RBS-R Psychometric Analysis: Reproducible Report

Contents

1 Settings

1.1 Clear working environment

```
# Clear Environment
rm(list=ls())
```

1.2 Required package

lavaan and semTools : Perform confirmatory factor analysis and measure composite reliability.

dplyr and psych : Perform corrected item-total correlations.

```
packages <- c("lavaan","semTools","dplyr","psych")

for (package in packages) {

  if (!requireNamespace(package, quietly = TRUE))
    install.packages(package)

  suppressPackageStartupMessages(library(package, character.only = TRUE))

}
```

```
## Warning: package 'lavaan' was built under R version 4.4.3
```

```
## Warning: package 'semTools' was built under R version 4.4.3
```

```
## Warning: package 'psych' was built under R version 4.4.3
```

1.3 Import and inspect data attributes

```r
# Load the data file
RBS <- read.csv("RBS_data.csv")

attributes(RBS)[names(attributes(RBS)) != "row.names"]
```

```
## $names
##  [1] "ID"                       "source"
##  [3] "age_years"                "gender"
##  [5] "residence"                "asd_sibling"
##  [7] "antipsychotics"           "stimulants"
##  [9] "anxiolytics"              "SSRIs"
## [11] "ADHD"                     "speech_disorders"
## [13] "intellectual_disability" "sb1"
## [15] "sb2"                      "sb3"
## [17] "sb4"                      "sb5"
## [19] "sb6"                      "sib1"
## [21] "sib2"                     "sib3"
## [23] "sib4"                     "sib5"
## [25] "sib6"                     "sib7"
## [27] "sib8"                     "cb1"
## [29] "cb2"                      "cb3"
## [31] "cb4"                      "cb5"
## [33] "cb6"                      "cb7"
## [35] "cb8"                      "rit1"
## [37] "rit2"                     "rit3"
## [39] "rit4"                     "rit5"
## [41] "rit6"                     "same1"
## [43] "same2"                    "same3"
## [45] "same4"                    "same5"
## [47] "same6"                    "same7"
## [49] "same8"                    "same9"
## [51] "same10"                   "same11"
## [53] "rb1"                      "rb2"
## [55] "rb3"                      "rb4"
## [57] "rsmb"                     "is"
## [59] "sb"                       "sib"
## [61] "cb"                       "rit"
## [63] "same"                     "rb"
## [65] "rsmbm"                    "ism"
##
## $class
## [1] "data.frame"
```

2 Confirmatory factor analysis

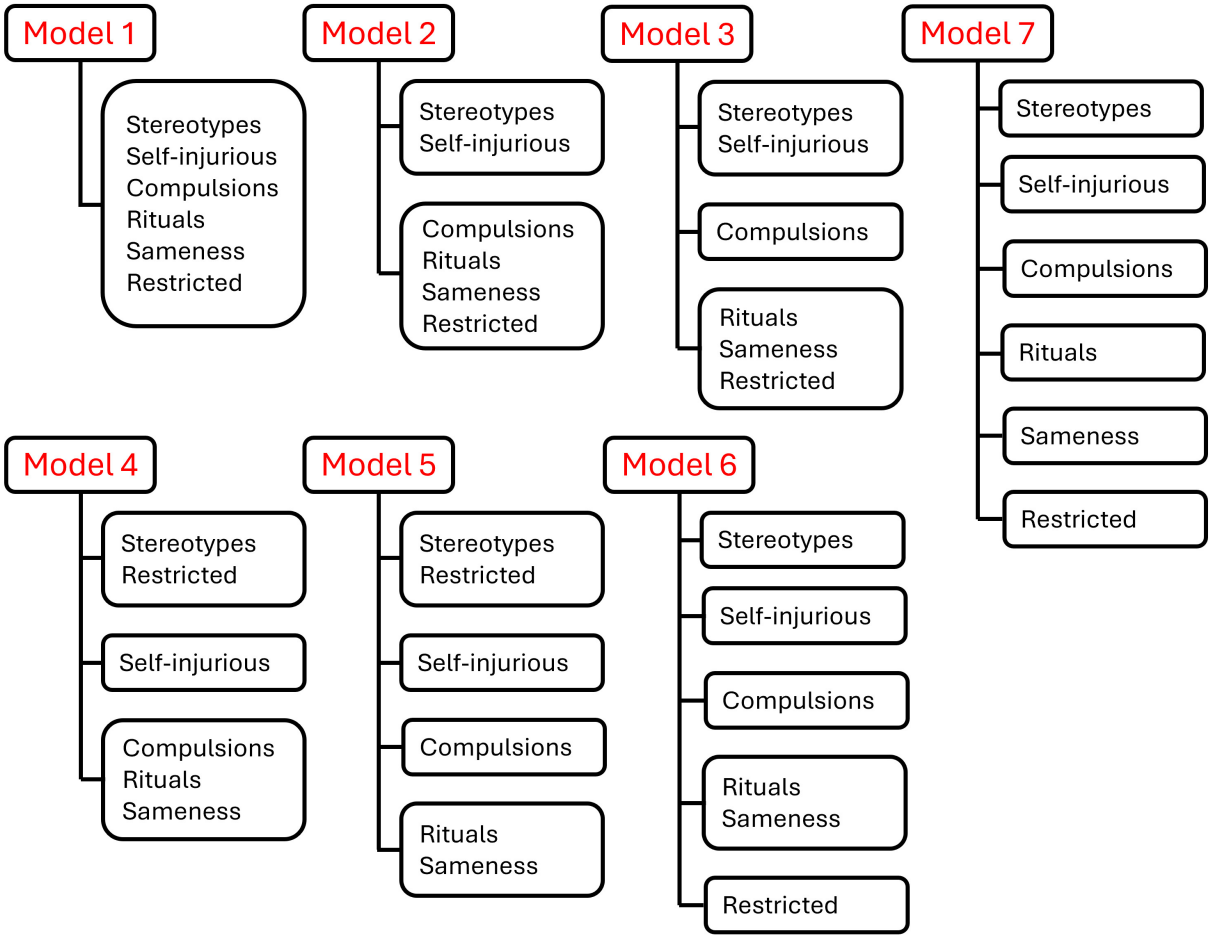

Figure 1: CFA models

```
# Store item names
sb_items <- c("sb1", "sb2", "sb3", "sb4", "sb5", "sb6")
sib_items <- c("sib1", "sib2", "sib3", "sib4", "sib5", "sib6", "sib7", "sib8")
cb_items <- c("cb1", "cb2", "cb3", "cb4", "cb5", "cb6", "cb7", "cb8")
rit_items <- c("rit1", "rit2", "rit3", "rit4", "rit5", "rit6")
same_items <- c("same1", "same2", "same3", "same4", "same5", "same6",
                "same7", "same8", "same9", "same10", "same11")
rb_items <- c("rb1", "rb2", "rb3", "rb4")

RSMB_items<- c(sb_items, sib_items)
IS_items <- c(cb_items, rit_items, same_items, rb_items)
RBS_items <- c(sb_items, sib_items, cb_items, rit_items, same_items, rb_items)

# Store factor names
mod2_factors <- c("rsmb", "is")
mod2m_factors <- c("rsmbm", "ism")
mod7_factors <- c("sb", "sib", "cb", "rit", "same","rb")
```

