   eisced3 ~~       HDI   1  9.247940e-04 0.0000000000          NA
## 51  domicil2 ~~  domicil2   1  2.168749e-01 0.0000000000          NA
## 52  domicil2 ~~  domicil3   1 -3.637234e-02 0.0000000000          NA
## 53  domicil2 ~~  domicil4   1 -5.640179e-02 0.0000000000          NA
## 54  domicil2 ~~       HDI   1 -2.078426e-04 0.0000000000          NA
## 55  domicil3 ~~  domicil3   1  1.012966e-01 0.0000000000          NA
## 56  domicil3 ~~  domicil4   1 -2.028695e-02 0.0000000000          NA
## 57  domicil3 ~~       HDI   1  8.963800e-04 0.0000000000          NA
## 58  domicil4 ~~  domicil4   1  1.459069e-01 0.0000000000          NA
## 59  domicil4 ~~       HDI   1 -1.068151e-03 0.0000000000          NA
## 60       HDI ~~       HDI   1  6.101580e-04 0.0000000000          NA
## 61 iphlppl_r ~1             0 -1.713439e+00 0.2044076592 -8.38246184
## 62 iplylfr_r ~1             0 -1.410733e-01 0.1635494845 -0.86257236
## 63  impenv_r ~1             0  1.555873e+00 0.1077275496 14.44266903
```

```
## 64 ipeqopt_r ~1             0  1.029759e+00 0.1184827768  8.69121627
## 65 ipudrst_r ~1             0  1.558910e+00 0.0970102833 16.06953195
## 66      agea ~1             1  5.093217e+01 0.0000000000          NA
## 67     gndrD ~1             1  5.332113e-01 0.0000000000          NA
## 68   eisced2 ~1             1  3.161185e-01 0.0000000000          NA
## 69   eisced3 ~1             1  2.380076e-01 0.0000000000          NA
## 70  domicil2 ~1             1  3.179977e-01 0.0000000000          NA
## 71  domicil3 ~1             1  1.143794e-01 0.0000000000          NA
## 72  domicil4 ~1             1  1.773657e-01 0.0000000000          NA
## 73       HDI ~1             1  9.125401e-01 0.0000000000          NA
## 74     Benev ~1             0  0.000000e+00 0.0000000000          NA
## 75     Unive ~1             0  0.000000e+00 0.0000000000          NA
## 76    STrasc ~1             0  0.000000e+00 0.0000000000          NA
## 77 iphlppl_r r2 iphlppl_r   0  5.064427e-01           NA          NA
## 78 iplylfr_r r2 iplylfr_r   0  3.998256e-01           NA          NA
## 79  impenv_r r2  impenv_r   0  3.178418e-01           NA          NA
## 80 ipeqopt_r r2 ipeqopt_r   0  3.304510e-01           NA          NA
## 81 ipudrst_r r2 ipudrst_r   0  2.609947e-01           NA          NA
## 82     Benev r2     Benev   0  2.357905e-01           NA          NA
## 83     Unive r2     Unive   0  9.855442e-02           NA          NA
## 84    STrasc r2    STrasc   0  3.968345e-01           NA          NA
##          pvalue        std.lv       std.all       std.nox
## 1            NA  6.921080e-01  0.7116479032  7.116479e-01
## 2            NA  5.536864e-01  0.6323176117  6.323176e-01
## 3            NA  5.634371e-01  0.5637746070  5.637746e-01
## 4            NA  6.197808e-01  0.5748486976  5.748487e-01
## 5            NA  5.070934e-01  0.5108763587  5.108764e-01
## 6            NA  9.268852e-01  0.9268852190  9.268852e-01
## 7            NA  3.139338e-01  0.3139337776  3.139338e-01
## 8            NA  4.855827e-01  0.4855826910  4.855827e-01
## 9  7.592331e-05 -3.608441e-03 -0.0676236189 -3.608441e-03
## 10 0.000000e+00  6.747778e-01  0.3366435529  6.747778e-01
## 11 2.968467e-03  1.183845e-01  0.0550439850  1.183845e-01
## 12 2.363793e-07  2.139988e-01  0.0911342820  2.139988e-01
## 13 9.843520e-01  7.817029e-04  0.0003640377  7.817029e-04
## 14 6.258916e-03  1.541951e-01  0.0490758886  1.541951e-01
## 15 4.677155e-01 -3.541336e-02 -0.0135271114 -3.541336e-02
## 16 0.000000e+00  2.109343e+01  0.5210366626  2.109343e+01
## 17 0.000000e+00  4.668259e-01  0.4935572619  4.935573e-01
## 18 0.000000e+00  4.601874e-01  0.6001744379  6.001744e-01
## 19 0.000000e+00  6.813417e-01  0.6821581925  6.821582e-01
## 20 0.000000e+00  7.783080e-01  0.6695489749  6.695490e-01
## 21 0.000000e+00  7.281014e-01  0.7390053461  7.390053e-01
## 22 0.000000e+00  7.642095e-01  0.7642094502  7.642095e-01
## 23 0.000000e+00  9.014456e-01  0.9014455833  9.014456e-01
## 24 1.483221e-08  6.031655e-01  0.6031655145  6.031655e-01
## 25           NA  3.512025e+02  1.0000000000  3.512025e+02
## 26           NA  3.753336e-01  0.0401447846  3.753336e-01
## 27           NA -7.056186e-01 -0.0809796973 -7.056186e-01
## 28           NA -6.766041e-01 -0.0847784376 -6.766041e-01
## 29           NA -2.465282e-02 -0.0028247707 -2.465282e-02
## 30           NA  1.011899e-01  0.0169652681  1.011899e-01
## 31           NA -3.280675e-01 -0.0458296442 -3.280675e-01
## 32           NA -5.391844e-03 -0.0116476235 -5.391844e-03
```

```
## 33           NA  2.488967e-01  1.0000000000  2.488967e-01
## 34           NA  2.946780e-03  0.0127034896  2.946780e-03
## 35           NA  1.490203e-03  0.0070139956  1.490203e-03
## 36           NA  6.028328e-03  0.0259467342  6.028328e-03
## 37           NA  3.920998e-04  0.0024693894  3.920998e-04
## 38           NA  1.157523e-03  0.0060741049  1.157523e-03
## 39           NA -5.210685e-04 -0.0422828331 -5.210685e-04
## 40           NA  2.161873e-01  1.0000000000  2.161873e-01
## 41           NA -7.523850e-02 -0.3799746527 -7.523850e-02
## 42           NA  6.072798e-03  0.0280458859  6.072798e-03
## 43           NA -1.758815e-03 -0.0118852281 -1.758815e-03
## 44           NA  3.915938e-03  0.0220486914  3.915938e-03
## 45           NA -1.109088e-03 -0.0965672158 -1.109088e-03
## 46           NA  1.813597e-01  1.0000000000  1.813597e-01
## 47           NA -3.350745e-03 -0.0168953169 -3.350745e-03
## 48           NA  9.776459e-03  0.0721296240  9.776459e-03
## 49           NA  1.321128e-02  0.0812150351  1.321128e-02
## 50           NA  9.247940e-04  0.0879130603  9.247940e-04
## 51           NA  2.168749e-01  1.0000000000  2.168749e-01
## 52           NA -3.637234e-02 -0.2453969333 -3.637234e-02
## 53           NA -5.640179e-02 -0.3170665299 -5.640179e-02
## 54           NA -2.078426e-04 -0.0180679497 -2.078426e-04
## 55           NA  1.012966e-01  1.0000000000  1.012966e-01
## 56           NA -2.028695e-02 -0.1668712195 -2.028695e-02
## 57           NA  8.963800e-04  0.1140180231  8.963800e-04
## 58           NA  1.459069e-01  1.0000000000  1.459069e-01
## 59           NA -1.068151e-03 -0.1132071138 -1.068151e-03
## 60           NA  6.101580e-04  1.0000000000  6.101580e-04
## 61 0.000000e+00 -1.713439e+00 -1.7618138904 -1.761814e+00
## 62 3.883726e-01 -1.410733e-01 -0.1611076315 -1.611076e-01
## 63 0.000000e+00  1.555873e+00  1.5568053177  1.556805e+00
## 64 0.000000e+00  1.029759e+00  0.9551051850  9.551052e-01
## 65 0.000000e+00  1.558910e+00  1.5705394585  1.570539e+00
## 66           NA  5.093217e+01  2.7177744054  5.093217e+01
## 67           NA  5.332113e-01  1.0687836358  5.332113e-01
## 68           NA  3.161185e-01  0.6798840274  3.161185e-01
## 69           NA  2.380076e-01  0.5588823466  2.380076e-01
## 70           NA  3.179977e-01  0.6828406186  3.179977e-01
## 71           NA  1.143794e-01  0.3593770897  1.143794e-01
## 72           NA  1.773657e-01  0.4643352516  1.773657e-01
## 73           NA  9.125401e-01 36.9428816993  9.125401e-01
## 74           NA  0.000000e+00  0.0000000000  0.000000e+00
## 75           NA  0.000000e+00  0.0000000000  0.000000e+00
## 76           NA  0.000000e+00  0.0000000000  0.000000e+00
## 77           NA            NA            NA            NA
## 78           NA            NA            NA            NA
## 79           NA            NA            NA            NA
## 80           NA            NA            NA            NA
## 81           NA            NA            NA            NA
## 82           NA            NA            NA            NA
## 83           NA            NA            NA            NA
## 84           NA            NA            NA            NA
```

```
semmodel <-'
Benev =~ 1*iphlppl_r + 0.8*iplylfr_r
Unive =~ 1*impenv_r + 1.1*ipeqopt_r + 0.9*ipudrst_r
Unive ~~ 0.3*Benev
STrasc =~ 1*Unive + 1.9*Benev
STrasc ~  agea + gndrD + eisced2 + eisced3 + domicil2 + domicil3 + domicil4
'

for (r in c(8,9)) {

  ds_filtrada2 <- ds_filtradaAll %>% filter(essround == r)
  survey.design2 <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada2)

  # 1. CONFIGURAL EQUIVALENCE
  ## Add the "meanstructure" argument to add means/intercepts
  lavaan.semconffit3 <- lavaan(semmodel, data=ds_filtrada2,
                               auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                               int.ov.free=TRUE,     #intercepts not fixed to 0
                               meanstructure=TRUE,   #the means of the observed variables enter the model,
                               auto.var=TRUE,        #residual variances and variances of exogeneous laten
                               auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are inclu
                               estimator="MLM",
                               group = "cntry",
                               group.label = countries
                               #group.equal = ...    #vector for multigroup analysis specify the pattern o
                               )
  survey.semconffit3 <- lavaan.survey(lavaan.fit=lavaan.semconffit3,survey.design=survey.design2)
  assign(paste0("survey.semconffit3r",r),survey.semconffit3)
  # 2. METRIC EQUIVALENCE: set the factor loadings equal across groups

  lavaan.semmetrfit3 <- lavaan(semmodel, data=ds_filtrada2,
                               auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                               int.ov.free=TRUE,     #intercepts not fixed to 0
                               meanstructure=TRUE,   #the means of the observed variables enter the model, n
                               auto.var=TRUE,        #residual variances and variances of exogeneous latent
                               auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                               estimator="MLM",
                               group = "cntry",
                               group.label = countries,
                               group.equal=c("loadings") #vector for multigroup analysis specify the pattern
                               )
  survey.semmetrfit3 <- lavaan.survey(lavaan.fit=lavaan.semmetrfit3,survey.design=survey.design2)

  # 3. SCALAR EQUIVALENCE: set the factor loadings and the intercepts equal across groups

  lavaan.semscalfit3 <- lavaan(semmodel, data=ds_filtrada2,
                               auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                               int.ov.free=TRUE,     #intercepts not fixed to 0
                               meanstructure=TRUE,   #the means of the observed variables enter the model, n
                               auto.var=TRUE,        #residual variances and variances of exogeneous latent
                               auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                               estimator="MLM",
                               group = "cntry",
```

```
                          group.label = countries,
                          group.equal=c("loadings","intercepts"))
  survey.semscalfit3 <- lavaan.survey(lavaan.fit=lavaan.semscalfit3,survey.design=survey.design2)


  # 4. check whether factor variances are equal across groups
  lavaan.semvarianfit3 <- lavaan(semmodel, data=ds_filtrada2,
                          auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                          int.ov.free=TRUE,     #intercepts not fixed to 0
                          meanstructure=TRUE,   #the means of the observed variables enter the model, n
                          auto.var=TRUE,        #residual variances and variances of exogeneous latent
                          auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                          estimator="MLM",
                          group = "cntry",
                          group.label = countries,
                          group.equal=c("loadings","intercepts","lv.variances"))
  survey.semvarianfit3 <- lavaan.survey(lavaan.fit=lavaan.semvarianfit3,survey.design=survey.design2)

  seminvar <- data.frame(round(rbind(Configural = fitMeasures(survey.semconffit3, c("cfi.robust","tli.r
                                Metric = fitMeasures(survey.semmetrfit3, c("cfi.robust","tli.robust",
                                Scalar = fitMeasures(survey.semscalfit3, c("cfi.robust","tli.robust",
                                Strict = fitMeasures(survey.semvarianfit3, c("cfi.robust","tli.robust
  semdif <- seminvar %>%
      mutate_all(funs(. - lag(.)))
  print(paste("ESS round: ", r))
  print(cbind(seminvar,semdif))

}
```

```
## [1] "ESS round:  8"
##            cfi.robust tli.robust rmsea.scaled cfi.robust tli.robust
## Configural      0.893      0.863        0.034         NA         NA
## Metric          0.893      0.863        0.034      0.000      0.000
## Scalar          0.812      0.770        0.044     -0.081     -0.093
## Strict          0.776      0.745        0.047     -0.036     -0.025
##            rmsea.scaled
## Configural           NA
## Metric            0.000
## Scalar            0.010
## Strict            0.003
## [1] "ESS round:  9"
##            cfi.robust tli.robust rmsea.scaled cfi.robust tli.robust
## Configural      0.902      0.873        0.034         NA         NA
## Metric          0.902      0.873        0.034      0.000      0.000
## Scalar          0.808      0.766        0.047     -0.094     -0.107
## Strict          0.763      0.731        0.051     -0.045     -0.035
##            rmsea.scaled
## Configural           NA
## Metric            0.000
## Scalar            0.013
## Strict            0.004
```

```
cntrylabels <- num_lab("
  1 Austria
```

```
  2 Belgium
  3 Czechia
  4 Estonia
  5 France
  6 Germany
  7 Ireland
  8 Italy
  9 Netherlands
  10    Norway
  11    Poland
  12    Slovenia
  13    Switzerland
  14    United Kingdom"
)

sum1 <-full_join(parameterEstimates(survey.fit3r8),
                 parameterEstimates(survey.fit3r9),
                 by=c("lhs", "op", "rhs"))
sum2 <-full_join(parameterEstimates(survey.conffit3r8),
                 parameterEstimates(survey.conffit3r9),
                 by=c("lhs", "op", "rhs", "block", "group"))
sum2$block <- as.character(sum2$block)

sum3 <-full_join(parameterEstimates(survey.semfit8),
                 parameterEstimates(survey.semfit9),
                 by=c("lhs", "op", "rhs"))
# sum4 <-full_join(parameterEstimates(survey.semconffit3r8),
#                  parameterEstimates(survey.semconffit3r9),
#                  by=c("lhs", "op", "rhs", "block", "group"))
sum2 <- sum2 %>%  mutate(est.x = ifelse(pvalue.x > 0.05, NA, round(est.x,3)),
                         est.x = ifelse(rhs == "agea", est.x*10, est.x),
                         est.y = ifelse(pvalue.y > 0.05, NA, round(est.y,3)),
                         est.y = ifelse(rhs == "agea", est.y*10, est.y),
                         rhs1 = ifelse(rhs == "gndrD", "Gender (Female / Male)",
                                       ifelse(rhs == "agea", "Age (10 years increment)",
                                              ifelse(rhs == "eisced2", "Highest level of education, (Up
                                                     ifelse(rhs == "eisced3", "Highest level of educati
                                                            ifelse(rhs == "domicil2", "Domicile (Town o
                                                                   ifelse(rhs == "domicil3", "Domicile
                                                                          ifelse(rhs == "domicil4", "Do

val_lab(sum2$block) <- cntrylabels
sum2$block <- as.character(sum2$block)

dir <- "G:/My Drive/Master in Statistics/Structural equations/Paper/"
write.table(sum1,paste0(dir,"Parametersfit.csv"), sep = ",", row.names = FALSE)
write.table(sum2,paste0(dir,"ParametersConffit.csv"), sep = ",", row.names = FALSE)

write.table(sum3,paste0(dir,"ParametersSemfit.csv"), sep = ",", row.names = FALSE)
# write.table(sum4,paste0(dir,"ParametersSemConffit.csv"), sep = ",", row.names = FALSE)
```

Ordered variables

The model with categorical variables is undefined, only 5 variables and too many parameters to estimate.