2.1 Model 1: 1-factor solution

```
mod1 <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6 +
               sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8 +
               cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 + cb8 +
               rit1 + rit2 + rit3 + rit4 + rit5 + rit6 +
               same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11 +
               rb1 + rb2 + rb3 + rb4'
mod1_fit <- cfa(mod1,
                data = RBS,
                estimator = "WLSMV",
                ordered = RBS_items
                )
summary(mod1_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 63 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       172
##
##   Number of observations                           258
##
## Model Test User Model:
##                                              Standard      Scaled
##   Test Statistic                             2461.974    1684.225
##   Degrees of freedom                              860         860
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.160
##   Shift parameter                                         544.523
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                             8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.794       0.650
##   Tucker-Lewis Index (TLI)                      0.784       0.633
##
##   Robust Comparative Fit Index (CFI)                           NA
##   Robust Tucker-Lewis Index (TLI)                              NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                         0.085       0.061
```

```
##   90 Percent confidence interval - lower         0.081       0.057
##   90 Percent confidence interval - upper         0.089       0.065
##   P-value H_0: RMSEA <= 0.050                    0.000       0.000
##   P-value H_0: RMSEA >= 0.080                    0.984       0.000
##
##   Robust RMSEA                                                  NA
##   90 Percent confidence interval - lower                        NA
##   90 Percent confidence interval - upper                        NA
##   P-value H_0: Robust RMSEA <= 0.050                            NA
##   P-value H_0: Robust RMSEA >= 0.080                            NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.131       0.131
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1               1.000                               0.337    0.337
##     sb2               1.310    0.234    5.609    0.000    0.442    0.442
##     sb3               1.305    0.257    5.075    0.000    0.440    0.440
##     sb4               1.422    0.282    5.040    0.000    0.479    0.479
##     sb5               1.225    0.275    4.461    0.000    0.413    0.413
##     sb6               1.179    0.283    4.166    0.000    0.397    0.397
##     sib1              1.205    0.284    4.238    0.000    0.406    0.406
##     sib2              1.013    0.288    3.521    0.000    0.341    0.341
##     sib3              1.025    0.362    2.831    0.005    0.345    0.345
##     sib4              0.768    0.211    3.641    0.000    0.259    0.259
##     sib5              1.445    0.392    3.687    0.000    0.487    0.487
##     sib6              1.099    0.307    3.580    0.000    0.370    0.370
##     sib7              0.652    0.206    3.162    0.002    0.220    0.220
##     sib8              0.682    0.251    2.714    0.007    0.230    0.230
##     cb1               1.182    0.307    3.844    0.000    0.398    0.398
##     cb2               1.538    0.359    4.289    0.000    0.518    0.518
##     cb3               1.135    0.313    3.623    0.000    0.383    0.383
##     cb4               1.574    0.381    4.128    0.000    0.530    0.530
##     cb5               1.074    0.343    3.132    0.002    0.362    0.362
##     cb6               0.947    0.272    3.483    0.000    0.319    0.319
##     cb7               1.201    0.287    4.191    0.000    0.405    0.405
##     cb8               1.481    0.347    4.267    0.000    0.499    0.499
##     rit1              1.627    0.354    4.593    0.000    0.548    0.548
##     rit2              1.510    0.331    4.567    0.000    0.509    0.509
##     rit3              1.252    0.358    3.500    0.000    0.422    0.422
##     rit4              1.869    0.383    4.886    0.000    0.630    0.630
##     rit5              1.188    0.293    4.051    0.000    0.401    0.401
##     rit6              1.011    0.236    4.278    0.000    0.341    0.341
##     same1             1.327    0.362    3.669    0.000    0.447    0.447
```

```
##     same2             1.335    0.319    4.178    0.000    0.450    0.450
##     same3             1.296    0.303    4.282    0.000    0.437    0.437
##     same4             1.184    0.322    3.682    0.000    0.399    0.399
##     same5             2.168    0.413    5.247    0.000    0.731    0.731
##     same6             1.758    0.410    4.290    0.000    0.593    0.593
##     same7             1.826    0.433    4.214    0.000    0.616    0.616
##     same8             1.212    0.294    4.123    0.000    0.408    0.408
##     same9             1.681    0.344    4.881    0.000    0.566    0.566
##     same10            2.301    0.448    5.133    0.000    0.776    0.776
##     same11            2.184    0.431    5.066    0.000    0.736    0.736
##     rb1               1.072    0.272    3.944    0.000    0.361    0.361
##     rb2               1.193    0.297    4.012    0.000    0.402    0.402
##     rb3               1.518    0.344    4.418    0.000    0.512    0.512
##     rb4               0.761    0.241    3.160    0.002    0.256    0.256
##
## Thresholds:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1            0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2            0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3            1.214    0.103   11.765    0.000    1.214    1.214
##     sb2|t1            0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2            0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3            1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1           -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2            0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3            0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2            0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3            0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1           -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2            0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3            1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1           -0.010    0.078   -0.124    0.901   -0.010   -0.010
##     sb6|t2            0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3            1.174    0.101   11.592    0.000    1.174    1.174
##     sib1|t1           0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2           0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1           0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2           1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3           1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1           1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2           1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3           2.067    0.182   11.330    0.000    2.067    2.067
##     sib4|t1           0.586    0.083    7.034    0.000    0.586    0.586
##     sib4|t2           0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3           1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1           1.155    0.100   11.502    0.000    1.155    1.155
##     sib5|t2           1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3           1.866    0.155   12.069    0.000    1.866    1.866
##     sib6|t1           0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2           1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3           1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1           0.357    0.080    4.464    0.000    0.357    0.357
```

```
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
##     rit2|t1          0.088    0.078    1.118    0.263    0.088    0.088
##     rit2|t2          0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3          0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1          0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2          1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3          1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1          0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3          1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1         -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2          0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3          1.322    0.109   12.146    0.000    1.322    1.322
##     rit6|t1         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2          0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3          0.967    0.093   10.398    0.000    0.967    0.967
##     same1|t1         0.782    0.088    8.937    0.000    0.782    0.782
##     same1|t2         1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3         1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1         0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2         0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3         1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1        -0.769    0.087   -8.820    0.000   -0.769   -0.769
```

```
##     same3|t2         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3          0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1          0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3          1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1          0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2          1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1          0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2          1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3          1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1          1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2          1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3          2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1         -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2          0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3          0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1          0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2          0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3          1.118    0.099   11.315    0.000    1.118    1.118
##     same10|t1         0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2         0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3         1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1         0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2         0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3         1.155    0.100   11.502    0.000    1.155    1.155
##     rb1|t1           -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2            0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3            0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1           -0.245    0.079   -3.104    0.002   -0.245   -0.245
##     rb2|t2            0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3            0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1            0.496    0.082    6.061    0.000    0.496    0.496
##     rb3|t2            1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3            1.605    0.128   12.500    0.000    1.605    1.605
##     rb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2            0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3            0.878    0.090    9.737    0.000    0.878    0.878
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1               0.886                              0.886    0.886
##    .sb2               0.805                              0.805    0.805
##    .sb3               0.806                              0.806    0.806
##    .sb4               0.770                              0.770    0.770
##    .sb5               0.830                              0.830    0.830
##    .sb6               0.842                              0.842    0.842
##    .sib1              0.835                              0.835    0.835
##    .sib2              0.883                              0.883    0.883
##    .sib3              0.881                              0.881    0.881
##    .sib4              0.933                              0.933    0.933
##    .sib5              0.763                              0.763    0.763
##    .sib6              0.863                              0.863    0.863
##    .sib7              0.952                              0.952    0.952
```

```
##    .sib8              0.947                                  0.947    0.947
##    .cb1               0.841                                  0.841    0.841
##    .cb2               0.731                                  0.731    0.731
##    .cb3               0.854                                  0.854    0.854
##    .cb4               0.719                                  0.719    0.719
##    .cb5               0.869                                  0.869    0.869
##    .cb6               0.898                                  0.898    0.898
##    .cb7               0.836                                  0.836    0.836
##    .cb8               0.751                                  0.751    0.751
##    .rit1              0.699                                  0.699    0.699
##    .rit2              0.741                                  0.741    0.741
##    .rit3              0.822                                  0.822    0.822
##    .rit4              0.603                                  0.603    0.603
##    .rit5              0.840                                  0.840    0.840
##    .rit6              0.884                                  0.884    0.884
##    .same1             0.800                                  0.800    0.800
##    .same2             0.798                                  0.798    0.798
##    .same3             0.809                                  0.809    0.809
##    .same4             0.841                                  0.841    0.841
##    .same5             0.466                                  0.466    0.466
##    .same6             0.649                                  0.649    0.649
##    .same7             0.621                                  0.621    0.621
##    .same8             0.833                                  0.833    0.833
##    .same9             0.679                                  0.679    0.679
##    .same10            0.398                                  0.398    0.398
##    .same11            0.458                                  0.458    0.458
##    .rb1               0.869                                  0.869    0.869
##    .rb2               0.838                                  0.838    0.838
##    .rb3               0.738                                  0.738    0.738
##    .rb4               0.934                                  0.934    0.934
##     f1                0.114    0.043    2.669    0.008       1.000    1.000
```

2.2 Model 2: 2-factor solution

```
mod2 <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6 +
               sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8
         f2 =~ cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 + cb8 +
               rit1 + rit2 + rit3 + rit4 + rit5 + rit6 +
               same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11 +
               rb1 + rb2 + rb3 + rb4'
mod2_fit <- cfa(mod2,
                data = RBS,
                estimator = "WLSMV",
                ordered = RBS_items
                )
summary(mod2_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 45 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       173
##
##   Number of observations                           258
##
## Model Test User Model:
##                                               Standard      Scaled
##   Test Statistic                              1763.313    1355.628
##   Degrees of freedom                              859         859
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.162
##   Shift parameter                                         539.972
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                              8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.884       0.789
##   Tucker-Lewis Index (TLI)                      0.878       0.778
##
##   Robust Comparative Fit Index (CFI)                           NA
##   Robust Tucker-Lewis Index (TLI)                              NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                         0.064       0.047
```

```
##   90 Percent confidence interval - lower         0.060       0.043
##   90 Percent confidence interval - upper         0.068       0.052
##   P-value H_0: RMSEA <= 0.050                    0.000       0.810
##   P-value H_0: RMSEA >= 0.080                    0.000       0.000
##
##   Robust RMSEA                                                 NA
##   90 Percent confidence interval - lower                       NA
##   90 Percent confidence interval - upper                       NA
##   P-value H_0: Robust RMSEA <= 0.050                           NA
##   P-value H_0: Robust RMSEA >= 0.080                           NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.110       0.110
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1               1.000                               0.534    0.534
##     sb2               1.241    0.147    8.456    0.000    0.663    0.663
##     sb3               1.210    0.170    7.111    0.000    0.646    0.646
##     sb4               1.225    0.168    7.290    0.000    0.654    0.654
##     sb5               1.064    0.184    5.779    0.000    0.568    0.568
##     sb6               0.870    0.163    5.323    0.000    0.465    0.465
##     sib1              1.168    0.187    6.262    0.000    0.624    0.624
##     sib2              1.000    0.194    5.160    0.000    0.534    0.534
##     sib3              1.032    0.249    4.137    0.000    0.551    0.551
##     sib4              0.765    0.150    5.092    0.000    0.409    0.409
##     sib5              1.307    0.247    5.293    0.000    0.698    0.698
##     sib6              1.132    0.202    5.604    0.000    0.605    0.605
##     sib7              0.780    0.149    5.231    0.000    0.416    0.416
##     sib8              0.862    0.180    4.800    0.000    0.460    0.460
##   f2 =~
##     cb1               1.000                               0.421    0.421
##     cb2               1.344    0.238    5.650    0.000    0.566    0.566
##     cb3               0.955    0.199    4.798    0.000    0.402    0.402
##     cb4               1.333    0.272    4.905    0.000    0.561    0.561
##     cb5               0.925    0.199    4.637    0.000    0.389    0.389
##     cb6               0.815    0.185    4.394    0.000    0.343    0.343
##     cb7               0.964    0.219    4.413    0.000    0.406    0.406
##     cb8               1.135    0.223    5.094    0.000    0.478    0.478
##     rit1              1.329    0.224    5.937    0.000    0.559    0.559
##     rit2              1.278    0.225    5.671    0.000    0.538    0.538
##     rit3              1.085    0.194    5.592    0.000    0.457    0.457
##     rit4              1.561    0.277    5.640    0.000    0.657    0.657
##     rit5              0.994    0.204    4.877    0.000    0.418    0.418
##     rit6              0.835    0.204    4.085    0.000    0.352    0.352
```

```
##     same1             1.170    0.198    5.903    0.000    0.492    0.492
##     same2             1.124    0.224    5.017    0.000    0.473    0.473
##     same3             1.004    0.203    4.954    0.000    0.423    0.423
##     same4             0.940    0.200    4.702    0.000    0.396    0.396
##     same5             1.803    0.295    6.118    0.000    0.759    0.759
##     same6             1.477    0.261    5.666    0.000    0.622    0.622
##     same7             1.594    0.317    5.033    0.000    0.671    0.671
##     same8             1.010    0.197    5.119    0.000    0.425    0.425
##     same9             1.421    0.240    5.919    0.000    0.598    0.598
##     same10            1.929    0.294    6.549    0.000    0.812    0.812
##     same11            1.824    0.285    6.389    0.000    0.767    0.767
##     rb1               0.917    0.185    4.951    0.000    0.386    0.386
##     rb2               0.980    0.191    5.126    0.000    0.412    0.412
##     rb3               1.252    0.228    5.479    0.000    0.527    0.527
##     rb4               0.586    0.178    3.292    0.001    0.247    0.247
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 ~~
##     f2               0.090    0.023    3.965    0.000    0.400    0.400
##
## Thresholds:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1           0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2           0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3           1.214    0.103   11.765    0.000    1.214    1.214
##     sb2|t1           0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2           0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3           1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1          -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2           0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3           0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2           0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3           0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1          -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2           0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3           1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1          -0.010    0.078   -0.124    0.901   -0.010   -0.010
##     sb6|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3           1.174    0.101   11.592    0.000    1.174    1.174
##     sib1|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2          0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3          1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1          0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2          1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1          1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2          1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3          2.067    0.182   11.330    0.000    2.067    2.067
##     sib4|t1          0.586    0.083    7.034    0.000    0.586    0.586
##     sib4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3          1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1          1.155    0.100   11.502    0.000    1.155    1.155
```

```
##     sib5|t2          1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3          1.866    0.155   12.069    0.000    1.866    1.866
##     sib6|t1          0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1          0.357    0.080    4.464    0.000    0.357    0.357
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
##     rit2|t1          0.088    0.078    1.118    0.263    0.088    0.088
##     rit2|t2          0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3          0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1          0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2          1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3          1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1          0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3          1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1         -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2          0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3          1.322    0.109   12.146    0.000    1.322    1.322
##     rit6|t1         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2          0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3          0.967    0.093   10.398    0.000    0.967    0.967
##     same1|t1         0.782    0.088    8.937    0.000    0.782    0.782
```

```
##     same1|t2          1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3          1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2          0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3          1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1         -0.769    0.087   -8.820    0.000   -0.769   -0.769
##     same3|t2         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3          0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1          0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3          1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1          0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2          1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1          0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2          1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3          1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1          1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2          1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3          2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1         -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2          0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3          0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1          0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2          0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3          1.118    0.099   11.315    0.000    1.118    1.118
##     same10|t1         0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2         0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3         1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1         0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2         0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3         1.155    0.100   11.502    0.000    1.155    1.155
##     rb1|t1           -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2            0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3            0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1           -0.245    0.079   -3.104    0.002   -0.245   -0.245
##     rb2|t2            0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3            0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1            0.496    0.082    6.061    0.000    0.496    0.496
##     rb3|t2            1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3            1.605    0.128   12.500    0.000    1.605    1.605
##     rb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2            0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3            0.878    0.090    9.737    0.000    0.878    0.878
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1              0.715                              0.715    0.715
##    .sb2              0.561                              0.561    0.561
##    .sb3              0.582                              0.582    0.582
##    .sb4              0.572                              0.572    0.572
##    .sb5              0.677                              0.677    0.677
##    .sb6              0.784                              0.784    0.784
##    .sib1             0.611                              0.611    0.611
```

```
##    .sib2              0.715                                  0.715    0.715
##    .sib3              0.696                                  0.696    0.696
##    .sib4              0.833                                  0.833    0.833
##    .sib5              0.512                                  0.512    0.512
##    .sib6              0.634                                  0.634    0.634
##    .sib7              0.827                                  0.827    0.827
##    .sib8              0.788                                  0.788    0.788
##    .cb1               0.823                                  0.823    0.823
##    .cb2               0.680                                  0.680    0.680
##    .cb3               0.839                                  0.839    0.839
##    .cb4               0.685                                  0.685    0.685
##    .cb5               0.849                                  0.849    0.849
##    .cb6               0.882                                  0.882    0.882
##    .cb7               0.835                                  0.835    0.835
##    .cb8               0.772                                  0.772    0.772
##    .rit1              0.687                                  0.687    0.687
##    .rit2              0.711                                  0.711    0.711
##    .rit3              0.791                                  0.791    0.791
##    .rit4              0.569                                  0.569    0.569
##    .rit5              0.825                                  0.825    0.825
##    .rit6              0.876                                  0.876    0.876
##    .same1             0.757                                  0.757    0.757
##    .same2             0.776                                  0.776    0.776
##    .same3             0.821                                  0.821    0.821
##    .same4             0.844                                  0.844    0.844
##    .same5             0.424                                  0.424    0.424
##    .same6             0.613                                  0.613    0.613
##    .same7             0.550                                  0.550    0.550
##    .same8             0.819                                  0.819    0.819
##    .same9             0.642                                  0.642    0.642
##    .same10            0.341                                  0.341    0.341
##    .same11            0.411                                  0.411    0.411
##    .rb1               0.851                                  0.851    0.851
##    .rb2               0.830                                  0.830    0.830
##    .rb3               0.723                                  0.723    0.723
##    .rb4               0.939                                  0.939    0.939
##     f1                0.285    0.069    4.111    0.000       1.000    1.000
##     f2                0.177    0.053    3.365    0.001       1.000    1.000
```