```
model3<-'
Benev =~ iphlppl_r + iplylfr_r +impenv_r
Unive =~ ipeqopt_r + ipudrst_r +impenv_r
Benev ~~ Unive

'
for (r in c(8,9)) {
  ds_filtrada <- ds_filtradaAll %>% filter(essround == r)
  survey.design <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada)

  lavaan.Ordfit3 <- lavaan(model3, data=ds_filtrada, estimator = "WLSMV",
                           ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r"))
  survey.Ordfit3 <- lavaan.Ordfit3
  assign(paste0("survey.Ordfit3r",r),survey.Ordfit3)

  print(paste("ESS round: ", r))
  print(fitMeasures(survey.Ordfit3, c("chisq","pvalue","cfi", "tli","rmsea", "srmr",
                                      "chisq.scaled","pvalue.scaled","cfi.robust","tli.robust","rmsea.r
  #print(modindices(survey.Ordfit3,sort=T)[1:10,])

  # cov <- round(cov(ds_filtrada[,items], use="complete.obs"),3)
  # print(lowerMat(cov, digits=3))
  # print(round(colMeans(ds_filtrada[,items], na.rm = TRUE),3))
  # print(fitted(survey.Ordfit3))
  # invisible(semPaths(survey.Ordfit3,"model","stand", style = "lisrel", rainbowStart = 0.8))
  #
  print(summary(survey.Ordfit3, standardized=T, rsquare=T, fit.measures=T))
}

countries <- c("Austria","Belgium","Czechia","Estonia","France","Germany",
               "Ireland","Italy","Netherlands","Slovenia","United Kingdom")

#,"Norway","Poland","Switzerland",
for (r in c(8,9)) {

   if (r == 9) countries <- c("Austria","Czechia","Estonia","France","Germany",
               "Ireland","Italy","Netherlands","Slovenia","United Kingdom") #"Belgium",

  ds_filtrada <- ds_filtradaAll %>% filter(essround == r)
  survey.design <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada)

  # 1. CONFIGURAL EQUIVALENCE
  ## Add the "meanstructure" argument to add means/intercepts
  lavaan.Ordconffit3 <- cfa(model3, data=ds_filtrada,
                            meanstructure=TRUE,   #the means of the observed variables enter the model,
                            ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r")
                            group.label = countries,
                            group = "cntry",
                            #group.equal = ...    #vector for multigroup analysis specify the pattern o
                            )
  survey.Ordconffit3 <- lavaan.survey(lavaan.fit=lavaan.Ordconffit3,survey.design=survey.design)
  assign(paste0("survey.Ordconffit3r",r),survey.Ordconffit3)
```

```
  # 2. METRIC EQUIVALENCE: set the factor loadings equal across groups

  lavaan.Ordmetrfit3 <- cfa(model3, data=ds_filtrada,
                            auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                            int.ov.free=TRUE,     #intercepts not fixed to 0
                            meanstructure=TRUE,   #the means of the observed variables enter the model, n
                            auto.var=TRUE,        #residual variances and variances of exogeneous latent
                            auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                            ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r"),
                            group = "cntry",
                            group.label = countries,
                            group.equal=c("loadings") #vector for multigroup analysis specify the pattern
                            )
  survey.Ordmetrfit3 <- lavaan.survey(lavaan.fit=lavaan.Ordmetrfit3,survey.design=survey.design)

  # 3. SCALAR EQUIVALENCE: set the factor loadings and the intercepts equal across groups

  lavaan.Ordscalfit3 <- cfa(model3, data=ds_filtrada,
                            auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                            int.ov.free=TRUE,     #intercepts not fixed to 0
                            meanstructure=TRUE,   #the means of the observed variables enter the model, n
                            auto.var=TRUE,        #residual variances and variances of exogeneous latent
                            auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                            ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r"),
                            group = "cntry",
                            group.label = countries,
                            group.equal=c("loadings", "thresholds"))
  survey.Ordscalfit3 <- lavaan.survey(lavaan.fit=lavaan.Ordscalfit3,survey.design=survey.design)


  # 4. check whether factor variances are equal across groups
  lavaan.Ordvarianfit3 <- cfa(model3, data=ds_filtrada,
                            auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                            int.ov.free=TRUE,     #intercepts not fixed to 0
                            meanstructure=TRUE,   #the means of the observed variables enter the model, n
                            auto.var=TRUE,        #residual variances and variances of exogeneous latent
                            auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                            ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r"),
                            group = "cntry",
                            group.label = countries,
                            group.equal=c("loadings","intercepts","lv.variances"))
  survey.Ordvarianfit3 <- lavaan.survey(lavaan.fit=lavaan.Ordvarianfit3,survey.design=survey.design)


  invar <- data.frame(round(rbind(Configural = fitMeasures(survey.Ordconffit3, c("cfi", "tli", "rmsea",
  Metric = fitMeasures(survey.Ordmetrfit3, c("cfi", "tli","rmsea", "srmr")),
  Scalar = fitMeasures(survey.Ordscalfit3, c("cfi", "tli","rmsea", "srmr")),
  Strict = fitMeasures(survey.Ordvarianfit3,  c("cfi", "tli","rmsea", "srmr"))),3))
  difOrd <- invar %>%
      mutate_all(funs(. - lag(.)))
  print(paste("ESS round: ", r))
  print(cbind(invar,difOrd))
}
```

SEM ordinal

```
semmodel <-'
Benev =~ iphlppl_r + iplylfr_r
Unive =~ ipeqopt_r + ipudrst_r + impenv_r
STrasc =~ Unive + Benev
STrasc ~  agea + gndrD + eisced2 + eisced3 + domicil2 + domicil3 + domicil4
'

for (r in c(8,9)) {
  ds_filtrada2 <- ds_filtradaAll %>% filter(essround == r)
  survey.design2 <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada2)


  lavaan.Ordsemfit <- lavaan(semmodel, data=ds_filtrada2,
                             ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r",
                                         "agea" , "gndrD" , "eisced2" , "eisced3" , "domicil2" , "domicil3
                             cluster = "cntry")
  survey.Ordsemfit <- lavaan.survey(lavaan.fit=lavaan.Ordsemfit,survey.design=survey.design2)
  assign(paste0("survey.Ordsemfit",r),survey.Ordsemfit)

  print(paste("ESS round: ", r))
  print(fitMeasures(survey.Ordsemfit, c("chisq","pvalue","cfi", "tli","rmsea", "srmr",
                                        "chisq.scaled","pvalue.scaled","cfi.robust","tli.robust","rmsea
  print(modindices(survey.Ordsemfit,sort=T)[1:10,])
  invisible(semPaths(survey.Ordsemfit,"model","stand", style = "lisrel"))

}


for (r in c(8,9)) {

  if (r == 9) countries <- c("Austria","Czechia","Estonia","France","Germany",
                             "Ireland","Italy","Netherlands","Slovenia","United Kingdom") #"Belgium",

  ds_filtrada2 <- ds_filtradaAll %>% filter(essround == r)
  survey.design2 <- svydesign(ids=~idno, prob=~dweight, data=ds_filtrada2)

  # 1. CONFIGURAL EQUIVALENCE
  ## Add the "meanstructure" argument to add means/intercepts
  lavaan.Ordsemconffit3 <- cfa(semmodel, data=ds_filtrada2,
                               auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                               int.ov.free=TRUE,     #intercepts not fixed to 0
                               meanstructure=TRUE,   #the means of the observed variables enter the model,
                               auto.var=TRUE,        #residual variances and variances of exogeneous laten
                               auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are inclu
                               ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r",
                                           "agea" , "gndrD" , "eisced2" , "eisced3" , "domicil2" , "domicil3
                               group = "cntry",
                               group.label = countries
                               #group.equal = ...    #vector for multigroup analysis specify the pattern o
                               )
  survey.Ordsemconffit3 <- lavaan.survey(lavaan.fit=lavaan.Ordsemconffit3,survey.design=survey.design2)
  assign(paste0("survey.Ordsemconffit3r",r),survey.Ordsemconffit3)
```

```r
# 2. METRIC EQUIVALENCE: set the factor loadings equal across groups

lavaan.Ordsemmetrfit3 <- cfa(semmodel, data=ds_filtrada2,
                        auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                        int.ov.free=TRUE,     #intercepts not fixed to 0
                        meanstructure=TRUE,   #the means of the observed variables enter the model, n
                        auto.var=TRUE,        #residual variances and variances of exogeneous latent
                        auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                        ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r",
                                    "agea" , "gndrD" , "eisced2" , "eisced3" , "domicil2" , "domicil3
                        group = "cntry",
                        group.label = countries,
                        group.equal=c("loadings") #vector for multigroup analysis specify the pattern
                        )
survey.Ordsemmetrfit3 <- lavaan.survey(lavaan.fit=lavaan.Ordsemmetrfit3,survey.design=survey.design2)

# 3. SCALAR EQUIVALENCE: set the factor loadings and the intercepts equal across groups

lavaan.Ordsemscalfit3 <- cfa(semmodel, data=ds_filtrada2,
                        auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                        int.ov.free=TRUE,     #intercepts not fixed to 0
                        meanstructure=TRUE,   #the means of the observed variables enter the model, n
                        auto.var=TRUE,        #residual variances and variances of exogeneous latent
                        auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                        ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r",
                                    "agea" , "gndrD" , "eisced2" , "eisced3" , "domicil2" , "domicil3
                        group = "cntry",
                        group.label = countries,
                        group.equal=c("loadings","intercepts"))
survey.Ordsemscalfit3 <- lavaan.survey(lavaan.fit=lavaan.Ordsemscalfit3,survey.design=survey.design2)


# 4. check whether factor variances are equal across groups
lavaan.Ordsemvarianfit3 <- cfa(semmodel, data=ds_filtrada2,
                        auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                        int.ov.free=TRUE,     #intercepts not fixed to 0
                        meanstructure=TRUE,   #the means of the observed variables enter the model, n
                        auto.var=TRUE,        #residual variances and variances of exogeneous latent
                        auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                        ordered = c("iphlppl_r", "iplylfr_r", "ipeqopt_r", "ipudrst_r", "impenv_r",
                                    "agea" , "gndrD" , "eisced2" , "eisced3" , "domicil2" , "domicil3
                        group = "cntry",
                        group.label = countries,
                        group.equal=c("loadings","intercepts","lv.variances"))
survey.Ordsemvarianfit3 <- lavaan.survey(lavaan.fit=lavaan.Ordsemvarianfit3,survey.design=survey.desig

Ordseminvar <- data.frame(round(rbind(Configural = fitMeasures(survey.Ordsemconffit3, c("cfi","tli",
                                Metric = fitMeasures(survey.Ordsemmetrfit3, c("cfi","tli", "rmsea", "
                                Scalar = fitMeasures(survey.Ordsemscalfit3, c("cfi","tli", "rmsea", "
                                Strict = fitMeasures(survey.Ordsemvarianfit3,  c("cfi","tli", "rmsea"
Ordsemdif <- Ordseminvar %>%
    mutate_all(funs(. - lag(.)))
print(paste("ESS round: ", r))
```

```
  print(cbind(Ordseminvar,Ordsemdif))

}

cntrylabels <- num_lab("
  1 Austria
  2 Belgium
  3 Czechia
  4 Estonia
  5 France
  6 Germany
  7 Ireland
  8 Italy
  9 Netherlands
  10    Norway
  11    Poland
  12    Slovenia
  13    Switzerland
  14    United Kingdom"
)

# sum11 <-full_join(parameterEstimates(survey.Ordfit3r8),
#                   parameterEstimates(survey.Ordfit3r9),
#                   by=c("lhs", "op", "rhs"))
# sum12 <-full_join(parameterEstimates(survey.Ordconffit3r8),
#                   parameterEstimates(survey.Ordconffit3r9),
#                   by=c("lhs", "op", "rhs", "block", "group"))
# sum12$block <- as.character(sum12$block)

# sum13 <-full_join(parameterEstimates(survey.Ordsemfit8),
#                   parameterEstimates(survey.Ordsemfit9),
#                   by=c("lhs", "op", "rhs"))
# sum14 <-full_join(parameterEstimates(survey.Ordsemconffit3r8),
#                   parameterEstimates(survey.Ordsemconffit3r9),
#                   by=c("lhs", "op", "rhs", "block", "group"))
# sum14 <- sum14 %>%  mutate(est.x = ifelse(pvalue.x > 0.05, NA, round(est.x,3)),
#                            est.x = ifelse(rhs == "agea", est.x*10, est.x),
#                            est.y = ifelse(pvalue.y > 0.05, NA, round(est.y,3)),
#                            est.y = ifelse(rhs == "agea", est.y*10, est.y),
#                            rhs1 = ifelse(rhs == "gndrD", "Gender (Female / Male)",
#                                          ifelse(rhs == "agea", "Age (10 years increment)",
#                                                 ifelse(rhs == "eisced2", "Highest level of education, (
#                                                        ifelse(rhs == "eisced3", "Highest level of educa
#                                                               ifelse(rhs == "domicil2", "Domicile (Town
#                                                                      ifelse(rhs == "domicil3", "Domicil
#                                                                             ifelse(rhs == "domicil4", "
# val_lab(sum14$block) <- cntrylabels
# sum14$block <- as.character(sum14$block)

# dir <- "G:/My Drive/Master in Statistics/Structural equations/Paper/"
# write.table(sum11,paste0(dir,"ParametersOrdfit.csv"), sep = ",", row.names = FALSE)
# write.table(sum12,paste0(dir,"ParametersOrdConffit.csv"), sep = ",", row.names = FALSE)
```

```
# write.table(sum13,paste0(dir,"ParametersOrdSemfit.csv"), sep = ",", row.names = FALSE)
# write.table(sum14,paste0(dir,"ParametersOrdSemConffit.csv"), sep = ",", row.names = FALSE)
```

Multilevel CFA

```
mmodel3<-'
level: 1
Benev_w =~ iphlppl_r + iplylfr_r
Unive_w =~ ipeqopt_r + ipudrst_r + impenv_r
Unive_w ~~ Benev_w
level: 2
Benev_b =~ iphlppl_r + iplylfr_r
Unive_b =~ ipeqopt_r + ipudrst_r + impenv_r
Unive_b ~~ Benev_b
'

for (r in c(8,9)) {
  ds_filtrada <- ds_filtradaAll %>% filter(essround == r)

  lavaan.mfit3 <- lavaan(mmodel3, data=ds_filtrada, auto.fix.first=TRUE,
                         auto.var=TRUE, int.ov.free=TRUE,
                         auto.cov.lv.x=TRUE,
                         cluster = "cntry", meanstructure=TRUE)
  survey.mfit3 <- lavaan.mfit3
  assign(paste0("survey.mfit3r",r),survey.mfit3)



  print(paste("ESS round: ", r))

  print(fitMeasures(survey.mfit3, c("chisq","pvalue","cfi", "tli","rmsea", "srmr")))
  print(modindices(survey.mfit3,sort=T)[1:10,])

  cov <- round(cov(ds_filtrada[,items], use="complete.obs"),3)
  print(lowerMat(cov, digits=3))
  print(round(colMeans(ds_filtrada[,items], na.rm = TRUE),3))
  print(fitted(survey.mfit3))

  print(summary(survey.mfit3, standardized=T, rsquare=T, fit.measures=T))

  # invisible(semPaths(survey.mfit3,"model","std","lisrel", edge.label.cex = 0.8, intercepts = FALSE ,p
  #                    levels = c(1, 2, 4),mar = c(rep(1,14)), optimizeLatRes = TRUE))


}
```

```
## [1] "ESS round:  8"
##   chisq  pvalue     cfi     tli   rmsea    srmr
## 300.026   0.000   0.987   0.968   0.036   0.088
##          lhs op       rhs block group level      mi       epc  sepc.lv
## 52 iplylfr_r ~~  impenv_r     1     1     1 206.589     0.071    0.071
## 55 ipudrst_r ~~  impenv_r     1     1     1 145.948    -0.079   -0.079
## 41   Benev_w =~ ipeqopt_r     1     1     1 145.908    -0.857   -0.558
```

```
## 43   Benev_w =~  impenv_r     1     1     1 118.770     0.778    0.507
## 53 ipeqopt_r ~~ ipudrst_r     1     1     1 118.744     0.071    0.071
## 50 iplylfr_r ~~ ipeqopt_r     1     1     1  83.942    -0.046   -0.046
## 48 iphlppl_r ~~ ipudrst_r     1     1     1  35.530     0.034    0.034
## 51 iplylfr_r ~~ ipudrst_r     1     1     1  26.417    -0.027   -0.027
## 49 iphlppl_r ~~  impenv_r     1     1     1  17.196    -0.023   -0.023
## 3    Unive_w =~ ipeqopt_r     1     1     1  13.063 -1248.075 -690.462
##    sepc.all sepc.nox
## 52    0.127    0.127
## 55   -0.115   -0.115
## 41   -0.538   -0.538
## 43    0.501    0.501
## 53    0.100    0.100
## 50   -0.080   -0.080
## 48    0.062    0.062
## 51   -0.049   -0.049
## 49   -0.040   -0.040
## 3  -665.652 -665.652
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.944
## iplylfr_r 0.401  0.791
## ipeqopt_r 0.354  0.276  1.124
## ipudrst_r 0.409  0.329  0.398  1.069
## impenv_r  0.332  0.318  0.321  0.318  1.052
##  [1] 0.401 0.354 0.409 0.332 0.276 0.329 0.318 0.398 0.321 0.318
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##     4.813     5.062     4.806     4.645     4.827
## $within
## $within$cov
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.886
## iplylfr_r 0.362  0.746
## ipeqopt_r 0.320  0.274  1.076
## ipudrst_r 0.348  0.298  0.333  1.022
## impenv_r  0.321  0.274  0.306  0.333  1.022
##
## $within$mean
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##         0         0         0         0         0
##
##
## $cntry
## $cntry$cov
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.057
## iplylfr_r 0.035  0.041
## ipeqopt_r 0.039  0.030  0.049
## ipudrst_r 0.046  0.036  0.034  0.043
## impenv_r  0.014  0.011  0.010  0.012  0.035
##
## $cntry$mean
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##     4.834     5.075     4.828     4.661     4.838
##
```

```
##
## lavaan 0.6-5 ended normally after 166 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         27
##
##                                                   Used       Total
##   Number of observations                          27533       28080
##   Number of clusters [cntry]                         14
##
## Model Test User Model:
##
##   Test statistic                               300.026
##   Degrees of freedom                                 8
##   P-value (Chi-square)                           0.000
##
## Model Test Baseline Model:
##
##   Test statistic                             22884.083
##   Degrees of freedom                                20
##   P-value                                        0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                    0.987
##   Tucker-Lewis Index (TLI)                       0.968
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)            -180119.917
##   Loglikelihood unrestricted model (H1)    -179969.904
##
##   Akaike (AIC)                              360293.833
##   Bayesian (BIC)                            360515.858
##   Sample-size adjusted Bayesian (BIC)       360430.053
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.036
##   90 Percent confidence interval - lower         0.033
##   90 Percent confidence interval - upper         0.040
##   P-value RMSEA <= 0.05                          1.000
##
## Standardized Root Mean Square Residual (corr metric):
##
##   SRMR (within covariance matrix)                0.018
##   SRMR (between covariance matrix)               0.070
##
## Parameter Estimates:
##
##   Information                                 Observed
##   Observed information based on                Hessian
##   Standard errors                             Standard
```

```
##
##
## Level 1 [within]:
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_w =~
##     iphlppl_r        1.000                               0.651    0.691
##     iplylfr_r        0.855    0.012   70.758    0.000    0.556    0.644
##   Unive_w =~
##     ipeqopt_r        1.000                               0.553    0.533
##     ipudrst_r        1.087    0.018   62.003    0.000    0.602    0.595
##     impenv_r         1.001    0.017   57.991    0.000    0.554    0.548
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_w ~~
##     Unive_w          0.320    0.006   57.352    0.000    0.890    0.890
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.000                               0.000    0.000
##    .iplylfr_r        0.000                               0.000    0.000
##    .ipeqopt_r        0.000                               0.000    0.000
##    .ipudrst_r        0.000                               0.000    0.000
##    .impenv_r         0.000                               0.000    0.000
##     Benev_w          0.000                               0.000    0.000
##     Unive_w          0.000                               0.000    0.000
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.462    0.007   68.843    0.000    0.462    0.522
##    .iplylfr_r        0.437    0.005   80.178    0.000    0.437    0.585
##    .ipeqopt_r        0.770    0.008   95.239    0.000    0.770    0.716
##    .ipudrst_r        0.660    0.008   87.167    0.000    0.660    0.646
##    .impenv_r         0.716    0.008   94.531    0.000    0.716    0.700
##     Benev_w          0.424    0.008   50.247    0.000    1.000    1.000
##     Unive_w          0.306    0.008   38.460    0.000    1.000    1.000
##
## R-Square:
##                   Estimate
##     iphlppl_r        0.478
##     iplylfr_r        0.415
##     ipeqopt_r        0.284
##     ipudrst_r        0.354
##     impenv_r         0.300
##
##
## Level 2 [cntry]:
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_b =~
##     iphlppl_r        1.000                               0.213    0.894
```

```
##     iplylfr_r         0.772    0.175    4.412    0.000    0.164    0.814
##   Unive_b =~
##     ipeqopt_r         1.000                               0.168    0.761
##     ipudrst_r         1.188    0.291    4.083    0.000    0.200    0.965
##     impenv_r          0.354    0.323    1.094    0.274    0.060    0.316
##
## Covariances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_b ~~
##     Unive_b           0.039    0.018    2.212    0.027    1.089    1.089
##
## Intercepts:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         4.834    0.064   75.640    0.000    4.834   20.300
##    .iplylfr_r         5.075    0.054   93.554    0.000    5.075   25.125
##    .ipeqopt_r         4.828    0.059   81.219    0.000    4.828   21.834
##    .ipudrst_r         4.661    0.056   83.657    0.000    4.661   22.499
##    .impenv_r          4.838    0.051   95.523    0.000    4.838   25.726
##     Benev_b           0.000                               0.000    0.000
##     Unive_b           0.000                               0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         0.011    0.006    2.064    0.039    0.011    0.201
##    .iplylfr_r         0.014    0.006    2.428    0.015    0.014    0.337
##    .ipeqopt_r         0.021    0.008    2.583    0.010    0.021    0.421
##    .ipudrst_r         0.003    0.003    0.979    0.328    0.003    0.070
##    .impenv_r          0.032    0.013    2.544    0.011    0.032    0.900
##     Benev_b           0.045    0.021    2.117    0.034    1.000    1.000
##     Unive_b           0.028    0.017    1.673    0.094    1.000    1.000
##
## R-Square:
##                    Estimate
##     iphlppl_r         0.799
##     iplylfr_r         0.663
##     ipeqopt_r         0.579
##     ipudrst_r         0.930
##     impenv_r          0.100
##
## $FIT
##              npar              fmin             chisq                df
##            27.000             1.947           300.026             8.000
##            pvalue    baseline.chisq       baseline.df   baseline.pvalue
##             0.000         22884.083            20.000             0.000
##               cfi               tli              logl unrestricted.logl
##             0.987             0.968       -180119.917       -179969.904
##               aic               bic            ntotal              bic2
##        360293.833        360515.858         27533.000        360430.053
##             rmsea    rmsea.ci.lower    rmsea.ci.upper      rmsea.pvalue
##             0.036             0.033             0.040             1.000
##              srmr       srmr_within      srmr_between
##             0.088             0.018             0.070
##
## $PE
```

```
##          lhs op       rhs block level exo         est          se
## 1    Benev_w =~ iphlppl_r     1     1   0 1.000000000 0.000000000
## 2    Benev_w =~ iplylfr_r     1     1   0 0.855081450 0.012084667
## 3    Unive_w =~ ipeqopt_r     1     1   0 1.000000000 0.000000000
## 4    Unive_w =~ ipudrst_r     1     1   0 1.087282308 0.017535864
## 5    Unive_w =~  impenv_r     1     1   0 1.001286431 0.017266305
## 6    Benev_w ~~   Unive_w     1     1   0 0.320269852 0.005584306
## 7  iphlppl_r ~~ iphlppl_r     1     1   0 0.462258527 0.006714641
## 8  iplylfr_r ~~ iplylfr_r     1     1   0 0.436638364 0.005445859
## 9  ipeqopt_r ~~ ipeqopt_r     1     1   0 0.769877434 0.008083655
## 10 ipudrst_r ~~ ipudrst_r     1     1   0 0.660260074 0.007574642
## 11  impenv_r ~~  impenv_r     1     1   0 0.715558943 0.007569563
## 12   Benev_w ~~   Benev_w     1     1   0 0.423550323 0.008429309
## 13   Unive_w ~~   Unive_w     1     1   0 0.306053773 0.007957736
## 14 iphlppl_r ~1               1     1   0 0.000000000 0.000000000
## 15 iplylfr_r ~1               1     1   0 0.000000000 0.000000000
## 16 ipeqopt_r ~1               1     1   0 0.000000000 0.000000000
## 17 ipudrst_r ~1               1     1   0 0.000000000 0.000000000
## 18  impenv_r ~1               1     1   0 0.000000000 0.000000000
## 19   Benev_w ~1               1     1   0 0.000000000 0.000000000
## 20   Unive_w ~1               1     1   0 0.000000000 0.000000000
## 21   Benev_b =~ iphlppl_r     2     2   0 1.000000000 0.000000000
## 22   Benev_b =~ iplylfr_r     2     2   0 0.772222385 0.175008384
## 23   Unive_b =~ ipeqopt_r     2     2   0 1.000000000 0.000000000
## 24   Unive_b =~ ipudrst_r     2     2   0 1.187694472 0.290916790
## 25   Unive_b =~  impenv_r     2     2   0 0.353671921 0.323400007
## 26   Benev_b ~~   Unive_b     2     2   0 0.039002503 0.017629717
## 27 iphlppl_r ~~ iphlppl_r     2     2   0 0.011390659 0.005517960
## 28 iplylfr_r ~~ iplylfr_r     2     2   0 0.013766982 0.005669243
## 29 ipeqopt_r ~~ ipeqopt_r     2     2   0 0.020593218 0.007972126
## 30 ipudrst_r ~~ ipudrst_r     2     2   0 0.002986637 0.003050332
## 31  impenv_r ~~  impenv_r     2     2   0 0.031822275 0.012508250
## 32   Benev_b ~~   Benev_b     2     2   0 0.045327447 0.021408529
## 33   Unive_b ~~   Unive_b     2     2   0 0.028308977 0.016923765
## 34 iphlppl_r ~1               2     2   0 4.834468806 0.063914478
## 35 iplylfr_r ~1               2     2   0 5.074829992 0.054245062
## 36 ipeqopt_r ~1               2     2   0 4.828275780 0.059447884
## 37 ipudrst_r ~1               2     2   0 4.661241880 0.055718749
## 38  impenv_r ~1               2     2   0 4.837810211 0.050645247
## 39   Benev_b ~1               2     2   0 0.000000000 0.000000000
## 40   Unive_b ~1               2     2   0 0.000000000 0.000000000
## 41 iphlppl_r r2 iphlppl_r     1     1   0 0.478150927          NA
## 42 iplylfr_r r2 iplylfr_r     1     1   0 0.414947378          NA
## 43 ipeqopt_r r2 ipeqopt_r     1     1   0 0.284454779          NA
## 44 ipudrst_r r2 ipudrst_r     1     1   0 0.353998210          NA
## 45  impenv_r r2  impenv_r     1     1   0 0.300118854          NA
## 46 iphlppl_r r2 iphlppl_r     2     2   0 0.799170675          NA
## 47 iplylfr_r r2 iplylfr_r     2     2   0 0.662549007          NA
## 48 ipeqopt_r r2 ipeqopt_r     2     2   0 0.578889695          NA
## 49 ipudrst_r r2 ipudrst_r     2     2   0 0.930413534          NA
## 50  impenv_r r2  impenv_r     2     2   0 0.100132006          NA
##             z       pvalue      std.lv     std.all     std.nox
## 1          NA           NA 0.650807439  0.69148458  0.69148458
## 2  70.7575540 0.000000e+00 0.556493369  0.64416409  0.64416409
```

```
## 3          NA           NA 0.553221270  0.53334302  0.53334302
## 4  62.0033491 0.000000e+00 0.601507699  0.59497749  0.59497749
## 5  57.9907771 0.000000e+00 0.553932950  0.54783105  0.54783105
## 6  57.3517761 0.000000e+00 0.889538361  0.88953836  0.88953836
## 7  68.8433690 0.000000e+00 0.462258527  0.52184907  0.52184907
## 8  80.1780525 0.000000e+00 0.436638364  0.58505262  0.58505262
## 9  95.2387801 0.000000e+00 0.769877434  0.71554522  0.71554522
## 10 87.1671623 0.000000e+00 0.660260074  0.64600179  0.64600179
## 11 94.5310771 0.000000e+00 0.715558943  0.69988115  0.69988115
## 12 50.2473341 0.000000e+00 1.000000000  1.00000000  1.00000000
## 13 38.4599048 0.000000e+00 1.000000000  1.00000000  1.00000000
## 14         NA           NA 0.000000000  0.00000000  0.00000000
## 15         NA           NA 0.000000000  0.00000000  0.00000000
## 16         NA           NA 0.000000000  0.00000000  0.00000000
## 17         NA           NA 0.000000000  0.00000000  0.00000000
## 18         NA           NA 0.000000000  0.00000000  0.00000000
## 19         NA           NA 0.000000000  0.00000000  0.00000000
## 20         NA           NA 0.000000000  0.00000000  0.00000000
## 21         NA           NA 0.212902435  0.89396346  0.89396346
## 22  4.4124879 1.021895e-05 0.164408027  0.81397113  0.81397113
## 23         NA           NA 0.168252718  0.76084801  0.76084801
## 24  4.0825917 4.453623e-05 0.199832823  0.96457946  0.96457946
## 25  1.0936052 2.741282e-01 0.059506262  0.31643642  0.31643642
## 26  2.2123159 2.694485e-02 1.088804133  1.08880413  1.08880413
## 27  2.0642881 3.899041e-02 0.011390659  0.20082932  0.20082932
## 28  2.4283634 1.516714e-02 0.013766982  0.33745099  0.33745099
## 29  2.5831527 9.790199e-03 0.020593218  0.42111030  0.42111030
## 30  0.9791185 3.275214e-01 0.002986637  0.06958647  0.06958647
## 31  2.5441029 1.095588e-02 0.031822275  0.89986799  0.89986799
## 32  2.1172611 3.423769e-02 1.000000000  1.00000000  1.00000000
## 33  1.6727352 9.437943e-02 1.000000000  1.00000000  1.00000000
## 34 75.6396510 0.000000e+00 4.834468806 20.29961974 20.29961974
## 35 93.5537682 0.000000e+00 5.074829992 25.12508185 25.12508185
## 36 81.2186311 0.000000e+00 4.828275780 21.83372768 21.83372768
## 37 83.6566138 0.000000e+00 4.661241880 22.49949789 22.49949789
## 38 95.5234790 0.000000e+00 4.837810211 25.72602078 25.72602078
## 39         NA           NA 0.000000000  0.00000000  0.00000000
## 40         NA           NA 0.000000000  0.00000000  0.00000000
## 41         NA           NA          NA          NA          NA
## 42         NA           NA          NA          NA          NA
## 43         NA           NA          NA          NA          NA
## 44         NA           NA          NA          NA          NA
## 45         NA           NA          NA          NA          NA
## 46         NA           NA          NA          NA          NA
## 47         NA           NA          NA          NA          NA
## 48         NA           NA          NA          NA          NA
## 49         NA           NA          NA          NA          NA
## 50         NA           NA          NA          NA          NA
##
## [1] "ESS round:  9"
##   chisq  pvalue     cfi     tli   rmsea    srmr
## 325.324   0.000   0.985   0.963   0.038   0.072
##          lhs op       rhs block group level      mi     epc sepc.lv
## 52 iplylfr_r ~~  impenv_r     1     1     1 283.993   0.085   0.085
```

```
## 53 ipeqopt_r ~~ ipudrst_r     1     1     1 142.305   0.075   0.075
## 43   Benev_w =~  impenv_r     1     1     1 142.300   1.317   0.814
## 50 iplylfr_r ~~ ipeqopt_r     1     1     1  92.793  -0.049  -0.049
## 55 ipudrst_r ~~  impenv_r     1     1     1  88.223  -0.061  -0.061
## 41   Benev_w =~ ipeqopt_r     1     1     1  88.214  -0.956  -0.591
## 51 iplylfr_r ~~ ipudrst_r     1     1     1  59.024  -0.040  -0.040
## 49 iphlppl_r ~~  impenv_r     1     1     1  40.371  -0.035  -0.035
## 48 iphlppl_r ~~ ipudrst_r     1     1     1  31.010   0.032   0.032
## 45   Unive_w =~ iplylfr_r     1     1     1  10.059 531.844 272.516
##    sepc.all sepc.nox
## 52    0.160    0.160
## 53    0.104    0.104
## 43    0.834    0.834
## 50   -0.084   -0.084
## 55   -0.092   -0.092
## 41   -0.578   -0.578
## 51   -0.075   -0.075
## 49   -0.063   -0.063
## 48    0.057    0.057
## 45  320.628  320.628
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.917
## iplylfr_r 0.373  0.763
## ipeqopt_r 0.337  0.257  1.100
## ipudrst_r 0.389  0.306  0.366  1.044
## impenv_r  0.315  0.321  0.280  0.305  0.974
##  [1] 0.373 0.337 0.389 0.315 0.257 0.306 0.321 0.366 0.280 0.305
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##     4.847     5.099     4.821     4.667     4.996
## $within
## $within$cov
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.852
## iplylfr_r 0.337  0.722
## ipeqopt_r 0.291  0.257  1.047
## ipudrst_r 0.326  0.287  0.294  0.995
## impenv_r  0.308  0.272  0.278  0.311  0.954
##
## $within$mean
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
##         0         0         0         0         0
##
##
## $cntry
## $cntry$cov
##           iphlp_ iplyl_ ipqpt_ ipdrs_ impnv_
## iphlppl_r 0.064
## iplylfr_r 0.033  0.037
## ipeqopt_r 0.046  0.027  0.054
## ipudrst_r 0.050  0.030  0.036  0.045
## impenv_r  0.017  0.010  0.012  0.013  0.023
##
## $cntry$mean
## iphlppl_r iplylfr_r ipeqopt_r ipudrst_r  impenv_r
```

```
##     4.864     5.110     4.837     4.685     5.003
##
##
## lavaan 0.6-5 ended normally after 134 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         27
##
##                                                   Used       Total
##   Number of observations                         26814       27540
##   Number of clusters [cntry]                        14
##
## Model Test User Model:
##
##   Test statistic                               325.324
##   Degrees of freedom                                 8
##   P-value (Chi-square)                           0.000
##
## Model Test Baseline Model:
##
##   Test statistic                             21183.167
##   Degrees of freedom                                20
##   P-value                                        0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                    0.985
##   Tucker-Lewis Index (TLI)                       0.963
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)            -173376.523
##   Loglikelihood unrestricted model (H1)    -173213.861
##
##   Akaike (AIC)                              346807.047
##   Bayesian (BIC)                            347028.357
##   Sample-size adjusted Bayesian (BIC)       346942.551
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.038
##   90 Percent confidence interval - lower         0.035
##   90 Percent confidence interval - upper         0.042
##   P-value RMSEA <= 0.05                          1.000
##
## Standardized Root Mean Square Residual (corr metric):
##
##   SRMR (within covariance matrix)                0.019
##   SRMR (between covariance matrix)               0.053
##
## Parameter Estimates:
##
##   Information                                 Observed
```