2.3 Model 3: 3-factor solution

```
mod3 <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6 +
               sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8
         f2 =~ cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 + cb8
         f3 =~ rit1 + rit2 + rit3 + rit4 + rit5 + rit6 +
               same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11 +
               rb1 + rb2 + rb3 + rb4'
mod3_fit <- cfa(mod3,
                data = RBS,
                estimator = "WLSMV",
                ordered = RBS_items
                )
summary(mod3_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 42 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       175
##
##   Number of observations                           258
##
## Model Test User Model:
##                                              Standard      Scaled
##   Test Statistic                             1704.288    1330.129
##   Degrees of freedom                              857         857
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.152
##   Shift parameter                                         538.112
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                             8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.891       0.799
##   Tucker-Lewis Index (TLI)                      0.885       0.788
##
##   Robust Comparative Fit Index (CFI)                           NA
##   Robust Tucker-Lewis Index (TLI)                              NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                         0.062       0.046
```

```
##   90 Percent confidence interval - lower         0.058       0.041
##   90 Percent confidence interval - upper         0.066       0.051
##   P-value H_0: RMSEA <= 0.050                    0.000       0.894
##   P-value H_0: RMSEA >= 0.080                    0.000       0.000
##
##   Robust RMSEA                                                  NA
##   90 Percent confidence interval - lower                        NA
##   90 Percent confidence interval - upper                        NA
##   P-value H_0: Robust RMSEA <= 0.050                            NA
##   P-value H_0: Robust RMSEA >= 0.080                            NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.110       0.110
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1              1.000                               0.533    0.533
##     sb2              1.241    0.148    8.395    0.000    0.662    0.662
##     sb3              1.216    0.171    7.093    0.000    0.648    0.648
##     sb4              1.226    0.168    7.277    0.000    0.654    0.654
##     sb5              1.065    0.183    5.814    0.000    0.568    0.568
##     sb6              0.869    0.164    5.294    0.000    0.464    0.464
##     sib1             1.169    0.188    6.221    0.000    0.624    0.624
##     sib2             0.996    0.194    5.137    0.000    0.531    0.531
##     sib3             1.026    0.247    4.151    0.000    0.547    0.547
##     sib4             0.766    0.150    5.108    0.000    0.409    0.409
##     sib5             1.315    0.248    5.314    0.000    0.702    0.702
##     sib6             1.136    0.202    5.625    0.000    0.606    0.606
##     sib7             0.784    0.149    5.247    0.000    0.418    0.418
##     sib8             0.865    0.180    4.801    0.000    0.461    0.461
##   f2 =~
##     cb1              1.000                               0.478    0.478
##     cb2              1.373    0.243    5.643    0.000    0.656    0.656
##     cb3              0.942    0.201    4.693    0.000    0.450    0.450
##     cb4              1.385    0.274    5.045    0.000    0.661    0.661
##     cb5              0.925    0.200    4.631    0.000    0.442    0.442
##     cb6              0.818    0.189    4.335    0.000    0.391    0.391
##     cb7              0.991    0.225    4.398    0.000    0.473    0.473
##     cb8              1.187    0.230    5.162    0.000    0.567    0.567
##   f3 =~
##     rit1             1.000                               0.564    0.564
##     rit2             0.965    0.129    7.488    0.000    0.545    0.545
##     rit3             0.819    0.139    5.882    0.000    0.462    0.462
##     rit4             1.186    0.147    8.086    0.000    0.669    0.669
##     rit5             0.756    0.124    6.074    0.000    0.427    0.427
```

```
##     rit6              0.629    0.135    4.646    0.000    0.355    0.355
##     same1             0.889    0.146    6.086    0.000    0.502    0.502
##     same2             0.862    0.133    6.482    0.000    0.486    0.486
##     same3             0.759    0.126    6.000    0.000    0.428    0.428
##     same4             0.711    0.131    5.438    0.000    0.401    0.401
##     same5             1.368    0.152    9.012    0.000    0.772    0.772
##     same6             1.124    0.149    7.553    0.000    0.634    0.634
##     same7             1.211    0.161    7.506    0.000    0.684    0.684
##     same8             0.765    0.117    6.562    0.000    0.432    0.432
##     same9             1.077    0.119    9.050    0.000    0.608    0.608
##     same10            1.460    0.139   10.519    0.000    0.824    0.824
##     same11            1.377    0.140    9.822    0.000    0.777    0.777
##     rb1               0.697    0.119    5.880    0.000    0.393    0.393
##     rb2               0.742    0.121    6.112    0.000    0.419    0.419
##     rb3               0.950    0.127    7.486    0.000    0.536    0.536
##     rb4               0.445    0.118    3.778    0.000    0.251    0.251
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 ~~
##     f2               0.111    0.026    4.338    0.000    0.434    0.434
##     f3               0.110    0.028    3.901    0.000    0.367    0.367
##   f2 ~~
##     f3               0.200    0.038    5.291    0.000    0.744    0.744
##
## Thresholds:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1           0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2           0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3           1.214    0.103   11.765    0.000    1.214    1.214
##     sb2|t1           0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2           0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3           1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1          -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2           0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3           0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2           0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3           0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1          -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2           0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3           1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1          -0.010    0.078   -0.124    0.901   -0.010   -0.010
##     sb6|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3           1.174    0.101   11.592    0.000    1.174    1.174
##     sib1|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2          0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3          1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1          0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2          1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1          1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2          1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3          2.067    0.182   11.330    0.000    2.067    2.067
```

```
##     sib4|t1          0.586    0.083    7.034    0.000    0.586    0.586
##     sib4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3          1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1          1.155    0.100   11.502    0.000    1.155    1.155
##     sib5|t2          1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3          1.866    0.155   12.069    0.000    1.866    1.866
##     sib6|t1          0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1          0.357    0.080    4.464    0.000    0.357    0.357
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
##     rit2|t1          0.088    0.078    1.118    0.263    0.088    0.088
##     rit2|t2          0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3          0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1          0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2          1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3          1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1          0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3          1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1         -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2          0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3          1.322    0.109   12.146    0.000    1.322    1.322
```

```
##     rit6|t1          -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2           0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3           0.967    0.093   10.398    0.000    0.967    0.967
##     same1|t1          0.782    0.088    8.937    0.000    0.782    0.782
##     same1|t2          1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3          1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2          0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3          1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1         -0.769    0.087   -8.820    0.000   -0.769   -0.769
##     same3|t2         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3          0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1          0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3          1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1          0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2          1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1          0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2          1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3          1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1          1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2          1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3          2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1         -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2          0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3          0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1          0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2          0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3          1.118    0.099   11.315    0.000    1.118    1.118
##     same10|t1         0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2         0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3         1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1         0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2         0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3         1.155    0.100   11.502    0.000    1.155    1.155
##     rb1|t1           -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2            0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3            0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1           -0.245    0.079   -3.104    0.002   -0.245   -0.245
##     rb2|t2            0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3            0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1            0.496    0.082    6.061    0.000    0.496    0.496
##     rb3|t2            1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3            1.605    0.128   12.500    0.000    1.605    1.605
##     rb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2            0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3            0.878    0.090    9.737    0.000    0.878    0.878
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1               0.715                               0.715    0.715
##    .sb2               0.562                               0.562    0.562
##    .sb3               0.579                               0.579    0.579
```

```
##    .sb4              0.573                                  0.573    0.573
##    .sb5              0.677                                  0.677    0.677
##    .sb6              0.785                                  0.785    0.785
##    .sib1             0.611                                  0.611    0.611
##    .sib2             0.718                                  0.718    0.718
##    .sib3             0.700                                  0.700    0.700
##    .sib4             0.833                                  0.833    0.833
##    .sib5             0.508                                  0.508    0.508
##    .sib6             0.633                                  0.633    0.633
##    .sib7             0.825                                  0.825    0.825
##    .sib8             0.787                                  0.787    0.787
##    .cb1              0.772                                  0.772    0.772
##    .cb2              0.570                                  0.570    0.570
##    .cb3              0.797                                  0.797    0.797
##    .cb4              0.563                                  0.563    0.563
##    .cb5              0.805                                  0.805    0.805
##    .cb6              0.847                                  0.847    0.847
##    .cb7              0.776                                  0.776    0.776
##    .cb8              0.679                                  0.679    0.679
##    .rit1             0.681                                  0.681    0.681
##    .rit2             0.703                                  0.703    0.703
##    .rit3             0.786                                  0.786    0.786
##    .rit4             0.552                                  0.552    0.552
##    .rit5             0.818                                  0.818    0.818
##    .rit6             0.874                                  0.874    0.874
##    .same1            0.748                                  0.748    0.748
##    .same2            0.763                                  0.763    0.763
##    .same3            0.817                                  0.817    0.817
##    .same4            0.839                                  0.839    0.839
##    .same5            0.404                                  0.404    0.404
##    .same6            0.598                                  0.598    0.598
##    .same7            0.533                                  0.533    0.533
##    .same8            0.814                                  0.814    0.814
##    .same9            0.630                                  0.630    0.630
##    .same10           0.321                                  0.321    0.321
##    .same11           0.396                                  0.396    0.396
##    .rb1              0.845                                  0.845    0.845
##    .rb2              0.825                                  0.825    0.825
##    .rb3              0.713                                  0.713    0.713
##    .rb4              0.937                                  0.937    0.937
##     f1               0.285    0.069    4.101    0.000    1.000    1.000
##     f2               0.228    0.070    3.280    0.001    1.000    1.000
##     f3               0.319    0.059    5.358    0.000    1.000    1.000
```

2.4 Model 4: alternative 3-factor solution

```
mod4 <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6 +
               rb1 + rb2 + rb3 + rb4
         f2 =~ sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8
         f3 =~ cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 + cb8 +
               rit1 + rit2 + rit3 + rit4 + rit5 + rit6 +
               same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11'
mod4_fit <- cfa(mod4,
                data = RBS,
                estimator = "WLSMV",
                ordered = RBS_items
                )
summary(mod4_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 48 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       175
##
##   Number of observations                           258
##
## Model Test User Model:
##                                              Standard      Scaled
##   Test Statistic                             1806.495    1379.785
##   Degrees of freedom                              857         857
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.146
##   Shift parameter                                         538.009
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                             8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.878       0.778
##   Tucker-Lewis Index (TLI)                      0.872       0.766
##
##   Robust Comparative Fit Index (CFI)                           NA
##   Robust Tucker-Lewis Index (TLI)                              NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                         0.066       0.049
```

```
##   90 Percent confidence interval - lower         0.061       0.044
##   90 Percent confidence interval - upper         0.070       0.053
##   P-value H_0: RMSEA <= 0.050                    0.000       0.668
##   P-value H_0: RMSEA >= 0.080                    0.000       0.000
##
##   Robust RMSEA                                                  NA
##   90 Percent confidence interval - lower                        NA
##   90 Percent confidence interval - upper                        NA
##   P-value H_0: Robust RMSEA <= 0.050                            NA
##   P-value H_0: Robust RMSEA >= 0.080                            NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.112       0.112
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1               1.000                               0.462    0.462
##     sb2               1.287    0.177    7.258    0.000    0.595    0.595
##     sb3               1.252    0.201    6.240    0.000    0.579    0.579
##     sb4               1.334    0.209    6.373    0.000    0.616    0.616
##     sb5               1.140    0.215    5.303    0.000    0.527    0.527
##     sb6               1.009    0.206    4.899    0.000    0.466    0.466
##     rb1               0.824    0.196    4.205    0.000    0.381    0.381
##     rb2               1.000    0.207    4.837    0.000    0.462    0.462
##     rb3               1.220    0.235    5.202    0.000    0.564    0.564
##     rb4               0.685    0.187    3.655    0.000    0.316    0.316
##   f2 =~
##     sib1              1.000                               0.695    0.695
##     sib2              0.886    0.116    7.640    0.000    0.616    0.616
##     sib3              0.862    0.169    5.090    0.000    0.599    0.599
##     sib4              0.635    0.134    4.722    0.000    0.441    0.441
##     sib5              1.156    0.158    7.332    0.000    0.803    0.803
##     sib6              1.010    0.126    8.028    0.000    0.702    0.702
##     sib7              0.683    0.116    5.890    0.000    0.475    0.475
##     sib8              0.803    0.115    7.013    0.000    0.558    0.558
##   f3 =~
##     cb1               1.000                               0.425    0.425
##     cb2               1.351    0.238    5.678    0.000    0.574    0.574
##     cb3               0.937    0.197    4.754    0.000    0.398    0.398
##     cb4               1.337    0.270    4.945    0.000    0.568    0.568
##     cb5               0.918    0.200    4.590    0.000    0.390    0.390
##     cb6               0.792    0.188    4.205    0.000    0.337    0.337
##     cb7               0.969    0.218    4.438    0.000    0.412    0.412
##     cb8               1.146    0.222    5.157    0.000    0.487    0.487
##     rit1              1.318    0.223    5.917    0.000    0.560    0.560
```

```
##     rit2              1.256    0.226    5.569    0.000    0.533    0.533
##     rit3              1.087    0.194    5.611    0.000    0.462    0.462
##     rit4              1.564    0.277    5.652    0.000    0.664    0.664
##     rit5              0.948    0.201    4.728    0.000    0.403    0.403
##     rit6              0.826    0.202    4.084    0.000    0.351    0.351
##     same1             1.170    0.198    5.897    0.000    0.497    0.497
##     same2             1.113    0.224    4.975    0.000    0.473    0.473
##     same3             0.989    0.203    4.873    0.000    0.420    0.420
##     same4             0.939    0.199    4.708    0.000    0.399    0.399
##     same5             1.803    0.296    6.098    0.000    0.766    0.766
##     same6             1.478    0.262    5.645    0.000    0.628    0.628
##     same7             1.615    0.319    5.065    0.000    0.686    0.686
##     same8             1.016    0.199    5.113    0.000    0.432    0.432
##     same9             1.425    0.241    5.921    0.000    0.605    0.605
##     same10            1.925    0.294    6.543    0.000    0.818    0.818
##     same11            1.820    0.286    6.362    0.000    0.773    0.773
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 ~~
##     f2               0.225    0.043    5.290    0.000    0.701    0.701
##     f3               0.115    0.024    4.723    0.000    0.586    0.586
##   f2 ~~
##     f3               0.076    0.029    2.592    0.010    0.257    0.257
##
## Thresholds:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1           0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2           0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3           1.214    0.103   11.765    0.000    1.214    1.214
##     sb2|t1           0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2           0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3           1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1          -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2           0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3           0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2           0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3           0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1          -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2           0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3           1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1          -0.010    0.078   -0.124    0.901   -0.010   -0.010
##     sb6|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3           1.174    0.101   11.592    0.000    1.174    1.174
##     rb1|t1          -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2           0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3           0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1          -0.245    0.079   -3.104    0.002   -0.245   -0.245
##     rb2|t2           0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3           0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1           0.496    0.082    6.061    0.000    0.496    0.496
##     rb3|t2           1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3           1.605    0.128   12.500    0.000    1.605    1.605
```

```
##     rb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2           0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3           0.878    0.090    9.737    0.000    0.878    0.878
##     sib1|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2          0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3          1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1          0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2          1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1          1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2          1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3          2.067    0.182   11.330    0.000    2.067    2.067
##     sib4|t1          0.586    0.083    7.034    0.000    0.586    0.586
##     sib4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3          1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1          1.155    0.100   11.502    0.000    1.155    1.155
##     sib5|t2          1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3          1.866    0.155   12.069    0.000    1.866    1.866
##     sib6|t1          0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1          0.357    0.080    4.464    0.000    0.357    0.357
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
```

```
##     rit2|t1           0.088    0.078    1.118    0.263    0.088    0.088
##     rit2|t2           0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1           0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2           1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3           1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1           0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2           1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3           1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1          -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2           0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3           1.322    0.109   12.146    0.000    1.322    1.322
##     rit6|t1          -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2           0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3           0.967    0.093   10.398    0.000    0.967    0.967
##     same1|t1          0.782    0.088    8.937    0.000    0.782    0.782
##     same1|t2          1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3          1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2          0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3          1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1         -0.769    0.087   -8.820    0.000   -0.769   -0.769
##     same3|t2         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3          0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1          0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3          1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1          0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2          1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1          0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2          1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3          1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1          1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2          1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3          2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1         -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2          0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3          0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1          0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2          0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3          1.118    0.099   11.315    0.000    1.118    1.118
##     same10|t1         0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2         0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3         1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1         0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2         0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3         1.155    0.100   11.502    0.000    1.155    1.155
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1              0.787                               0.787    0.787
##    .sb2              0.646                               0.646    0.646
##    .sb3              0.665                               0.665    0.665
```

```
##    .sb4              0.620                                  0.620    0.620
##    .sb5              0.723                                  0.723    0.723
##    .sb6              0.783                                  0.783    0.783
##    .rb1              0.855                                  0.855    0.855
##    .rb2              0.786                                  0.786    0.786
##    .rb3              0.682                                  0.682    0.682
##    .rb4              0.900                                  0.900    0.900
##    .sib1             0.517                                  0.517    0.517
##    .sib2             0.620                                  0.620    0.620
##    .sib3             0.641                                  0.641    0.641
##    .sib4             0.805                                  0.805    0.805
##    .sib5             0.355                                  0.355    0.355
##    .sib6             0.508                                  0.508    0.508
##    .sib7             0.775                                  0.775    0.775
##    .sib8             0.688                                  0.688    0.688
##    .cb1              0.820                                  0.820    0.820
##    .cb2              0.670                                  0.670    0.670
##    .cb3              0.842                                  0.842    0.842
##    .cb4              0.677                                  0.677    0.677
##    .cb5              0.848                                  0.848    0.848
##    .cb6              0.887                                  0.887    0.887
##    .cb7              0.830                                  0.830    0.830
##    .cb8              0.763                                  0.763    0.763
##    .rit1             0.687                                  0.687    0.687
##    .rit2             0.715                                  0.715    0.715
##    .rit3             0.787                                  0.787    0.787
##    .rit4             0.559                                  0.559    0.559
##    .rit5             0.838                                  0.838    0.838
##    .rit6             0.877                                  0.877    0.877
##    .same1            0.753                                  0.753    0.753
##    .same2            0.776                                  0.776    0.776
##    .same3            0.824                                  0.824    0.824
##    .same4            0.841                                  0.841    0.841
##    .same5            0.413                                  0.413    0.413
##    .same6            0.606                                  0.606    0.606
##    .same7            0.529                                  0.529    0.529
##    .same8            0.814                                  0.814    0.814
##    .same9            0.634                                  0.634    0.634
##    .same10           0.331                                  0.331    0.331
##    .same11           0.402                                  0.402    0.402
##     f1               0.213    0.062    3.454    0.001       1.000    1.000
##     f2               0.483    0.084    5.736    0.000       1.000    1.000
##     f3               0.180    0.054    3.364    0.001       1.000    1.000
```