```
##   Observed information based on                Hessian
##   Standard errors                             Standard
##
##
## Level 1 [within]:
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_w =~
##     iphlppl_r        1.000                               0.618    0.670
##     iplylfr_r        0.881    0.013   68.646    0.000    0.545    0.641
##   Unive_w =~
##     ipeqopt_r        1.000                               0.512    0.501
##     ipudrst_r        1.120    0.019   57.859    0.000    0.574    0.575
##     impenv_r         1.059    0.019   54.931    0.000    0.543    0.556
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_w ~~
##     Unive_w          0.291    0.005   53.865    0.000    0.919    0.919
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.000                               0.000    0.000
##    .iplylfr_r        0.000                               0.000    0.000
##    .ipeqopt_r        0.000                               0.000    0.000
##    .ipudrst_r        0.000                               0.000    0.000
##    .impenv_r         0.000                               0.000    0.000
##     Benev_w          0.000                               0.000    0.000
##     Unive_w          0.000                               0.000    0.000
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.470    0.007   72.010    0.000    0.470    0.551
##    .iplylfr_r        0.425    0.005   78.667    0.000    0.425    0.589
##    .ipeqopt_r        0.784    0.008   97.094    0.000    0.784    0.749
##    .ipudrst_r        0.666    0.008   87.947    0.000    0.666    0.669
##    .impenv_r         0.659    0.007   91.876    0.000    0.659    0.691
##     Benev_w          0.382    0.008   47.854    0.000    1.000    1.000
##     Unive_w          0.263    0.007   35.330    0.000    1.000    1.000
##
## R-Square:
##                   Estimate
##     iphlppl_r        0.449
##     iplylfr_r        0.411
##     ipeqopt_r        0.251
##     ipudrst_r        0.331
##     impenv_r         0.309
##
##
## Level 2 [cntry]:
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
```

```
##   Benev_b =~
##     iphlppl_r         1.000                               0.236    0.931
##     iplylfr_r         0.595    0.161    3.696    0.000    0.140    0.730
##   Unive_b =~
##     ipeqopt_r         1.000                               0.181    0.784
##     ipudrst_r         1.091    0.260    4.190    0.000    0.198    0.929
##     impenv_r          0.365    0.228    1.600    0.110    0.066    0.436
##
## Covariances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_b ~~
##     Unive_b           0.046    0.020    2.300    0.021    1.080    1.080
##
## Intercepts:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         4.864    0.068   71.607    0.000    4.864   19.207
##    .iplylfr_r         5.110    0.052   99.065    0.000    5.110   26.618
##    .ipeqopt_r         4.837    0.062   77.779    0.000    4.837   20.898
##    .ipudrst_r         4.685    0.057   81.749    0.000    4.685   21.979
##    .impenv_r          5.003    0.041  122.077    0.000    5.003   32.995
##     Benev_b           0.000                               0.000    0.000
##     Unive_b           0.000                               0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         0.009    0.006    1.417    0.157    0.009    0.134
##    .iplylfr_r         0.017    0.007    2.515    0.012    0.017    0.466
##    .ipeqopt_r         0.021    0.008    2.640    0.008    0.021    0.386
##    .ipudrst_r         0.006    0.004    1.590    0.112    0.006    0.138
##    .impenv_r          0.019    0.007    2.494    0.013    0.019    0.810
##     Benev_b           0.056    0.025    2.248    0.025    1.000    1.000
##     Unive_b           0.033    0.019    1.752    0.080    1.000    1.000
##
## R-Square:
##                    Estimate
##     iphlppl_r         0.866
##     iplylfr_r         0.534
##     ipeqopt_r         0.614
##     ipudrst_r         0.862
##     impenv_r          0.190
##
## $FIT
##              npar              fmin             chisq                df
##            27.000             1.871           325.324             8.000
##            pvalue    baseline.chisq       baseline.df   baseline.pvalue
##             0.000         21183.167            20.000             0.000
##               cfi               tli              logl unrestricted.logl
##             0.985             0.963       -173376.523       -173213.861
##               aic               bic           ntotal              bic2
##        346807.047        347028.357         26814.000        346942.551
##             rmsea    rmsea.ci.lower    rmsea.ci.upper      rmsea.pvalue
##             0.038             0.035             0.042             1.000
##              srmr       srmr_within      srmr_between
##             0.072             0.019             0.053
```

```
##
## $PE
##          lhs op       rhs block level exo         est          se
## 1    Benev_w =~ iphlppl_r     1     1   0 1.000000000 0.000000000
## 2    Benev_w =~ iplylfr_r     1     1   0 0.881461360 0.012840614
## 3    Unive_w =~ ipeqopt_r     1     1   0 1.000000000 0.000000000
## 4    Unive_w =~ ipudrst_r     1     1   0 1.119563346 0.019349881
## 5    Unive_w =~  impenv_r     1     1   0 1.059305143 0.019284353
## 6    Benev_w ~~   Unive_w     1     1   0 0.291013414 0.005402635
## 7  iphlppl_r ~~ iphlppl_r     1     1   0 0.469688508 0.006522559
## 8  iplylfr_r ~~ iplylfr_r     1     1   0 0.425498502 0.005408858
## 9  ipeqopt_r ~~ ipeqopt_r     1     1   0 0.784324544 0.008077972
## 10 ipudrst_r ~~ ipudrst_r     1     1   0 0.666251439 0.007575636
## 11  impenv_r ~~  impenv_r     1     1   0 0.659453751 0.007177612
## 12   Benev_w ~~   Benev_w     1     1   0 0.382138029 0.007985434
## 13   Unive_w ~~   Unive_w     1     1   0 0.262552908 0.007431381
## 14 iphlppl_r ~1               1     1   0 0.000000000 0.000000000
## 15 iplylfr_r ~1               1     1   0 0.000000000 0.000000000
## 16 ipeqopt_r ~1               1     1   0 0.000000000 0.000000000
## 17 ipudrst_r ~1               1     1   0 0.000000000 0.000000000
## 18  impenv_r ~1               1     1   0 0.000000000 0.000000000
## 19   Benev_w ~1               1     1   0 0.000000000 0.000000000
## 20   Unive_w ~1               1     1   0 0.000000000 0.000000000
## 21   Benev_b =~ iphlppl_r     2     2   0 1.000000000 0.000000000
## 22   Benev_b =~ iplylfr_r     2     2   0 0.595039598 0.160986042
## 23   Unive_b =~ ipeqopt_r     2     2   0 1.000000000 0.000000000
## 24   Unive_b =~ ipudrst_r     2     2   0 1.091211026 0.260410682
## 25   Unive_b =~  impenv_r     2     2   0 0.364601603 0.227910959
## 26   Benev_b ~~   Unive_b     2     2   0 0.046148355 0.020067681
## 27 iphlppl_r ~~ iphlppl_r     2     2   0 0.008592054 0.006065688
## 28 iplylfr_r ~~ iplylfr_r     2     2   0 0.017187102 0.006835153
## 29 ipeqopt_r ~~ ipeqopt_r     2     2   0 0.020679993 0.007833753
## 30 ipudrst_r ~~ ipudrst_r     2     2   0 0.006263758 0.003940249
## 31  impenv_r ~~  impenv_r     2     2   0 0.018615378 0.007463831
## 32   Benev_b ~~   Benev_b     2     2   0 0.055536010 0.024704209
## 33   Unive_b ~~   Unive_b     2     2   0 0.032898971 0.018776285
## 34 iphlppl_r ~1               2     2   0 4.863931703 0.067925785
## 35 iplylfr_r ~1               2     2   0 5.109778118 0.051579888
## 36 ipeqopt_r ~1               2     2   0 4.837368593 0.062193620
## 37 ipudrst_r ~1               2     2   0 4.685070437 0.057310333
## 38  impenv_r ~1               2     2   0 5.002753533 0.040980327
## 39   Benev_b ~1               2     2   0 0.000000000 0.000000000
## 40   Unive_b ~1               2     2   0 0.000000000 0.000000000
## 41 iphlppl_r r2 iphlppl_r     1     1   0 0.448610148          NA
## 42 iplylfr_r r2 iplylfr_r     1     1   0 0.411001257          NA
## 43 ipeqopt_r r2 ipeqopt_r     1     1   0 0.250796220          NA
## 44 ipudrst_r r2 ipudrst_r     1     1   0 0.330630001          NA
## 45  impenv_r r2  impenv_r     1     1   0 0.308800535          NA
## 46 iphlppl_r r2 iphlppl_r     2     2   0 0.866017252          NA
## 47 iplylfr_r r2 iplylfr_r     2     2   0 0.533603716          NA
## 48 ipeqopt_r r2 ipeqopt_r     2     2   0 0.614027752          NA
## 49 ipudrst_r r2 ipudrst_r     2     2   0 0.862146928          NA
## 50  impenv_r r2  impenv_r     2     2   0 0.190240743          NA
##             z       pvalue      std.lv    std.all    std.nox
```

```
## 1          NA           NA 0.618173138  0.6697837  0.6697837
## 2   68.646354 0.000000e+00 0.544895736  0.6410938  0.6410938
## 3          NA           NA 0.512399169  0.5007956  0.5007956
## 4   57.858928 0.000000e+00 0.573663328  0.5750043  0.5750043
## 5   54.930810 0.000000e+00 0.542787074  0.5556982  0.5556982
## 6   53.865091 0.000000e+00 0.918743886  0.9187439  0.9187439
## 7   72.009855 0.000000e+00 0.469688508  0.5513899  0.5513899
## 8   78.666973 0.000000e+00 0.425498502  0.5889987  0.5889987
## 9   97.094243 0.000000e+00 0.784324544  0.7492038  0.7492038
## 10  87.946605 0.000000e+00 0.666251439  0.6693700  0.6693700
## 11  91.876484 0.000000e+00 0.659453751  0.6911995  0.6911995
## 12  47.854385 0.000000e+00 1.000000000  1.0000000  1.0000000
## 13  35.330298 0.000000e+00 1.000000000  1.0000000  1.0000000
## 14         NA           NA 0.000000000  0.0000000  0.0000000
## 15         NA           NA 0.000000000  0.0000000  0.0000000
## 16         NA           NA 0.000000000  0.0000000  0.0000000
## 17         NA           NA 0.000000000  0.0000000  0.0000000
## 18         NA           NA 0.000000000  0.0000000  0.0000000
## 19         NA           NA 0.000000000  0.0000000  0.0000000
## 20         NA           NA 0.000000000  0.0000000  0.0000000
## 21         NA           NA 0.235660794  0.9306005  0.9306005
## 22   3.696219 2.188346e-04 0.140227504  0.7304818  0.7304818
## 23         NA           NA 0.181380736  0.7835992  0.7835992
## 24   4.190347 2.785286e-05 0.197924659  0.9285187  0.9285187
## 25   1.599755 1.096530e-01 0.066131707  0.4361660  0.4361660
## 26   2.299636 2.146887e-02 1.079636923  1.0796369  1.0796369
## 27   1.416501 1.566288e-01 0.008592054  0.1339827  0.1339827
## 28   2.514516 1.191959e-02 0.017187102  0.4663963  0.4663963
## 29   2.639858 8.294086e-03 0.020679993  0.3859722  0.3859722
## 30   1.589686 1.119056e-01 0.006263758  0.1378531  0.1378531
## 31   2.494078 1.262848e-02 0.018615378  0.8097593  0.8097593
## 32   2.248038 2.457374e-02 1.000000000  1.0000000  1.0000000
## 33   1.752156 7.974707e-02 1.000000000  1.0000000  1.0000000
## 34  71.606559 0.000000e+00 4.863931703 19.2071711 19.2071711
## 35  99.065319 0.000000e+00 5.109778118 26.6181741 26.6181741
## 36  77.779177 0.000000e+00 4.837368593 20.8983511 20.8983511
## 37  81.749140 0.000000e+00 4.685070437 21.9789460 21.9789460
## 38 122.076956 0.000000e+00 5.002753533 32.9952286 32.9952286
## 39         NA           NA 0.000000000  0.0000000  0.0000000
## 40         NA           NA 0.000000000  0.0000000  0.0000000
## 41         NA           NA          NA         NA         NA
## 42         NA           NA          NA         NA         NA
## 43         NA           NA          NA         NA         NA
## 44         NA           NA          NA         NA         NA
## 45         NA           NA          NA         NA         NA
## 46         NA           NA          NA         NA         NA
## 47         NA           NA          NA         NA         NA
## 48         NA           NA          NA         NA         NA
## 49         NA           NA          NA         NA         NA
## 50         NA           NA          NA         NA         NA
```

Multilevel SEM

```
Msemmodel <-'
level: 1
Benev_w =~ 1*iphlppl_r + 0.8*iplylfr_r
Unive_w =~ 1*ipeqopt_r + 1*ipudrst_r + 1*impenv_r
STrasc_w =~ 1*Unive_w + 0.9*Benev_w
STrasc_w ~  agea + gndrD + eisced2 + eisced3 + domicil2 + domicil3 + domicil4
level: 2
Benev_b =~ 1*iphlppl_r + 0.6*iplylfr_r
Unive_b =~ 1*ipeqopt_r + 1*ipudrst_r + 0.3*impenv_r
STrasc_b =~ 1*Unive_b + 0.3*Benev_b
STrasc_b ~  HDI
'
for (r in c(8,9)) {
  ds_filtrada2 <- ds_filtradaAll %>% filter(essround == r)

  lavaan.Msemfit <- lavaan(Msemmodel, data=ds_filtrada2,
                           auto.fix.first=TRUE,  #factor loading of first indicator set to 1
                           int.ov.free=TRUE,     #intercepts not fixed to 0
                           meanstructure=TRUE,   #the means of the observed variables enter the model, n
                           auto.var=TRUE,        #residual variances and variances of exogeneous latent
                           auto.cov.lv.x=TRUE,   #covariances of exogeneous latent variables are include
                           cluster = "cntry")
  assign(paste0("survey.Msemfit",r),lavaan.Msemfit)

  print(paste("ESS round: ", r))
  print(fitMeasures(lavaan.Msemfit, c("chisq","pvalue","cfi", "tli","rmsea", "srmr")))
  print(modindices(lavaan.Msemfit,sort=T)[1:10,])

  print(summary(lavaan.Msemfit, standardized=T, rsquare=T, fit.measures=T))


}
```

```
## Warning in lav_object_post_check(object): lavaan WARNING: some estimated lv
## variances are negative
```

```
## [1] "ESS round:  8"
##    chisq   pvalue      cfi      tli    rmsea     srmr
## 2033.985    0.000    0.970    0.960    0.040    0.309
##           lhs op       rhs block group level         mi         epc
## 186   Unive_b ~~  STrasc_b     2     1     2 396394.674  161240.049
## 174 iphlppl_r ~~ iplylfr_r     2     1     2 361094.283  316169.226
## 185   Benev_b ~~  STrasc_b     2     1     2 295543.042 -130486.769
## 184   Benev_b ~~   Unive_b     2     1     2 120253.434  -37084.702
## 108 iplylfr_r ~~  impenv_r     1     1     1    176.467       0.058
## 109 ipeqopt_r ~~ ipudrst_r     1     1     1    114.448       0.063
## 111 ipudrst_r ~~  impenv_r     1     1     1    102.694      -0.059
## 106 iplylfr_r ~~ ipeqopt_r     1     1     1     48.930      -0.031
## 4     Unive_w =~ ipudrst_r     1     1     1     46.845       0.096
## 93    Benev_w =~ ipudrst_r     1     1     1     43.606       0.074
##          sepc.lv     sepc.all     sepc.nox
## 186   914512.218   914512.218   914512.218
```

```
## 174   316169.226 22865141.238 22865141.238
## 185 -1447795.867 -1447795.867 -1447795.867
## 184  -475985.224  -475985.224  -475985.224
## 108        0.058        0.103        0.103
## 109        0.063        0.088        0.088
## 111       -0.059       -0.085       -0.085
## 106       -0.031       -0.054       -0.054
## 4          0.055        0.055        0.055
## 93         0.050        0.050        0.050
## lavaan 0.6-5 ended normally after 150 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         29
##
##                                                   Used       Total
##   Number of observations                         27310       28080
##   Number of clusters [cntry]                        14
##
## Model Test User Model:
##
##   Test statistic                              2033.985
##   Degrees of freedom                            46
##   P-value (Chi-square)                           0.000
##
## Model Test Baseline Model:
##
##   Test statistic                             65249.164
##   Degrees of freedom                            60
##   P-value                                        0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                    0.970
##   Tucker-Lewis Index (TLI)                       0.960
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)            -379814.359
##   Loglikelihood unrestricted model (H1)    -378797.367
##
##   Akaike (AIC)                              759686.718
##   Bayesian (BIC)                            759924.953
##   Sample-size adjusted Bayesian (BIC)       759832.792
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.040
##   90 Percent confidence interval - lower         0.038
##   90 Percent confidence interval - upper         0.041
##   P-value RMSEA <= 0.05                          1.000
##
## Standardized Root Mean Square Residual (corr metric):
##
```