2.5 Model 5: 4-factor solution

```
mod5 <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6 +
               rb1 + rb2 + rb3 + rb4
         f2 =~ sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8
         f3 =~ cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 + cb8
         f4 =~ rit1 + rit2 + rit3 + rit4 + rit5 + rit6 +
               same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11'
mod5_fit <- cfa(mod5,
                data = RBS,
                estimator = "WLSMV",
                ordered = RBS_items
                )
summary(mod5_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 56 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       178
##
##   Number of observations                           258
##
## Model Test User Model:
##                                              Standard      Scaled
##   Test Statistic                             1743.937    1353.283
##   Degrees of freedom                              854         854
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.132
##   Shift parameter                                         535.304
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                             8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.886       0.788
##   Tucker-Lewis Index (TLI)                      0.879       0.776
##
##   Robust Comparative Fit Index (CFI)                           NA
##   Robust Tucker-Lewis Index (TLI)                              NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                         0.064       0.048
```

```
##   90 Percent confidence interval - lower         0.059       0.043
##   90 Percent confidence interval - upper         0.068       0.052
##   P-value H_0: RMSEA <= 0.050                    0.000       0.784
##   P-value H_0: RMSEA >= 0.080                    0.000       0.000
##
##   Robust RMSEA                                                 NA
##   90 Percent confidence interval - lower                       NA
##   90 Percent confidence interval - upper                       NA
##   P-value H_0: Robust RMSEA <= 0.050                           NA
##   P-value H_0: Robust RMSEA >= 0.080                           NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.111       0.111
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1               1.000                               0.462    0.462
##     sb2               1.287    0.178    7.242    0.000    0.595    0.595
##     sb3               1.256    0.201    6.247    0.000    0.581    0.581
##     sb4               1.334    0.209    6.379    0.000    0.617    0.617
##     sb5               1.140    0.214    5.332    0.000    0.527    0.527
##     sb6               1.008    0.206    4.892    0.000    0.466    0.466
##     rb1               0.820    0.196    4.195    0.000    0.379    0.379
##     rb2               0.998    0.207    4.827    0.000    0.461    0.461
##     rb3               1.217    0.235    5.186    0.000    0.563    0.563
##     rb4               0.682    0.187    3.638    0.000    0.315    0.315
##   f2 =~
##     sib1              1.000                               0.692    0.692
##     sib2              0.884    0.116    7.615    0.000    0.612    0.612
##     sib3              0.857    0.168    5.088    0.000    0.593    0.593
##     sib4              0.636    0.135    4.727    0.000    0.440    0.440
##     sib5              1.169    0.158    7.399    0.000    0.809    0.809
##     sib6              1.018    0.126    8.084    0.000    0.705    0.705
##     sib7              0.690    0.117    5.917    0.000    0.477    0.477
##     sib8              0.808    0.115    7.028    0.000    0.560    0.560
##   f3 =~
##     cb1               1.000                               0.478    0.478
##     cb2               1.375    0.243    5.654    0.000    0.657    0.657
##     cb3               0.931    0.200    4.662    0.000    0.445    0.445
##     cb4               1.384    0.274    5.059    0.000    0.661    0.661
##     cb5               0.918    0.201    4.568    0.000    0.438    0.438
##     cb6               0.801    0.190    4.224    0.000    0.383    0.383
##     cb7               0.994    0.225    4.408    0.000    0.475    0.475
##     cb8               1.200    0.230    5.211    0.000    0.573    0.573
##   f4 =~
```

```
##     rit1              1.000                                    0.567    0.567
##     rit2              0.955    0.131    7.292    0.000    0.541    0.541
##     rit3              0.830    0.139    5.956    0.000    0.470    0.470
##     rit4              1.200    0.149    8.073    0.000    0.680    0.680
##     rit5              0.723    0.127    5.675    0.000    0.410    0.410
##     rit6              0.627    0.138    4.537    0.000    0.355    0.355
##     same1             0.900    0.148    6.088    0.000    0.510    0.510
##     same2             0.861    0.136    6.348    0.000    0.488    0.488
##     same3             0.750    0.129    5.832    0.000    0.425    0.425
##     same4             0.716    0.132    5.422    0.000    0.406    0.406
##     same5             1.381    0.155    8.888    0.000    0.783    0.783
##     same6             1.136    0.152    7.484    0.000    0.644    0.644
##     same7             1.239    0.166    7.482    0.000    0.702    0.702
##     same8             0.777    0.119    6.516    0.000    0.440    0.440
##     same9             1.092    0.123    8.901    0.000    0.619    0.619
##     same10            1.471    0.143   10.314    0.000    0.833    0.833
##     same11            1.387    0.145    9.588    0.000    0.786    0.786
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 ~~
##     f2               0.224    0.042    5.304    0.000    0.701    0.701
##     f3               0.127    0.027    4.653    0.000    0.573    0.573
##     f4               0.145    0.029    5.071    0.000    0.554    0.554
##   f2 ~~
##     f3               0.110    0.033    3.289    0.001    0.332    0.332
##     f4               0.085    0.039    2.158    0.031    0.216    0.216
##   f3 ~~
##     f4               0.200    0.038    5.232    0.000    0.737    0.737
##
## Thresholds:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1           0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2           0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3           1.214    0.103   11.765    0.000    1.214    1.214
##     sb2|t1           0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2           0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3           1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1          -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2           0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3           0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2           0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3           0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1          -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2           0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3           1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1          -0.010    0.078   -0.124    0.901   -0.010   -0.010
##     sb6|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3           1.174    0.101   11.592    0.000    1.174    1.174
##     rb1|t1          -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2           0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3           0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1          -0.245    0.079   -3.104    0.002   -0.245   -0.245
```

```
##     rb2|t2           0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3           0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1           0.496    0.082    6.061    0.000    0.496    0.496
##     rb3|t2           1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3           1.605    0.128   12.500    0.000    1.605    1.605
##     rb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2           0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3           0.878    0.090    9.737    0.000    0.878    0.878
##     sib1|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2          0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3          1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1          0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2          1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1          1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2          1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3          2.067    0.182   11.330    0.000    2.067    2.067
##     sib4|t1          0.586    0.083    7.034    0.000    0.586    0.586
##     sib4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3          1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1          1.155    0.100   11.502    0.000    1.155    1.155
##     sib5|t2          1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3          1.866    0.155   12.069    0.000    1.866    1.866
##     sib6|t1          0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1          0.357    0.080    4.464    0.000    0.357    0.357
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
```

```
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
##     rit2|t1          0.088    0.078    1.118    0.263    0.088    0.088
##     rit2|t2          0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3          0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1          0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2          1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3          1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1          0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3          1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1         -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2          0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3          1.322    0.109   12.146    0.000    1.322    1.322
##     rit6|t1         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2          0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3          0.967    0.093   10.398    0.000    0.967    0.967
##     same1|t1         0.782    0.088    8.937    0.000    0.782    0.782
##     same1|t2         1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3         1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1         0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2         0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3         1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1        -0.769    0.087   -8.820    0.000   -0.769   -0.769
##     same3|t2        -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3         0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1         0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2         0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3         1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1         0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2         1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3         1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1         0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2         1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3         1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1         1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2         1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3         2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1        -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2         0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3         0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1         0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2         0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3         1.118    0.099   11.315    0.000    1.118    1.118
##     same10|t1        0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2        0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3        1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1        0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2        0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3        1.155    0.100   11.502    0.000    1.155    1.155
##
```

```
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1               0.786                               0.786    0.786
##    .sb2               0.646                               0.646    0.646
##    .sb3               0.663                               0.663    0.663
##    .sb4               0.619                               0.619    0.619
##    .sb5               0.722                               0.722    0.722
##    .sb6               0.783                               0.783    0.783
##    .rb1               0.856                               0.856    0.856
##    .rb2               0.787                               0.787    0.787
##    .rb3               0.683                               0.683    0.683
##    .rb4               0.901                               0.901    0.901
##    .sib1              0.521                               0.521    0.521
##    .sib2              0.626                               0.626    0.626
##    .sib3              0.648                               0.648    0.648
##    .sib4              0.806                               0.806    0.806
##    .sib5              0.345                               0.345    0.345
##    .sib6              0.504                               0.504    0.504
##    .sib7              0.772                               0.772    0.772
##    .sib8              0.687                               0.687    0.687
##    .cb1               0.772                               0.772    0.772
##    .cb2               0.568                               0.568    0.568
##    .cb3               0.802                               0.802    0.802
##    .cb4               0.563                               0.563    0.563
##    .cb5               0.808                               0.808    0.808
##    .cb6               0.853                               0.853    0.853
##    .cb7               0.775                               0.775    0.775
##    .cb8               0.671                               0.671    0.671
##    .rit1              0.679                               0.679    0.679
##    .rit2              0.707                               0.707    0.707
##    .rit3              0.779                               0.779    0.779
##    .rit4              0.538                               0.538    0.538
##    .rit5              0.832                               0.832    0.832
##    .rit6              0.874                               0.874    0.874
##    .same1             0.740                               0.740    0.740
##    .same2             0.762                               0.762    0.762
##    .same3             0.819                               0.819    0.819
##    .same4             0.835                               0.835    0.835
##    .same5             0.387                               0.387    0.387
##    .same6             0.586                               0.586    0.586
##    .same7             0.507                               0.507    0.507
##    .same8             0.806                               0.806    0.806
##    .same9             0.617                               0.617    0.617
##    .same10            0.305                               0.305    0.305
##    .same11            0.383                               0.383    0.383
##     f1                0.214    0.062    3.456    0.001    1.000    1.000
##     f2                0.479    0.084    5.702    0.000    1.000    1.000
##     f3                0.228    0.069    3.284    0.001    1.000    1.000
##     f4                0.321    0.061    5.265    0.000    1.000    1.000
```