```
##   SRMR (within covariance matrix)                0.024
##   SRMR (between covariance matrix)               0.285
##
## Parameter Estimates:
##
##   Information                                 Observed
##   Observed information based on                Hessian
##   Standard errors                             Standard
##
##
## Level 1 [within]:
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_w =~
##     iphlppl_r        1.000                               0.670    0.708
##     iplylfr_r        0.800                               0.536    0.625
##   Unive_w =~
##     ipeqopt_r        1.000                               0.569    0.546
##     ipudrst_r        1.000                               0.569    0.570
##     impenv_r         1.000                               0.569    0.560
##   STrasc_w =~
##     Unive_w          1.000                               1.078    1.078
##     Benev_w          0.900                               0.824    0.824
##
## Regressions:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   STrasc_w ~
##     agea             0.002    0.000    6.575    0.000    0.003    0.047
##     gndrD            0.153    0.009   17.776    0.000    0.249    0.125
##     eisced2          0.118    0.010   11.487    0.000    0.193    0.089
##     eisced3          0.194    0.011   17.081    0.000    0.316    0.133
##     domicil2         0.044    0.010    4.312    0.000    0.072    0.034
##     domicil3        -0.046    0.015   -3.037    0.002   -0.074   -0.023
##     domicil4         0.023    0.013    1.763    0.078    0.037    0.014
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.000                               0.000    0.000
##    .iplylfr_r        0.000                               0.000    0.000
##    .ipeqopt_r        0.000                               0.000    0.000
##    .ipudrst_r        0.000                               0.000    0.000
##    .impenv_r         0.000                               0.000    0.000
##    .Benev_w          0.000                               0.000    0.000
##    .Unive_w          0.000                               0.000    0.000
##    .STrasc_w         0.000                               0.000    0.000
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.447    0.006   74.161    0.000    0.447    0.499
##    .iplylfr_r        0.447    0.005   92.163    0.000    0.447    0.609
##    .ipeqopt_r        0.763    0.008   98.653    0.000    0.763    0.702
##    .ipudrst_r        0.674    0.007   96.816    0.000    0.674    0.675
##    .impenv_r         0.708    0.007   98.797    0.000    0.708    0.686
```

```
##    .Benev_w           0.144    0.005   27.336    0.000    0.320    0.320
##    .Unive_w          -0.052    0.004  -12.481    0.000   -0.162   -0.162
##    .STrasc_w          0.363    0.005   76.484    0.000    0.964    0.964
##
## R-Square:
##                    Estimate
##     iphlppl_r         0.501
##     iplylfr_r         0.391
##     ipeqopt_r         0.298
##     ipudrst_r         0.325
##     impenv_r          0.314
##     Benev_w           0.680
##     Unive_w              NA
##     STrasc_w          0.036
##
##
## Level 2 [cntry]:
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_b =~
##     iphlppl_r         1.000                               0.242    0.902
##     iplylfr_r         0.600                               0.145    0.772
##   Unive_b =~
##     ipeqopt_r         1.000                               0.235    0.848
##     ipudrst_r         1.000                               0.235    0.957
##     impenv_r          0.300                               0.070    0.375
##   STrasc_b =~
##     Unive_b           1.000                               1.940    1.940
##     Benev_b           0.300                               0.565    0.565
##
## Regressions:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   STrasc_b ~
##     HDI              -2.201    0.630   -3.492    0.000   -4.830   -0.132
##
## Intercepts:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         5.211    0.187   27.931    0.000    5.211   19.440
##    .iplylfr_r         5.257    0.115   45.626    0.000    5.257   27.953
##    .ipeqopt_r         6.580    0.577   11.397    0.000    6.580   23.776
##    .ipudrst_r         6.412    0.576   11.125    0.000    6.412   26.133
##    .impenv_r          5.189    0.180   28.890    0.000    5.189   27.620
##    .Benev_b           0.000                               0.000    0.000
##    .Unive_b           0.000                               0.000    0.000
##    .STrasc_b          0.000                               0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         0.013    0.006    2.298    0.022    0.013    0.186
##    .iplylfr_r         0.014    0.006    2.556    0.011    0.014    0.405
##    .ipeqopt_r         0.021    0.008    2.644    0.008    0.021    0.280
##    .ipudrst_r         0.005    0.003    1.909    0.056    0.005    0.084
##    .impenv_r          0.030    0.012    2.621    0.009    0.030    0.859
```

```
##    .Benev_b           0.040    0.019    2.057    0.040    0.681    0.681
##    .Unive_b          -0.152    0.057   -2.667    0.008   -2.764   -2.764
##    .STrasc_b          0.204    0.079    2.596    0.009    0.983    0.983
##
## R-Square:
##                    Estimate
##     iphlppl_r         0.814
##     iplylfr_r         0.595
##     ipeqopt_r         0.720
##     ipudrst_r         0.916
##     impenv_r          0.141
##     Benev_b           0.319
##     Unive_b              NA
##     STrasc_b          0.017
##
## $FIT
##              npar              fmin             chisq                df
##            29.000             2.880          2033.985            46.000
##            pvalue    baseline.chisq       baseline.df   baseline.pvalue
##             0.000         65249.164            60.000             0.000
##               cfi               tli              logl unrestricted.logl
##             0.970             0.960       -379814.359       -378797.367
##               aic               bic            ntotal              bic2
##        759686.718        759924.953         27310.000        759832.792
##             rmsea    rmsea.ci.lower    rmsea.ci.upper      rmsea.pvalue
##             0.040             0.038             0.041             1.000
##              srmr       srmr_within      srmr_between
##             0.309             0.024             0.285
##
## $PE
##           lhs op       rhs block level exo           est          se
## 1     Benev_w =~ iphlppl_r     1     1   0  1.000000e+00 0.000000000
## 2     Benev_w =~ iplylfr_r     1     1   0  8.000000e-01 0.000000000
## 3     Unive_w =~ ipeqopt_r     1     1   0  1.000000e+00 0.000000000
## 4     Unive_w =~ ipudrst_r     1     1   0  1.000000e+00 0.000000000
## 5     Unive_w =~  impenv_r     1     1   0  1.000000e+00 0.000000000
## 6    STrasc_w =~   Unive_w     1     1   0  1.000000e+00 0.000000000
## 7    STrasc_w =~   Benev_w     1     1   0  9.000000e-01 0.000000000
## 8    STrasc_w  ~      agea     1     1   0  1.556544e-03 0.000236734
## 9    STrasc_w  ~     gndrD     1     1   0  1.528786e-01 0.008600340
## 10   STrasc_w  ~   eisced2     1     1   0  1.181197e-01 0.010282582
## 11   STrasc_w  ~   eisced3     1     1   0  1.937525e-01 0.011343114
## 12   STrasc_w  ~  domicil2     1     1   0  4.429143e-02 0.010272637
## 13   STrasc_w  ~  domicil3     1     1   0 -4.568284e-02 0.015040908
## 14   STrasc_w  ~  domicil4     1     1   0  2.254077e-02 0.012788988
## 15  iphlppl_r ~~ iphlppl_r     1     1   0  4.468736e-01 0.006025726
## 16  iplylfr_r ~~ iplylfr_r     1     1   0  4.468929e-01 0.004848955
## 17  ipeqopt_r ~~ ipeqopt_r     1     1   0  7.628520e-01 0.007732712
## 18  ipudrst_r ~~ ipudrst_r     1     1   0  6.735985e-01 0.006957500
## 19   impenv_r ~~  impenv_r     1     1   0  7.084666e-01 0.007170912
## 20    Benev_w ~~   Benev_w     1     1   0  1.437275e-01 0.005257783
## 21    Unive_w ~~   Unive_w     1     1   0 -5.242045e-02 0.004200037
## 22   STrasc_w ~~  STrasc_w     1     1   0  3.627491e-01 0.004742799
## 23       agea ~~      agea     1     1   1  3.410479e+02 0.000000000
```

```
## 24       agea ~~     gndrD     1     1   1  2.198374e-01 0.000000000
## 25       agea ~~   eisced2     1     1   1 -7.871643e-01 0.000000000
## 26       agea ~~   eisced3     1     1   1 -4.428063e-01 0.000000000
## 27       agea ~~  domicil2     1     1   1 -1.265644e-01 0.000000000
## 28       agea ~~  domicil3     1     1   1  1.319128e-02 0.000000000
## 29       agea ~~  domicil4     1     1   1 -3.595062e-01 0.000000000
## 30      gndrD ~~     gndrD     1     1   1  2.497038e-01 0.000000000
## 31      gndrD ~~   eisced2     1     1   1  7.219213e-04 0.000000000
## 32      gndrD ~~   eisced3     1     1   1  3.103269e-03 0.000000000
## 33      gndrD ~~  domicil2     1     1   1  4.278976e-03 0.000000000
## 34      gndrD ~~  domicil3     1     1   1 -2.766908e-03 0.000000000
## 35      gndrD ~~  domicil4     1     1   1  1.353776e-03 0.000000000
## 36    eisced2 ~~   eisced2     1     1   1  2.139681e-01 0.000000000
## 37    eisced2 ~~   eisced3     1     1   1 -7.144008e-02 0.000000000
## 38    eisced2 ~~  domicil2     1     1   1  5.272074e-03 0.000000000
## 39    eisced2 ~~  domicil3     1     1   1 -3.777640e-04 0.000000000
## 40    eisced2 ~~  domicil4     1     1   1  1.122347e-03 0.000000000
## 41    eisced3 ~~   eisced3     1     1   1  1.772719e-01 0.000000000
## 42    eisced3 ~~  domicil2     1     1   1 -4.220485e-03 0.000000000
## 43    eisced3 ~~  domicil3     1     1   1  8.044033e-03 0.000000000
## 44    eisced3 ~~  domicil4     1     1   1  1.710203e-02 0.000000000
## 45   domicil2 ~~  domicil2     1     1   1  2.162388e-01 0.000000000
## 46   domicil2 ~~  domicil3     1     1   1 -3.335124e-02 0.000000000
## 47   domicil2 ~~  domicil4     1     1   1 -5.284087e-02 0.000000000
## 48   domicil3 ~~  domicil3     1     1   1  9.433493e-02 0.000000000
## 49   domicil3 ~~  domicil4     1     1   1 -1.761974e-02 0.000000000
## 50   domicil4 ~~  domicil4     1     1   1  1.391654e-01 0.000000000
## 51  iphlppl_r ~1              1     1   0  0.000000e+00 0.000000000
## 52  iplylfr_r ~1              1     1   0  0.000000e+00 0.000000000
## 53  ipeqopt_r ~1              1     1   0  0.000000e+00 0.000000000
## 54  ipudrst_r ~1              1     1   0  0.000000e+00 0.000000000
## 55   impenv_r ~1              1     1   0  0.000000e+00 0.000000000
## 56       agea ~1              1     1   1  4.892179e+01 0.000000000
## 57      gndrD ~1              1     1   1  5.172098e-01 0.000000000
## 58    eisced2 ~1              1     1   1  3.101794e-01 0.000000000
## 59    eisced3 ~1              1     1   1  2.303186e-01 0.000000000
## 60   domicil2 ~1              1     1   1  3.162578e-01 0.000000000
## 61   domicil3 ~1              1     1   1  1.054559e-01 0.000000000
## 62   domicil4 ~1              1     1   1  1.670817e-01 0.000000000
## 63    Benev_w ~1              1     1   0  0.000000e+00 0.000000000
## 64    Unive_w ~1              1     1   0  0.000000e+00 0.000000000
## 65   STrasc_w ~1              1     1   0  0.000000e+00 0.000000000
## 66    Benev_b =~ iphlppl_r    2     2   0  1.000000e+00 0.000000000
## 67    Benev_b =~ iplylfr_r    2     2   0  6.000000e-01 0.000000000
## 68    Unive_b =~ ipeqopt_r    2     2   0  1.000000e+00 0.000000000
## 69    Unive_b =~ ipudrst_r    2     2   0  1.000000e+00 0.000000000
## 70    Unive_b =~  impenv_r    2     2   0  3.000000e-01 0.000000000
## 71   STrasc_b =~   Unive_b    2     2   0  1.000000e+00 0.000000000
## 72   STrasc_b =~   Benev_b    2     2   0  3.000000e-01 0.000000000
## 73   STrasc_b  ~       HDI    2     2   0 -2.200560e+00 0.630204698
## 74  iphlppl_r ~~ iphlppl_r    2     2   0  1.336121e-02 0.005813258
## 75  iplylfr_r ~~ iplylfr_r    2     2   0  1.431020e-02 0.005598895
## 76  ipeqopt_r ~~ ipeqopt_r    2     2   0  2.145820e-02 0.008114645
## 77  ipudrst_r ~~ ipudrst_r    2     2   0  5.071479e-03 0.002656770
```

```
## 78   impenv_r ~~  impenv_r     2     2   0  3.033974e-02 0.011577578
## 79    Benev_b ~~   Benev_b     2     2   0  3.982695e-02 0.019363247
## 80    Unive_b ~~   Unive_b     2     2   0 -1.524143e-01 0.057151720
## 81   STrasc_b ~~  STrasc_b     2     2   0  2.039582e-01 0.078572075
## 82        HDI ~~       HDI     2     2   1  7.415306e-04 0.000000000
## 83  iphlppl_r ~1              2     2   0  5.211421e+00 0.186580898
## 84  iplylfr_r ~1              2     2   0  5.257246e+00 0.115225027
## 85  ipeqopt_r ~1              2     2   0  6.580006e+00 0.577326722
## 86  ipudrst_r ~1              2     2   0  6.412218e+00 0.576356730
## 87   impenv_r ~1              2     2   0  5.189453e+00 0.179625594
## 88        HDI ~1              2     2   1  9.084286e-01 0.000000000
## 89    Benev_b ~1              2     2   0  0.000000e+00 0.000000000
## 90    Unive_b ~1              2     2   0  0.000000e+00 0.000000000
## 91   STrasc_b ~1              2     2   0  0.000000e+00 0.000000000
## 92  iphlppl_r r2 iphlppl_r    1     1   0  5.009515e-01          NA
## 93  iplylfr_r r2 iplylfr_r    1     1   0  3.911397e-01          NA
## 94  ipeqopt_r r2 ipeqopt_r    1     1   0  2.980685e-01          NA
## 95  ipudrst_r r2 ipudrst_r    1     1   0  3.247379e-01          NA
## 96   impenv_r r2  impenv_r    1     1   0  3.137703e-01          NA
## 97    Benev_w r2   Benev_w    1     1   0  6.795929e-01          NA
## 98    Unive_w r2   Unive_w    1     1   0            NA          NA
## 99   STrasc_w r2  STrasc_w    1     1   0  3.616018e-02          NA
## 100 iphlppl_r r2 iphlppl_r    2     2   0  8.140857e-01          NA
## 101 iplylfr_r r2 iplylfr_r    2     2   0  5.954427e-01          NA
## 102 ipeqopt_r r2 ipeqopt_r    2     2   0  7.198412e-01          NA
## 103 ipudrst_r r2 ipudrst_r    2     2   0  9.157650e-01          NA
## 104  impenv_r r2  impenv_r    2     2   0  1.405629e-01          NA
## 105   Benev_b r2   Benev_b    2     2   0  3.192715e-01          NA
## 106   Unive_b r2   Unive_b    2     2   0            NA          NA
## 107  STrasc_b r2  STrasc_b    2     2   0  1.730114e-02          NA
##              z       pvalue        std.lv      std.all       std.nox
## 1           NA           NA  6.697594e-01  0.707779301  7.077793e-01
## 2           NA           NA  5.358076e-01  0.625411621  6.254116e-01
## 3           NA           NA  5.691554e-01  0.545956539  5.459565e-01
## 4           NA           NA  5.691554e-01  0.569857799  5.698578e-01
## 5           NA           NA  5.691554e-01  0.560152034  5.601520e-01
## 6           NA           NA  1.077879e+00  1.077878724  1.077879e+00
## 7           NA           NA  8.243743e-01  0.824374272  8.243743e-01
## 8     6.575076 4.862843e-11  2.537234e-03  0.046856329  2.537234e-03
## 9    17.775881 0.000000e+00  2.491988e-01  0.124525586  2.491988e-01
## 10   11.487356 0.000000e+00  1.925402e-01  0.089062742  1.925402e-01
## 11   17.081070 0.000000e+00  3.158251e-01  0.132973959  3.158251e-01
## 12    4.311593 1.620828e-05  7.219696e-02  0.033572656  7.219696e-02
## 13   -3.037239 2.387558e-03 -7.446502e-02 -0.022871180 -7.446502e-02
## 14    1.762514 7.798255e-02  3.674243e-02  0.013706718  3.674243e-02
## 15   74.160954 0.000000e+00  4.468736e-01  0.499048461  4.990485e-01
## 16   92.162717 0.000000e+00  4.468929e-01  0.608860305  6.088603e-01
## 17   98.652582 0.000000e+00  7.628520e-01  0.701931458  7.019315e-01
## 18   96.816168 0.000000e+00  6.735985e-01  0.675262089  6.752621e-01
## 19   98.797291 0.000000e+00  7.084666e-01  0.686229699  6.862297e-01
## 20   27.336134 0.000000e+00  3.204071e-01  0.320407060  3.204071e-01
## 21  -12.480950 0.000000e+00 -1.618225e-01 -0.161822543 -1.618225e-01
## 22   76.484195 0.000000e+00  9.638398e-01  0.963839824  9.638398e-01
## 23          NA           NA  3.410479e+02  1.000000000  3.410479e+02
```

```
## 24          NA           NA  2.198374e-01  0.023822173  2.198374e-01
## 25          NA           NA -7.871643e-01 -0.092147415 -7.871643e-01
## 26          NA           NA -4.428063e-01 -0.056949004 -4.428063e-01
## 27          NA           NA -1.265644e-01 -0.014737949 -1.265644e-01
## 28          NA           NA  1.319128e-02  0.002325642  1.319128e-02
## 29          NA           NA -3.595062e-01 -0.052183487 -3.595062e-01
## 30          NA           NA  2.497038e-01  1.000000000  2.497038e-01
## 31          NA           NA  7.219213e-04  0.003123221  7.219213e-04
## 32          NA           NA  3.103269e-03  0.014749824  3.103269e-03
## 33          NA           NA  4.278976e-03  0.018414523  4.278976e-03
## 34          NA           NA -2.766908e-03 -0.018027930 -2.766908e-03
## 35          NA           NA  1.353776e-03  0.007262207  1.353776e-03
## 36          NA           NA  2.139681e-01  1.000000000  2.139681e-01
## 37          NA           NA -7.144008e-02 -0.366815252 -7.144008e-02
## 38          NA           NA  5.272074e-03  0.024509820  5.272074e-03
## 39          NA           NA -3.777640e-04 -0.002658947 -3.777640e-04
## 40          NA           NA  1.122347e-03  0.006504097  1.122347e-03
## 41          NA           NA  1.772719e-01  1.000000000  1.772719e-01
## 42          NA           NA -4.220485e-03 -0.021556367 -4.220485e-03
## 43          NA           NA  8.044033e-03  0.062203894  8.044033e-03
## 44          NA           NA  1.710203e-02  0.108883492  1.710203e-02
## 45          NA           NA  2.162388e-01  1.000000000  2.162388e-01
## 46          NA           NA -3.335124e-02 -0.233511848 -3.335124e-02
## 47          NA           NA -5.284087e-02 -0.304605388 -5.284087e-02
## 48          NA           NA  9.433493e-02  1.000000000  9.433493e-02
## 49          NA           NA -1.761974e-02 -0.153779230 -1.761974e-02
## 50          NA           NA  1.391654e-01  1.000000000  1.391654e-01
## 51          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 52          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 53          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 54          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 55          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 56          NA           NA  4.892179e+01  2.649077414  4.892179e+01
## 57          NA           NA  5.172098e-01  1.035032915  5.172098e-01
## 58          NA           NA  3.101794e-01  0.670561196  3.101794e-01
## 59          NA           NA  2.303186e-01  0.547027257  2.303186e-01
## 60          NA           NA  3.162578e-01  0.680102563  3.162578e-01
## 61          NA           NA  1.054559e-01  0.343347991  1.054559e-01
## 62          NA           NA  1.670817e-01  0.447881548  1.670817e-01
## 63          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 64          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 65          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 66          NA           NA  2.418809e-01  0.902267004  9.022670e-01
## 67          NA           NA  1.451285e-01  0.771649318  7.716493e-01
## 68          NA           NA  2.348080e-01  0.848434587  8.484346e-01
## 69          NA           NA  2.348080e-01  0.956956090  9.569561e-01
## 70          NA           NA  7.044241e-02  0.374917142  3.749171e-01
## 71          NA           NA  1.940204e+00  1.940204223  1.940204e+00
## 72          NA           NA  5.650412e-01  0.565041156  5.650412e-01
## 73   -3.491818 4.797447e-04 -4.830286e+00 -0.131533814 -4.830286e+00
## 74    2.298402 2.153889e-02  1.336121e-02  0.185914254  1.859143e-01
## 75    2.555898 1.059143e-02  1.431020e-02  0.404557330  4.045573e-01
## 76    2.644380 8.184074e-03  2.145820e-02  0.280158752  2.801588e-01
## 77    1.908889 5.627641e-02  5.071479e-03  0.084235042  8.423504e-02
```

```
## 78    2.620561 8.778534e-03  3.033974e-02  0.859437136  8.594371e-01
## 79    2.056832 3.970236e-02  6.807285e-01  0.680728492  6.807285e-01
## 80   -2.666836 7.656907e-03 -2.764392e+00 -2.764392428 -2.764392e+00
## 81    2.595811 9.436805e-03  9.826989e-01  0.982698856  9.826989e-01
## 82          NA           NA  7.415306e-04  1.000000000  7.415306e-04
## 83   27.931159 0.000000e+00  5.211421e+00 19.439703888  1.943970e+01
## 84   45.625905 0.000000e+00  5.257246e+00 27.952810241  2.795281e+01
## 85   11.397370 0.000000e+00  6.580006e+00 23.775612922  2.377561e+01
## 86   11.125432 0.000000e+00  6.412218e+00 26.132882796  2.613288e+01
## 87   28.890385 0.000000e+00  5.189453e+00 27.619934473  2.761993e+01
## 88          NA           NA  9.084286e-01 33.360015421  9.084286e-01
## 89          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 90          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 91          NA           NA  0.000000e+00  0.000000000  0.000000e+00
## 92          NA           NA            NA           NA            NA
## 93          NA           NA            NA           NA            NA
## 94          NA           NA            NA           NA            NA
## 95          NA           NA            NA           NA            NA
## 96          NA           NA            NA           NA            NA
## 97          NA           NA            NA           NA            NA
## 98          NA           NA            NA           NA            NA
## 99          NA           NA            NA           NA            NA
## 100         NA           NA            NA           NA            NA
## 101         NA           NA            NA           NA            NA
## 102         NA           NA            NA           NA            NA
## 103         NA           NA            NA           NA            NA
## 104         NA           NA            NA           NA            NA
## 105         NA           NA            NA           NA            NA
## 106         NA           NA            NA           NA            NA
## 107         NA           NA            NA           NA            NA

## Warning in lav_object_post_check(object): lavaan WARNING: some estimated lv
## variances are negative

## [1] "ESS round:  9"
##    chisq   pvalue      cfi      tli    rmsea     srmr
## 1625.558    0.000    0.974    0.966    0.036    0.368
##           lhs op       rhs block group level      mi    epc sepc.lv
## 108 iplylfr_r ~~  impenv_r     1     1     1 266.356  0.069   0.069
## 109 ipeqopt_r ~~ ipudrst_r     1     1     1 102.467  0.059   0.059
## 106 iplylfr_r ~~ ipeqopt_r     1     1     1  56.361 -0.034  -0.034
## 105 iphlppl_r ~~  impenv_r     1     1     1  53.062 -0.034  -0.034
## 100  STrasc_w =~ ipudrst_r     1     1     1  49.720  0.098   0.058
## 4     Unive_w =~ ipudrst_r     1     1     1  48.486  0.103   0.056
## 92    Benev_w =~ ipeqopt_r     1     1     1  45.741 -0.083  -0.054
## 111 ipudrst_r ~~  impenv_r     1     1     1  40.661 -0.036  -0.036
## 2     Benev_w =~ iplylfr_r     1     1     1  37.233  0.072   0.046
## 98   STrasc_w =~ iplylfr_r     1     1     1  37.233  0.065   0.038
##     sepc.all sepc.nox
## 108    0.129    0.129
## 109    0.082    0.082
## 106   -0.058   -0.058
## 105   -0.063   -0.063
## 100    0.059    0.059
## 4      0.057    0.057
```

```
## 92    -0.052   -0.052
## 111   -0.054   -0.054
## 2      0.055    0.055
## 98     0.046    0.046
## lavaan 0.6-5 ended normally after 129 iterations
##
##   Estimator                                         ML
##   Optimization method                           NLMINB
##   Number of free parameters                         29
##
##                                                   Used       Total
##   Number of observations                         26525       27540
##   Number of clusters [cntry]                        14
##
## Model Test User Model:
##
##   Test statistic                              1625.558
##   Degrees of freedom                            46
##   P-value (Chi-square)                           0.000
##
## Model Test Baseline Model:
##
##   Test statistic                             61286.099
##   Degrees of freedom                            60
##   P-value                                        0.000
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                    0.974
##   Tucker-Lewis Index (TLI)                       0.966
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)            -368587.364
##   Loglikelihood unrestricted model (H1)    -367774.585
##
##   Akaike (AIC)                              737232.727
##   Bayesian (BIC)                            737470.117
##   Sample-size adjusted Bayesian (BIC)       737377.955
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.036
##   90 Percent confidence interval - lower         0.034
##   90 Percent confidence interval - upper         0.037
##   P-value RMSEA <= 0.05                          1.000
##
## Standardized Root Mean Square Residual (corr metric):
##
##   SRMR (within covariance matrix)                0.021
##   SRMR (between covariance matrix)               0.347
##
## Parameter Estimates:
##
```

```
##   Information                                 Observed
##   Observed information based on                Hessian
##   Standard errors                             Standard
##
##
## Level 1 [within]:
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_w =~
##     iphlppl_r        1.000                               0.644    0.693
##     iplylfr_r        0.800                               0.516    0.615
##   Unive_w =~
##     ipeqopt_r        1.000                               0.543    0.527
##     ipudrst_r        1.000                               0.543    0.552
##     impenv_r         1.000                               0.543    0.556
##   STrasc_w =~
##     Unive_w          1.000                               1.096    1.096
##     Benev_w          0.900                               0.831    0.831
##
## Regressions:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   STrasc_w ~
##     agea            -0.000    0.000   -0.509    0.610   -0.000   -0.004
##     gndrD            0.158    0.008   18.614    0.000    0.265    0.132
##     eisced2          0.097    0.010    9.494    0.000    0.163    0.076
##     eisced3          0.171    0.011   15.414    0.000    0.288    0.123
##     domicil2         0.024    0.010    2.381    0.017    0.041    0.019
##     domicil3         0.061    0.014    4.209    0.000    0.102    0.032
##     domicil4         0.053    0.012    4.240    0.000    0.089    0.034
##
## Intercepts:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.000                               0.000    0.000
##    .iplylfr_r        0.000                               0.000    0.000
##    .ipeqopt_r        0.000                               0.000    0.000
##    .ipudrst_r        0.000                               0.000    0.000
##    .impenv_r         0.000                               0.000    0.000
##    .Benev_w          0.000                               0.000    0.000
##    .Unive_w          0.000                               0.000    0.000
##    .STrasc_w         0.000                               0.000    0.000
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r        0.448    0.006   74.486    0.000    0.448    0.519
##    .iplylfr_r        0.437    0.005   91.053    0.000    0.437    0.622
##    .ipeqopt_r        0.768    0.008   98.701    0.000    0.768    0.723
##    .ipudrst_r        0.674    0.007   96.352    0.000    0.674    0.696
##    .impenv_r         0.660    0.007   97.041    0.000    0.660    0.691
##    .Benev_w          0.128    0.005   25.086    0.000    0.309    0.309
##    .Unive_w         -0.059    0.004  -14.722    0.000   -0.201   -0.201
##    .STrasc_w         0.342    0.005   75.173    0.000    0.965    0.965
##
## R-Square:
```

```
##                    Estimate
##     iphlppl_r         0.481
##     iplylfr_r         0.378
##     ipeqopt_r         0.277
##     ipudrst_r         0.304
##     impenv_r          0.309
##     Benev_w           0.691
##     Unive_w              NA
##     STrasc_w          0.035
##
##
## Level 2 [cntry]:
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   Benev_b =~
##     iphlppl_r         1.000                               0.257    0.930
##     iplylfr_r         0.600                               0.154    0.768
##   Unive_b =~
##     ipeqopt_r         1.000                               0.258    0.871
##     ipudrst_r         1.000                               0.258    0.942
##     impenv_r          0.300                               0.077    0.498
##   STrasc_b =~
##     Unive_b           1.000                               1.885    1.885
##     Benev_b           0.300                               0.568    0.568
##
## Regressions:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   STrasc_b ~
##     HDI              -2.747    1.256   -2.188    0.029   -5.644   -0.147
##
## Intercepts:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         5.462    0.352   15.504    0.000    5.462   19.773
##    .iplylfr_r         5.439    0.214   25.453    0.000    5.439   27.080
##    .ipeqopt_r         7.176    1.150    6.241    0.000    7.176   24.208
##    .ipudrst_r         7.022    1.149    6.109    0.000    7.022   25.613
##    .impenv_r          5.584    0.347   16.093    0.000    5.584   35.892
##    .Benev_b           0.000                               0.000    0.000
##    .Unive_b           0.000                               0.000    0.000
##    .STrasc_b          0.000                               0.000    0.000
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .iphlppl_r         0.010    0.005    1.944    0.052    0.010    0.135
##    .iplylfr_r         0.017    0.006    2.555    0.011    0.017    0.411
##    .ipeqopt_r         0.021    0.008    2.720    0.007    0.021    0.242
##    .ipudrst_r         0.009    0.004    2.065    0.039    0.009    0.113
##    .impenv_r          0.018    0.007    2.591    0.010    0.018    0.752
##    .Benev_b           0.045    0.021    2.169    0.030    0.677    0.677
##    .Unive_b          -0.170    0.066   -2.589    0.010   -2.554   -2.554
##    .STrasc_b          0.232    0.093    2.481    0.013    0.979    0.979
##
## R-Square:
```

```
##                   Estimate
##     iphlppl_r        0.865
##     iplylfr_r        0.589
##     ipeqopt_r        0.758
##     ipudrst_r        0.887
##     impenv_r         0.248
##     Benev_b          0.323
##     Unive_b             NA
##     STrasc_b         0.021
##
## $FIT
##              npar              fmin             chisq                df
##            29.000             2.868          1625.558            46.000
##            pvalue    baseline.chisq       baseline.df   baseline.pvalue
##             0.000         61286.099            60.000             0.000
##               cfi               tli              logl unrestricted.logl
##             0.974             0.966       -368587.364       -367774.585
##               aic               bic            ntotal              bic2
##        737232.727        737470.117         26525.000        737377.955
##             rmsea    rmsea.ci.lower    rmsea.ci.upper      rmsea.pvalue
##             0.036             0.034             0.037             1.000
##              srmr       srmr_within      srmr_between
##             0.368             0.021             0.347
##
## $PE
##           lhs op       rhs block level exo           est           se
## 1     Benev_w =~ iphlppl_r     1     1   0  1.000000e+00 0.0000000000
## 2     Benev_w =~ iplylfr_r     1     1   0  8.000000e-01 0.0000000000
## 3     Unive_w =~ ipeqopt_r     1     1   0  1.000000e+00 0.0000000000
## 4     Unive_w =~ ipudrst_r     1     1   0  1.000000e+00 0.0000000000
## 5     Unive_w =~  impenv_r     1     1   0  1.000000e+00 0.0000000000
## 6    STrasc_w =~   Unive_w     1     1   0  1.000000e+00 0.0000000000
## 7    STrasc_w =~   Benev_w     1     1   0  9.000000e-01 0.0000000000
## 8    STrasc_w  ~      agea     1     1   0 -1.171120e-04 0.0002298919
## 9    STrasc_w  ~     gndrD     1     1   0  1.576829e-01 0.0084712322
## 10   STrasc_w  ~   eisced2     1     1   0  9.671476e-02 0.0101870586
## 11   STrasc_w  ~   eisced3     1     1   0  1.711307e-01 0.0111022194
## 12   STrasc_w  ~  domicil2     1     1   0  2.427666e-02 0.0101943465
## 13   STrasc_w  ~  domicil3     1     1   0  6.074543e-02 0.0144322294
## 14   STrasc_w  ~  domicil4     1     1   0  5.283799e-02 0.0124615900
## 15  iphlppl_r ~~ iphlppl_r     1     1   0  4.483448e-01 0.0060192120
## 16  iplylfr_r ~~ iplylfr_r     1     1   0  4.370384e-01 0.0047998150
## 17  ipeqopt_r ~~ ipeqopt_r     1     1   0  7.683690e-01 0.0077847825
## 18  ipudrst_r ~~ ipudrst_r     1     1   0  6.741743e-01 0.0069970030
## 19   impenv_r ~~  impenv_r     1     1   0  6.596906e-01 0.0067980655
## 20    Benev_w ~~   Benev_w     1     1   0  1.284189e-01 0.0051190518
## 21    Unive_w ~~   Unive_w     1     1   0 -5.937010e-02 0.0040327811
## 22   STrasc_w ~~  STrasc_w     1     1   0  3.418662e-01 0.0045477022
## 23       agea ~~      agea     1     1   1  3.476750e+02 0.0000000000
## 24       agea ~~     gndrD     1     1   1  2.426912e-01 0.0000000000
## 25       agea ~~   eisced2     1     1   1 -6.507168e-01 0.0000000000
## 26       agea ~~   eisced3     1     1   1 -5.406374e-01 0.0000000000
## 27       agea ~~  domicil2     1     1   1 -4.031874e-02 0.0000000000
## 28       agea ~~  domicil3     1     1   1  7.142469e-02 0.0000000000
```