2.6 Model 6: 5-factor solution

```
mod6 <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6
         f2 =~ sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8
         f3 =~ cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 + cb8
         f4 =~ rit1 + rit2 + rit3 + rit4 + rit5 + rit6 +
               same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11
         f5 =~ rb1 + rb2 + rb3 + rb4'
mod6_fit <- cfa(mod6,
                data = RBS,
                estimator = "WLSMV",
                ordered = RBS_items
                )
summary(mod6_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 63 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       182
##
##   Number of observations                           258
##
## Model Test User Model:
##                                              Standard      Scaled
##   Test Statistic                             1585.539    1284.335
##   Degrees of freedom                              850         850
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.105
##   Shift parameter                                         531.115
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                             8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.906       0.816
##   Tucker-Lewis Index (TLI)                      0.900       0.804
##
##   Robust Comparative Fit Index (CFI)                           NA
##   Robust Tucker-Lewis Index (TLI)                              NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                         0.058       0.045
```

```
##   90 Percent confidence interval - lower         0.054       0.040
##   90 Percent confidence interval - upper         0.062       0.049
##   P-value H_0: RMSEA <= 0.050                    0.002       0.966
##   P-value H_0: RMSEA >= 0.080                    0.000       0.000
##
##   Robust RMSEA                                                  NA
##   90 Percent confidence interval - lower                        NA
##   90 Percent confidence interval - upper                        NA
##   P-value H_0: Robust RMSEA <= 0.050                            NA
##   P-value H_0: Robust RMSEA >= 0.080                            NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.106       0.106
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1               1.000                               0.536    0.536
##     sb2               1.262    0.156    8.075    0.000    0.676    0.676
##     sb3               1.239    0.179    6.903    0.000    0.664    0.664
##     sb4               1.269    0.179    7.097    0.000    0.680    0.680
##     sb5               1.089    0.189    5.750    0.000    0.584    0.584
##     sb6               0.916    0.176    5.195    0.000    0.491    0.491
##   f2 =~
##     sib1              1.000                               0.698    0.698
##     sib2              0.869    0.115    7.548    0.000    0.607    0.607
##     sib3              0.856    0.163    5.253    0.000    0.598    0.598
##     sib4              0.644    0.131    4.927    0.000    0.450    0.450
##     sib5              1.142    0.154    7.435    0.000    0.798    0.798
##     sib6              1.001    0.123    8.131    0.000    0.699    0.699
##     sib7              0.699    0.115    6.066    0.000    0.488    0.488
##     sib8              0.797    0.114    7.018    0.000    0.557    0.557
##   f3 =~
##     cb1               1.000                               0.480    0.480
##     cb2               1.374    0.242    5.680    0.000    0.659    0.659
##     cb3               0.933    0.199    4.686    0.000    0.448    0.448
##     cb4               1.377    0.272    5.068    0.000    0.661    0.661
##     cb5               0.916    0.200    4.580    0.000    0.439    0.439
##     cb6               0.807    0.188    4.291    0.000    0.387    0.387
##     cb7               0.985    0.223    4.412    0.000    0.473    0.473
##     cb8               1.184    0.228    5.187    0.000    0.568    0.568
##   f4 =~
##     rit1              1.000                               0.564    0.564
##     rit2              0.970    0.131    7.378    0.000    0.547    0.547
##     rit3              0.835    0.141    5.934    0.000    0.471    0.471
##     rit4              1.201    0.150    8.021    0.000    0.677    0.677
```

```
##     rit5              0.746    0.127    5.879    0.000    0.421    0.421
##     rit6              0.632    0.138    4.598    0.000    0.357    0.357
##     same1             0.908    0.148    6.113    0.000    0.512    0.512
##     same2             0.869    0.135    6.423    0.000    0.490    0.490
##     same3             0.749    0.128    5.847    0.000    0.423    0.423
##     same4             0.715    0.132    5.419    0.000    0.403    0.403
##     same5             1.385    0.155    8.914    0.000    0.781    0.781
##     same6             1.139    0.152    7.505    0.000    0.642    0.642
##     same7             1.244    0.166    7.499    0.000    0.701    0.701
##     same8             0.779    0.119    6.549    0.000    0.440    0.440
##     same9             1.093    0.123    8.924    0.000    0.617    0.617
##     same10            1.476    0.143   10.329    0.000    0.833    0.833
##     same11            1.391    0.144    9.647    0.000    0.785    0.785
##   f5 =~
##     rb1               1.000                              0.499    0.499
##     rb2               1.124    0.181    6.214    0.000    0.561    0.561
##     rb3               1.405    0.241    5.840    0.000    0.701    0.701
##     rb4               0.688    0.176    3.911    0.000    0.343    0.343
##
## Covariances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 ~~
##     f2                0.267    0.046    5.866    0.000    0.714    0.714
##     f3                0.121    0.028    4.264    0.000    0.469    0.469
##     f4                0.120    0.028    4.326    0.000    0.395    0.395
##     f5                0.116    0.032    3.613    0.000    0.434    0.434
##   f2 ~~
##     f3                0.111    0.034    3.282    0.001    0.330    0.330
##     f4                0.085    0.039    2.159    0.031    0.216    0.216
##     f5                0.128    0.043    2.981    0.003    0.367    0.367
##   f3 ~~
##     f4                0.200    0.038    5.252    0.000    0.737    0.737
##     f5                0.134    0.034    3.919    0.000    0.560    0.560
##   f4 ~~
##     f5                0.184    0.039    4.757    0.000    0.654    0.654
##
## Thresholds:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1            0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2            0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3            1.214    0.103   11.765    0.000    1.214    1.214
##     sb2|t1            0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2            0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3            1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1           -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2            0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3            0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2            0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3            0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1           -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2            0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3            1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1           -0.010    0.078   -0.124    0.901   -0.010   -0.010
```

```
##     sb6|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3           1.174    0.101   11.592    0.000    1.174    1.174
##     sib1|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2          0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3          1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1          0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2          1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1          1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2          1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3          2.067    0.182   11.330    0.000    2.067    2.067
##     sib4|t1          0.586    0.083    7.034    0.000    0.586    0.586
##     sib4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3          1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1          1.155    0.100   11.502    0.000    1.155    1.155
##     sib5|t2          1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3          1.866    0.155   12.069    0.000    1.866    1.866
##     sib6|t1          0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1          0.357    0.080    4.464    0.000    0.357    0.357
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
##     rit2|t1          0.088    0.078    1.118    0.263    0.088    0.088
```

```
##     rit2|t2           0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1           0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2           1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3           1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1           0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2           1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3           1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1          -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2           0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3           1.322    0.109   12.146    0.000    1.322    1.322
##     rit6|t1          -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2           0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3           0.967    0.093   10.398    0.000    0.967    0.967
##     same1|t1          0.782    0.088    8.937    0.000    0.782    0.782
##     same1|t2          1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3          1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2          0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3          1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1         -0.769    0.087   -8.820    0.000   -0.769   -0.769
##     same3|t2         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3          0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1          0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3          1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1          0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2          1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1          0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2          1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3          1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1          1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2          1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3          2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1         -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2          0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3          0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1          0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2          0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3          1.118    0.099   11.315    0.000    1.118    1.118
##     same10|t1         0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2         0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3         1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1         0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2         0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3         1.155    0.100   11.502    0.000    1.155    1.155
##     rb1|t1           -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2            0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3            0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1           -0.245    0.079   -3.104    0.002   -0.245   -0.245
##     rb2|t2            0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3            0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1            0.496    0.082    6.061    0.000    0.496    0.496
```

```
##     rb3|t2            1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3            1.605    0.128   12.500    0.000    1.605    1.605
##     rb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2            0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3            0.878    0.090    9.737    0.000    0.878    0.878
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1               0.713                               0.713    0.713
##    .sb2               0.543                               0.543    0.543
##    .sb3               0.559                               0.559    0.559
##    .sb4               0.538                               0.538    0.538
##    .sb5               0.659                               0.659    0.659
##    .sb6               0.759                               0.759    0.759
##    .sib1              0.512                               0.512    0.512
##    .sib2              0.631                               0.631    0.631
##    .sib3              0.643                               0.643    0.643
##    .sib4              0.798                               0.798    0.798
##    .sib5              0.364                               0.364    0.364
##    .sib6              0.512                               0.512    0.512
##    .sib7              0.762                               0.762    0.762
##    .sib8              0.690                               0.690    0.690
##    .cb1               0.770                               0.770    0.770
##    .cb2               0.566                               0.566    0.566
##    .cb3               0.800                               0.800    0.800
##    .cb4               0.563                               0.563    0.563
##    .cb5               0.807                               0.807    0.807
##    .cb6               0.850                               0.850    0.850
##    .cb7               0.777                               0.777    0.777
##    .cb8               0.678                               0.678    0.678
##    .rit1              0.682                               0.682    0.682
##    .rit2              0.701                               0.701    0.701
##    .rit3              0.778                               0.778    0.778
##    .rit4              0.541                               0.541    0.541
##    .rit5              0.823                               0.823    0.823
##    .rit6              0.873                               0.873    0.873
##    .same1             0.738                               0.738    0.738
##    .same2             0.759                               0.759    0.759
##    .same3             0.821                               0.821    0.821
##    .same4             0.837                               0.837    0.837
##    .same5             0.389                               0.389    0.389
##    .same6             0.587                               0.587    0.587
##    .same7             0.508                               0.508    0.508
##    .same8             0.807                               0.807    0.807
##    .same9             0.620                               0.620    0.620
##    .same10            0.307                               0.307    0.307
##    .same11            0.384                               0.384    0.384
##    .rb1               0.751                               0.751    0.751
##    .rb2               0.686                               0.686    0.686
##    .rb3               0.509                               0.509    0.509
##    .rb4               0.882                               0.882    0.882
##     f1                0.287    0.069    4.133    0.000    1.000    1.000
##     f2                0.488    0.084    5.791    0.000    1.000    1.000
##     f3                0.230    0.070    3.300    0.001    1.000    1.000
```

```
##     f4                0.318    0.060    5.272    0.000    1.000    1.000
##     f5                0.249    0.065    3.808    0.000    1.000    1.000
```