```
## 29       agea ~~  domicil4     1     1   1 -3.147939e-01 0.0000000000
## 30      gndrD ~~     gndrD     1     1   1  2.492865e-01 0.0000000000
## 31      gndrD ~~   eisced2     1     1   1  2.435458e-03 0.0000000000
## 32      gndrD ~~   eisced3     1     1   1  1.850434e-03 0.0000000000
## 33      gndrD ~~  domicil2     1     1   1  5.429576e-03 0.0000000000
## 34      gndrD ~~  domicil3     1     1   1  2.237286e-05 0.0000000000
## 35      gndrD ~~  domicil4     1     1   1  1.692725e-04 0.0000000000
## 36    eisced2 ~~   eisced2     1     1   1  2.174369e-01 0.0000000000
## 37    eisced2 ~~   eisced3     1     1   1 -7.776361e-02 0.0000000000
## 38    eisced2 ~~  domicil2     1     1   1  5.859252e-03 0.0000000000
## 39    eisced2 ~~  domicil3     1     1   1 -1.655407e-03 0.0000000000
## 40    eisced2 ~~  domicil4     1     1   1  3.408555e-03 0.0000000000
## 41    eisced3 ~~   eisced3     1     1   1  1.841335e-01 0.0000000000
## 42    eisced3 ~~  domicil2     1     1   1 -2.470509e-03 0.0000000000
## 43    eisced3 ~~  domicil3     1     1   1  1.013673e-02 0.0000000000
## 44    eisced3 ~~  domicil4     1     1   1  1.310933e-02 0.0000000000
## 45   domicil2 ~~  domicil2     1     1   1  2.156720e-01 0.0000000000
## 46   domicil2 ~~  domicil3     1     1   1 -3.593941e-02 0.0000000000
## 47   domicil2 ~~  domicil4     1     1   1 -5.486425e-02 0.0000000000
## 48   domicil3 ~~  domicil3     1     1   1  1.011539e-01 0.0000000000
## 49   domicil3 ~~  domicil4     1     1   1 -1.990702e-02 0.0000000000
## 50   domicil4 ~~  domicil4     1     1   1  1.439365e-01 0.0000000000
## 51  iphlppl_r ~1              1     1   0  0.000000e+00 0.0000000000
## 52  iplylfr_r ~1              1     1   0  0.000000e+00 0.0000000000
## 53  ipeqopt_r ~1              1     1   0  0.000000e+00 0.0000000000
## 54  ipudrst_r ~1              1     1   0  0.000000e+00 0.0000000000
## 55   impenv_r ~1              1     1   0  0.000000e+00 0.0000000000
## 56       agea ~1              1     1   1  4.992818e+01 0.0000000000
## 57      gndrD ~1              1     1   1  5.267107e-01 0.0000000000
## 58    eisced2 ~1              1     1   1  3.195476e-01 0.0000000000
## 59    eisced3 ~1              1     1   1  2.433553e-01 0.0000000000
## 60   domicil2 ~1              1     1   1  3.147220e-01 0.0000000000
## 61   domicil3 ~1              1     1   1  1.141942e-01 0.0000000000
## 62   domicil4 ~1              1     1   1  1.743261e-01 0.0000000000
## 63    Benev_w ~1              1     1   0  0.000000e+00 0.0000000000
## 64    Unive_w ~1              1     1   0  0.000000e+00 0.0000000000
## 65   STrasc_w ~1              1     1   0  0.000000e+00 0.0000000000
## 66    Benev_b =~ iphlppl_r    2     2   0  1.000000e+00 0.0000000000
## 67    Benev_b =~ iplylfr_r    2     2   0  6.000000e-01 0.0000000000
## 68    Unive_b =~ ipeqopt_r    2     2   0  1.000000e+00 0.0000000000
## 69    Unive_b =~ ipudrst_r    2     2   0  1.000000e+00 0.0000000000
## 70    Unive_b =~  impenv_r    2     2   0  3.000000e-01 0.0000000000
## 71   STrasc_b =~   Unive_b    2     2   0  1.000000e+00 0.0000000000
## 72   STrasc_b =~   Benev_b    2     2   0  3.000000e-01 0.0000000000
## 73   STrasc_b  ~       HDI    2     2   0 -2.747089e+00 1.2557159064
## 74  iphlppl_r ~~ iphlppl_r    2     2   0  1.027236e-02 0.0052831418
## 75  iplylfr_r ~~ iplylfr_r    2     2   0  1.657031e-02 0.0064854741
## 76  ipeqopt_r ~~ ipeqopt_r    2     2   0  2.122868e-02 0.0078038810
## 77  ipudrst_r ~~ ipudrst_r    2     2   0  8.524864e-03 0.0041291925
## 78   impenv_r ~~  impenv_r    2     2   0  1.820477e-02 0.0070249056
## 79    Benev_b ~~   Benev_b    2     2   0  4.471581e-02 0.0206196201
## 80    Unive_b ~~   Unive_b    2     2   0 -1.702261e-01 0.0657391744
## 81   STrasc_b ~~  STrasc_b    2     2   0  2.317770e-01 0.0934117910
## 82       HDI ~~       HDI    2     2   1  6.743929e-04 0.0000000000
```

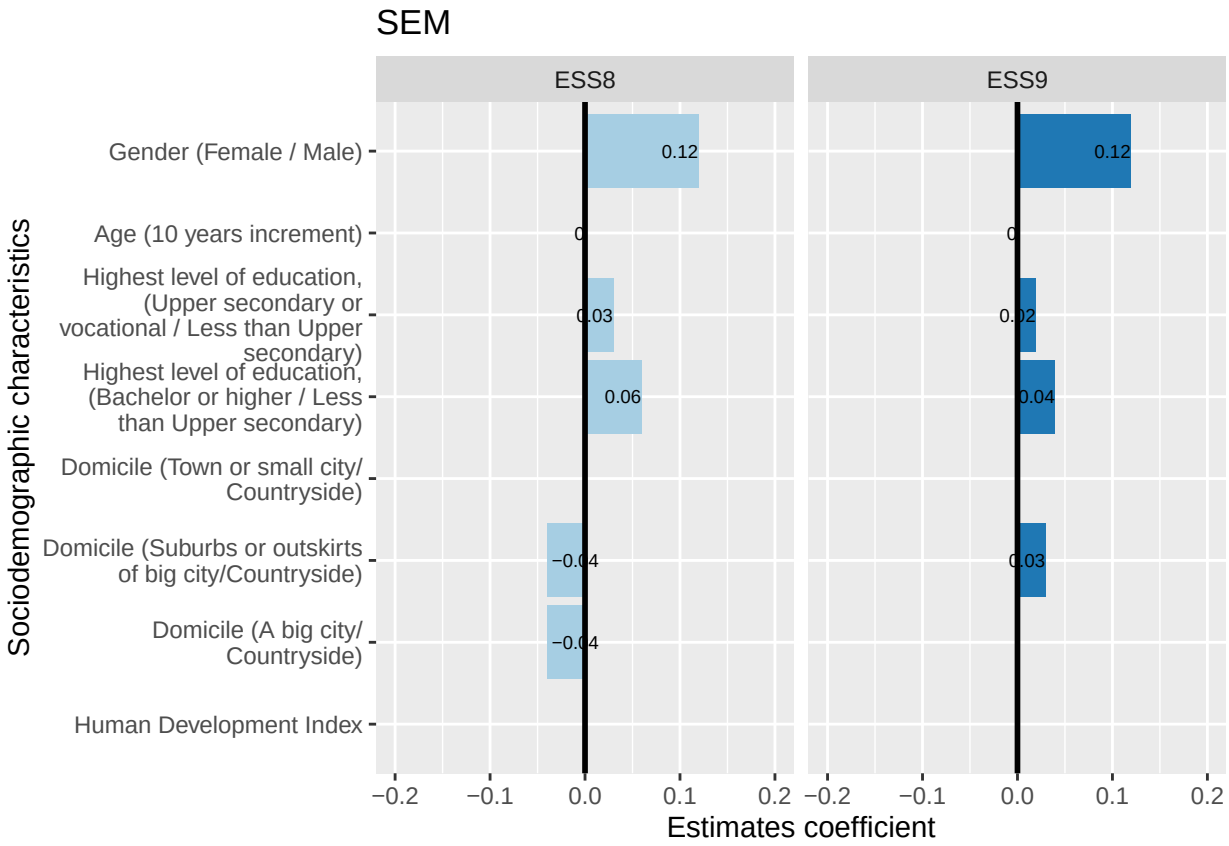
```
## 83  iphlppl_r ~1              2     2   0  5.461977e+00 0.3522979661
## 84  iplylfr_r ~1              2     2   0  5.439100e+00 0.2136958520
## 85  ipeqopt_r ~1              2     2   0  7.175775e+00 1.1497789923
## 86  ipudrst_r ~1              2     2   0  7.022142e+00 1.1493948679
## 87   impenv_r ~1              2     2   0  5.583718e+00 0.3469595797
## 88       HDI ~1              2     2   1  9.135000e-01 0.0000000000
## 89    Benev_b ~1              2     2   0  0.000000e+00 0.0000000000
## 90    Unive_b ~1              2     2   0  0.000000e+00 0.0000000000
## 91   STrasc_b ~1              2     2   0  0.000000e+00 0.0000000000
## 92  iphlppl_r r2 iphlppl_r    1     1   0  4.808664e-01           NA
## 93  iplylfr_r r2 iplylfr_r    1     1   0  3.781713e-01           NA
## 94  ipeqopt_r r2 ipeqopt_r    1     1   0  2.772833e-01           NA
## 95  ipudrst_r r2 ipudrst_r    1     1   0  3.042383e-01           NA
## 96   impenv_r r2  impenv_r    1     1   0  3.088549e-01           NA
## 97    Benev_w r2   Benev_w    1     1   0  6.907772e-01           NA
## 98    Unive_w r2   Unive_w    1     1   0            NA           NA
## 99   STrasc_w r2  STrasc_w    1     1   0  3.473660e-02           NA
## 100 iphlppl_r r2 iphlppl_r    2     2   0  8.653797e-01           NA
## 101 iplylfr_r r2 iplylfr_r    2     2   0  5.892590e-01           NA
## 102 ipeqopt_r r2 ipeqopt_r    2     2   0  7.584050e-01           NA
## 103 ipudrst_r r2 ipudrst_r    2     2   0  8.865847e-01           NA
## 104  impenv_r r2  impenv_r    2     2   0  2.478110e-01           NA
## 105   Benev_b r2   Benev_b    2     2   0  3.228342e-01           NA
## 106   Unive_b r2   Unive_b    2     2   0            NA           NA
## 107  STrasc_b r2  STrasc_b    2     2   0  2.148599e-02           NA
##              z       pvalue        std.lv       std.all       std.nox
## 1           NA           NA  6.444343e-01  0.6934452862  6.934453e-01
## 2           NA           NA  5.155475e-01  0.6149563119  6.149563e-01
## 3           NA           NA  5.429537e-01  0.5265769997  5.265770e-01
## 4           NA           NA  5.429537e-01  0.5515780010  5.515780e-01
## 5           NA           NA  5.429537e-01  0.5557471564  5.557472e-01
## 6           NA           NA  1.096080e+00  1.0960802860  1.096080e+00
## 7           NA           NA  8.311301e-01  0.8311300535  8.311301e-01
## 8   -0.509422 6.104565e-01 -1.967870e-04 -0.0036692982 -1.967870e-04
## 9   18.613932 0.000000e+00  2.649595e-01  0.1322905977  2.649595e-01
## 10   9.493885 0.000000e+00  1.625128e-01  0.0757799420  1.625128e-01
## 11  15.414095 0.000000e+00  2.875562e-01  0.1233925959  2.875562e-01
## 12   2.381385 1.724769e-02  4.079283e-02  0.0189443949  4.079283e-02
## 13   4.209012 2.564896e-05  1.020724e-01  0.0324638234  1.020724e-01
## 14   4.240068 2.234521e-05  8.878531e-02  0.0336842299  8.878531e-02
## 15  74.485626 0.000000e+00  4.483448e-01  0.5191336351  5.191336e-01
## 16  91.053171 0.000000e+00  4.370384e-01  0.6218287345  6.218287e-01
## 17  98.701415 0.000000e+00  7.683690e-01  0.7227166634  7.227167e-01
## 18  96.351871 0.000000e+00  6.741743e-01  0.6957617088  6.957617e-01
## 19  97.040931 0.000000e+00  6.596906e-01  0.6911450982  6.911451e-01
## 20  25.086460 0.000000e+00  3.092228e-01  0.3092228341  3.092228e-01
## 21 -14.721875 0.000000e+00 -2.013920e-01 -0.2013919935 -2.013920e-01
## 22  75.173387 0.000000e+00  9.652634e-01  0.9652633953  9.652634e-01
## 23          NA           NA  3.476750e+02  1.0000000000  3.476750e+02
## 24          NA           NA  2.426912e-01  0.0260686109  2.426912e-01
## 25          NA           NA -6.507168e-01 -0.0748408359 -6.507168e-01
## 26          NA           NA -5.406374e-01 -0.0675698567 -5.406374e-01
## 27          NA           NA -4.031874e-02 -0.0046561113 -4.031874e-02
## 28          NA           NA  7.142469e-02  0.0120439915  7.142469e-02
```

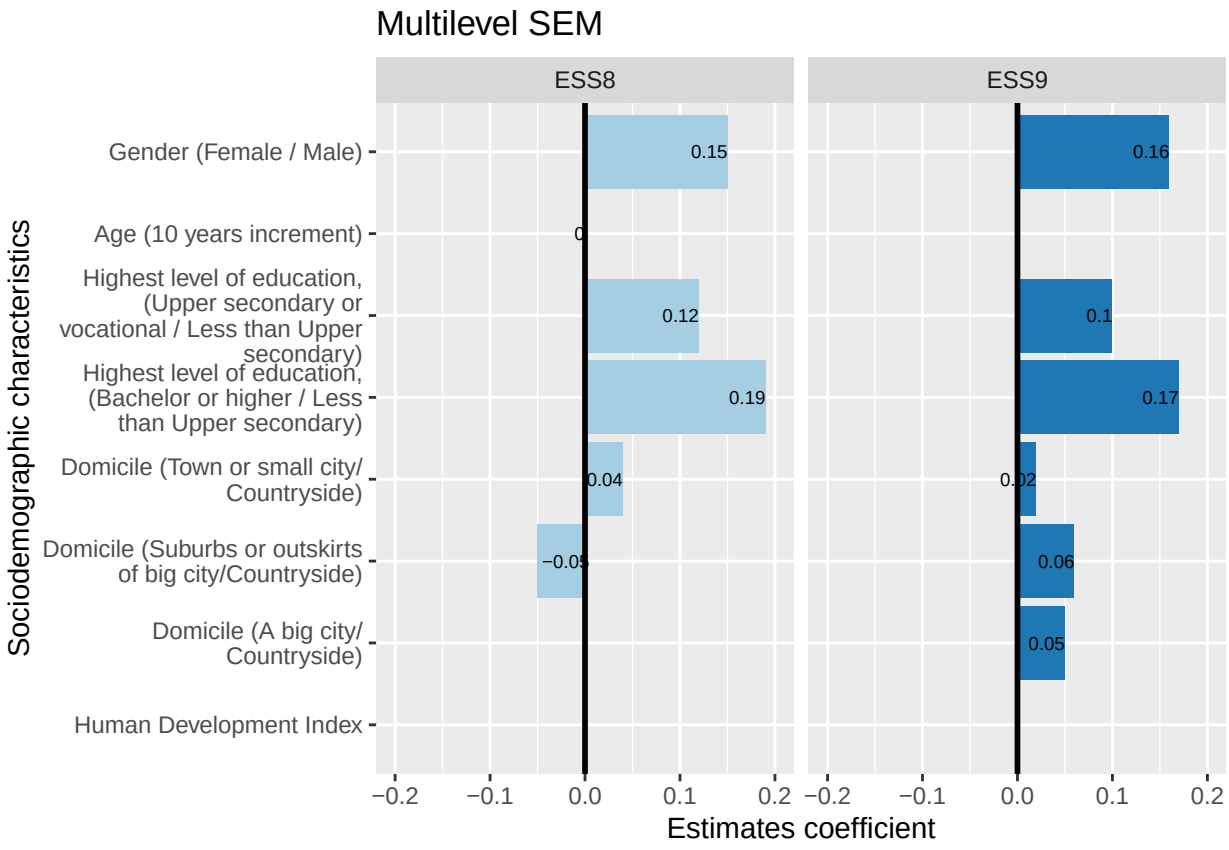
```
## 29          NA           NA -3.147939e-01 -0.0444993986 -3.147939e-01
## 30          NA           NA  2.492865e-01  1.0000000000  2.492865e-01
## 31          NA           NA  2.435458e-03  0.0104607929  2.435458e-03
## 32          NA           NA  1.850434e-03  0.0086368958  1.850434e-03
## 33          NA           NA  5.429576e-03  0.0234163679  5.429576e-03
## 34          NA           NA  2.237286e-05  0.0001408902  2.237286e-05
## 35          NA           NA  1.692725e-04  0.0008936171  1.692725e-04
## 36          NA           NA  2.174369e-01  1.0000000000  2.174369e-01
## 37          NA           NA -7.776361e-02 -0.3886362784 -7.776361e-02
## 38          NA           NA  5.859252e-03  0.0270569353  5.859252e-03
## 39          NA           NA -1.655407e-03 -0.0111621259 -1.655407e-03
## 40          NA           NA  3.408555e-03  0.0192671785  3.408555e-03
## 41          NA           NA  1.841335e-01  1.0000000000  1.841335e-01
## 42          NA           NA -2.470509e-03 -0.0123971859 -2.470509e-03
## 43          NA           NA  1.013673e-02  0.0742745760  1.013673e-02
## 44          NA           NA  1.310933e-02  0.0805246015  1.310933e-02
## 45          NA           NA  2.156720e-01  1.0000000000  2.156720e-01
## 46          NA           NA -3.593941e-02 -0.2433227894 -3.593941e-02
## 47          NA           NA -5.486425e-02 -0.3113917174 -5.486425e-02
## 48          NA           NA  1.011539e-01  1.0000000000  1.011539e-01
## 49          NA           NA -1.990702e-02 -0.1649793583 -1.990702e-02
## 50          NA           NA  1.439365e-01  1.0000000000  1.439365e-01
## 51          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 52          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 53          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 54          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 55          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 56          NA           NA  4.992818e+01  2.6776822518  4.992818e+01
## 57          NA           NA  5.267107e-01  1.0549276711  5.267107e-01
## 58          NA           NA  3.195476e-01  0.6852813325  3.195476e-01
## 59          NA           NA  2.433553e-01  0.5671193128  2.433553e-01
## 60          NA           NA  3.147220e-01  0.6776885010  3.147220e-01
## 61          NA           NA  1.141942e-01  0.3590481306  1.141942e-01
## 62          NA           NA  1.743261e-01  0.4594909268  1.743261e-01
## 63          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 64          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 65          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 66          NA           NA  2.569704e-01  0.9302578590  9.302579e-01
## 67          NA           NA  1.541822e-01  0.7676320489  7.676320e-01
## 68          NA           NA  2.581476e-01  0.8708644953  8.708645e-01
## 69          NA           NA  2.581476e-01  0.9415862739  9.415863e-01
## 70          NA           NA  7.744427e-02  0.4978061447  4.978061e-01
## 71          NA           NA  1.885313e+00  1.8853133853  1.885313e+00
## 72          NA           NA  5.681850e-01  0.5681850381  5.681850e-01
## 73  -2.187668 2.869381e-02 -5.644444e+00 -0.1465809886 -5.644444e+00
## 74   1.944365 5.185146e-02  1.027236e-02  0.1346203158  1.346203e-01
## 75   2.554988 1.061916e-02  1.657031e-02  0.4107410375  4.107410e-01
## 76   2.720272 6.522828e-03  2.122868e-02  0.2415950309  2.415950e-01
## 77   2.064535 3.896698e-02  8.524864e-03  0.1134152888  1.134153e-01
## 78   2.591461 9.556946e-03  1.820477e-02  0.7521890423  7.521890e-01
## 79   2.168605 3.011268e-02  6.771658e-01  0.6771657625  6.771658e-01
## 80  -2.589416 9.613878e-03 -2.554407e+00 -2.5544065607 -2.554407e+00
## 81   2.481239 1.309266e-02  9.785140e-01  0.9785140138  9.785140e-01
## 82          NA           NA  6.743929e-04  1.0000000000  6.743929e-04
```

```
## 83   15.503855 0.000000e+00  5.461977e+00 19.7728887963  1.977289e+01
## 84   25.452530 0.000000e+00  5.439100e+00 27.0798232455  2.707982e+01
## 85    6.241004 4.347722e-10  7.175775e+00 24.2075776203  2.420758e+01
## 86    6.109426 9.999033e-10  7.022142e+00 25.6130738778  2.561307e+01
## 87   16.093282 0.000000e+00  5.583718e+00 35.8917343696  3.589173e+01
## 88          NA           NA  9.135000e-01 35.1764550515  9.135000e-01
## 89          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 90          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 91          NA           NA  0.000000e+00  0.0000000000  0.000000e+00
## 92          NA           NA            NA            NA            NA
## 93          NA           NA            NA            NA            NA
## 94          NA           NA            NA            NA            NA
## 95          NA           NA            NA            NA            NA
## 96          NA           NA            NA            NA            NA
## 97          NA           NA            NA            NA            NA
## 98          NA           NA            NA            NA            NA
## 99          NA           NA            NA            NA            NA
## 100         NA           NA            NA            NA            NA
## 101         NA           NA            NA            NA            NA
## 102         NA           NA            NA            NA            NA
## 103         NA           NA            NA            NA            NA
## 104         NA           NA            NA            NA            NA
## 105         NA           NA            NA            NA            NA
## 106         NA           NA            NA            NA            NA
## 107         NA           NA            NA            NA            NA
```

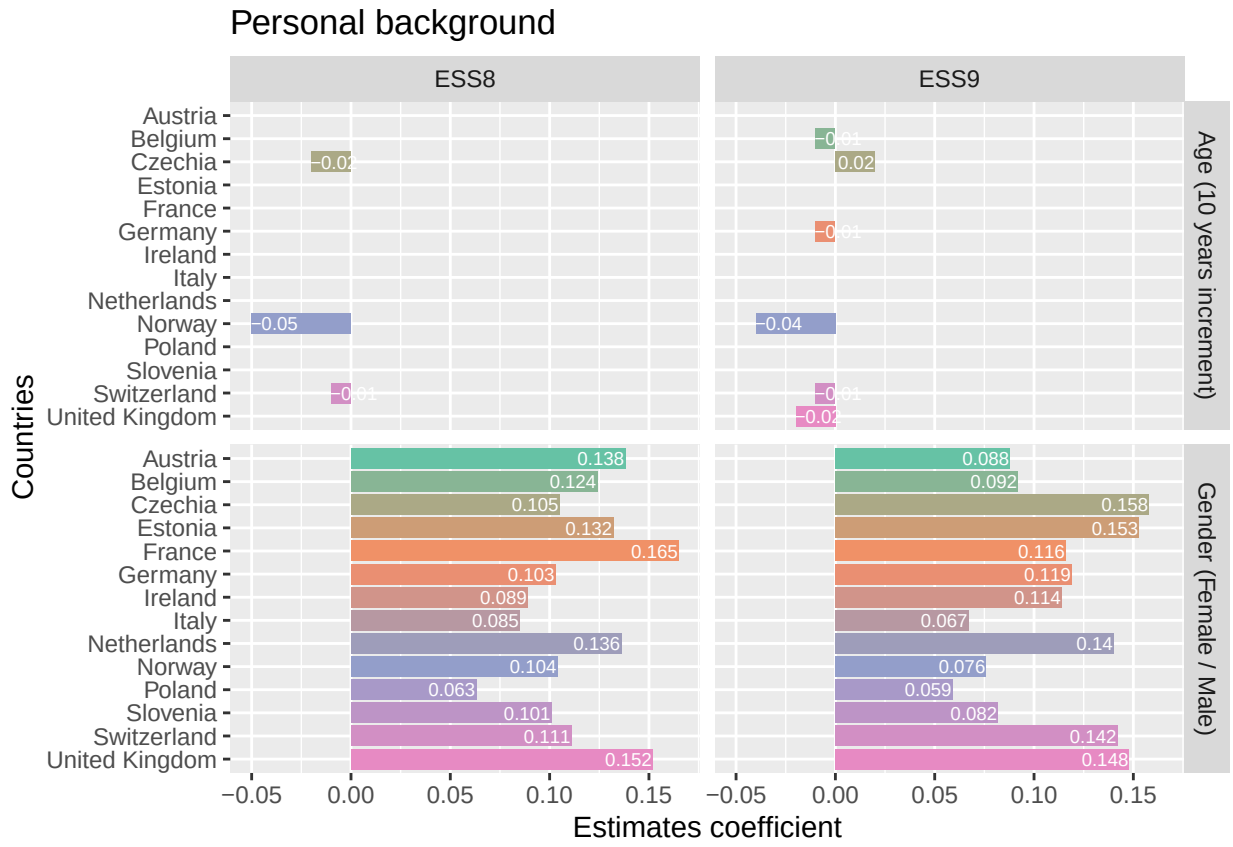
```
cntrylabels <- num_lab("
  1 Austria
  2 Belgium
  3 Czechia
  4 Estonia
  5 France
  6 Germany
  7 Ireland
  8 Italy
  9 Netherlands
  10    Norway
  11    Poland
  12    Slovenia
  13    Switzerland
  14    United Kingdom"
)

sum1 <-full_join(parameterEstimates(survey.mfit3r8),
                 parameterEstimates(survey.mfit3r9),
                 by=c("lhs", "op", "rhs","block","level"))

sum3 <-full_join(parameterEstimates(survey.Msemfit8),
                 parameterEstimates(survey.Msemfit9),
                 by=c("lhs", "op", "rhs","block","level"))
sum3 <- sum3 %>%  mutate(est.x = ifelse(pvalue.x > 0.05, NA, round(est.x,3)),
                         est.x = ifelse(rhs == "agea", est.x*10, est.x),
                         est.y = ifelse(pvalue.y > 0.05, NA, round(est.y,3)),
                         est.y = ifelse(rhs == "agea", est.y*10, est.y),
```

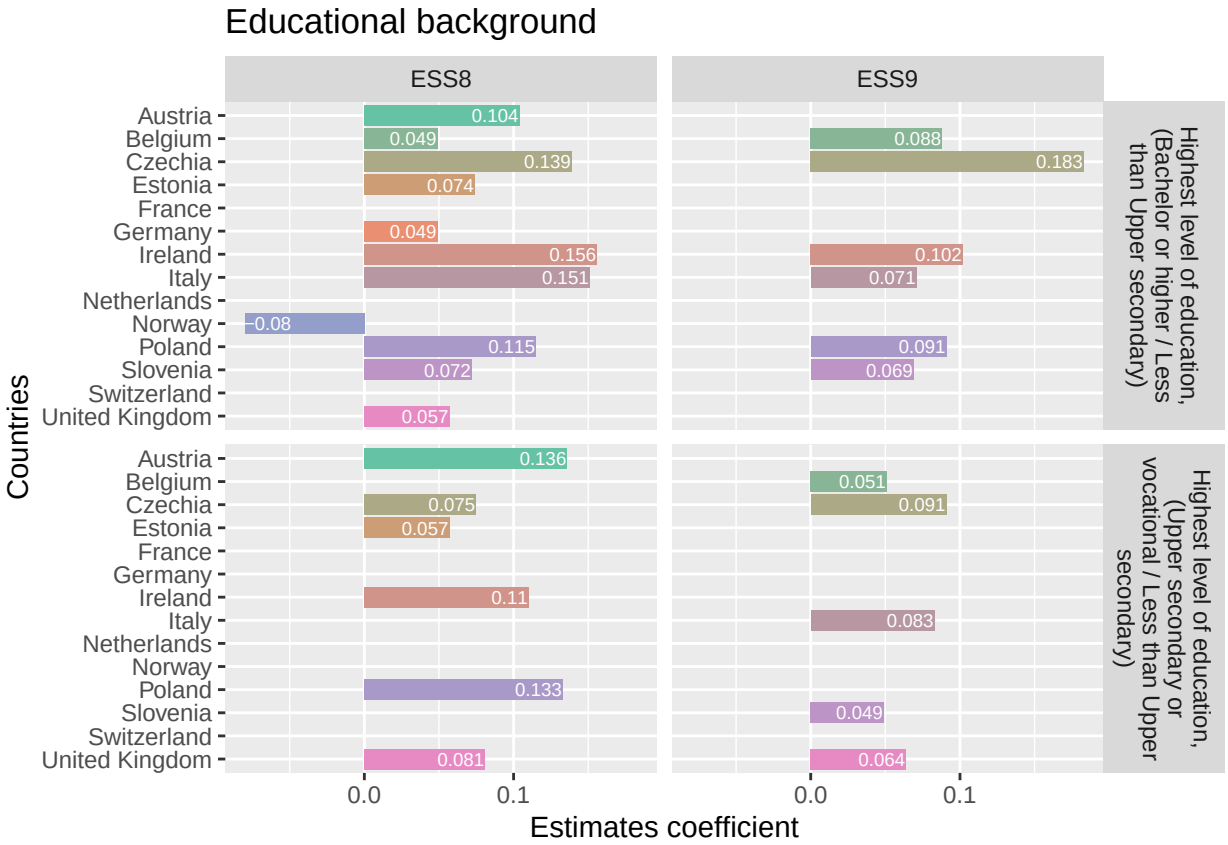
```
                        rhs1 = ifelse(rhs == "gndrD", "Gender (Female / Male)",
                               ifelse(rhs == "agea", "Age (10 years increment)",
                               ifelse(rhs == "eisced2", "Highest level of education, (Upper secondary
                               ifelse(rhs == "eisced3", "Highest level of education, (Bachelor or high
                               ifelse(rhs == "domicil2", "Domicile (Town or small city/Countryside)",
                               ifelse(rhs == "domicil3", "Domicile (Suburbs or outskirts of big city/C
                               ifelse(rhs == "domicil4", "Domicile (A big city/Countryside)",
                               ifelse(rhs == "HDI","Human Development Index",rhs)))))))))
                               #,
                               # ifelse(rhs == "CntryAge", "Avg Age",
                               # ifelse(rhs == "CntryFemale", "Prop. Women",
                               # ifelse(rhs == "CntryEisced2", "Prop. Highest level of education, Uppe
                               # ifelse(rhs == "CntryEisced3","Prop. Highest level of education Bachel
                               # ifelse(rhs == "CntryDomici2","Prop. people living in Town or small ci
                               # ifelse(rhs == "CntryDomici3","Prop. people living in Suburbs or outsk
                               # ifelse(rhs == "CntryDomici4","Prop. people living in a big city",rhs)

dir <- "G:/My Drive/Master in Statistics/Structural equations/Paper/"
write.table(sum1,paste0(dir,"ParametersMfit.csv"), sep = ",", row.names = FALSE)
write.table(sum3,paste0(dir,"ParametersMSemfit.csv"), sep = ",", row.names = FALSE)
```

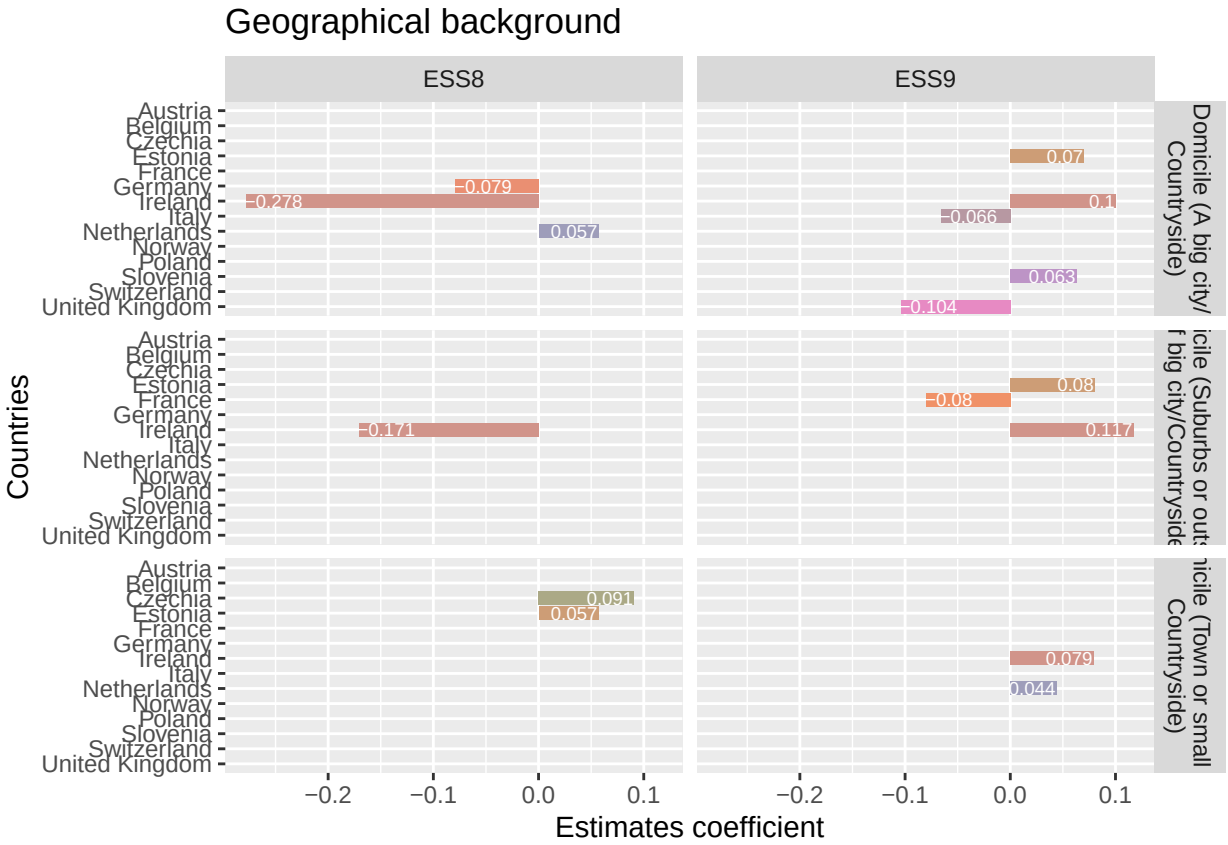

SEM
ESS8
ESS9
Gender (Female / Male)
Age (10 years increment)
Highest level of education, (Upper secondary or vocational / Less than Upper secondary)
Highest level of education, (Bachelor or higher / Less than Upper secondary)
Domicile (Town or small city/ Countryside)
Domicile (Suburbs or outskirts of big city/Countryside)
Domicile (A big city/ Countryside)
Human Development Index
Sociodemographic characteristics
0.12
0
0.03
0.06
−0.04
−0.04
0.12
0
0.02
0.04
0.03
−0.2
−0.1
0.0
0.1
0.2
Estimates coefficient


Multilevel SEM
ESS8
ESS9
Gender (Female / Male)
Age (10 years increment)
Highest level of education, (Upper secondary or vocational / Less than Upper secondary)
Highest level of education, (Bachelor or higher / Less than Upper secondary)
Domicile (Town or small city/ Countryside)
Domicile (Suburbs or outskirts of big city/Countryside)
Domicile (A big city/ Countryside)
Human Development Index
Sociodemographic characteristics
0.15
0
0.12
0.19
0.04
−0.05
0.16
0.1
0.17
0.02
0.06
0.05
−0.2
−0.1
0.0
0.1
0.2
Estimates coefficient

```
## [1] "Continuous exogeneous variables"
```




Educational background
ESS8
ESS9
Highest level of education, (Bachelor or higher / Less than Upper secondary)
Highest level of education, (Upper secondary or vocational / Less than Upper secondary)
Countries
Austria
Belgium
Czechia
Estonia
France
Germany
Ireland
Italy
Netherlands
Norway
Poland
Slovenia
Switzerland
United Kingdom
0.104
0.049
0.139
0.074
0.049
0.156
0.151
−0.08
0.115
0.072
0.057
0.088
0.183
0.102
0.071
0.091
0.069
0.136
0.075
0.057
0.11
0.133
0.081
0.051
0.091
0.083
0.049
0.064
0.0
0.1
Estimates coefficient


Geographical background
ESS8
ESS9
Domicile (A big city/ Countryside)
icile (Suburbs or outs f big city/Countryside
icile (Town or small Countryside)
Countries
Austria
Belgium
Czechia
Estonia
France
Germany
Ireland
Italy
Netherlands
Norway
Poland
Slovenia
Switzerland
United Kingdom
−0.278
−0.079
0.057
0.07
0.1
−0.066
0.063
−0.104
−0.171
0.08
−0.08
0.117
0.091
0.057
0.079
0.044
−0.2
−0.1
0.0
0.1
Estimates coefficient