2.7 Model 7: 6-factor solution

```
mod7 <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6
         f2 =~ sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8
         f3 =~ cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 + cb8
         f4 =~ rit1 + rit2 + rit3 + rit4 + rit5 + rit6
         f5 =~ same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11
         f6 =~ rb1 + rb2 + rb3 + rb4'
mod7_fit <- cfa(mod7,
                data = RBS,
                estimator = "WLSMV",
                ordered = RBS_items
                )
```

```
## Warning: lavaan->lav_object_post_check():
##    covariance matrix of latent variables is not positive definite ; use
##    lavInspect(fit, "cov.lv") to investigate.
```

```
summary(mod7_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 76 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       187
##
##   Number of observations                           258
##
## Model Test User Model:
##                                               Standard      Scaled
##   Test Statistic                              1547.018    1266.181
##   Degrees of freedom                              845         845
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                 2.094
##   Shift parameter                                         527.260
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                              8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                 3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.910       0.821
##   Tucker-Lewis Index (TLI)                      0.904       0.809
##
```

```
##   Robust Comparative Fit Index (CFI)                            NA
##   Robust Tucker-Lewis Index (TLI)                               NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.057       0.044
##   90 Percent confidence interval - lower         0.052       0.039
##   90 Percent confidence interval - upper         0.061       0.049
##   P-value H_0: RMSEA <= 0.050                    0.006       0.977
##   P-value H_0: RMSEA >= 0.080                    0.000       0.000
##
##   Robust RMSEA                                                  NA
##   90 Percent confidence interval - lower                        NA
##   90 Percent confidence interval - upper                        NA
##   P-value H_0: Robust RMSEA <= 0.050                            NA
##   P-value H_0: Robust RMSEA >= 0.080                            NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.105       0.105
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1               1.000                               0.536    0.536
##     sb2               1.262    0.156    8.069    0.000    0.676    0.676
##     sb3               1.238    0.179    6.901    0.000    0.663    0.663
##     sb4               1.269    0.179    7.093    0.000    0.680    0.680
##     sb5               1.090    0.190    5.749    0.000    0.584    0.584
##     sb6               0.917    0.177    5.194    0.000    0.491    0.491
##   f2 =~
##     sib1              1.000                               0.702    0.702
##     sib2              0.863    0.114    7.560    0.000    0.605    0.605
##     sib3              0.856    0.162    5.283    0.000    0.601    0.601
##     sib4              0.641    0.130    4.916    0.000    0.450    0.450
##     sib5              1.140    0.153    7.451    0.000    0.800    0.800
##     sib6              0.991    0.121    8.165    0.000    0.695    0.695
##     sib7              0.694    0.114    6.084    0.000    0.487    0.487
##     sib8              0.790    0.113    7.001    0.000    0.554    0.554
##   f3 =~
##     cb1               1.000                               0.480    0.480
##     cb2               1.373    0.241    5.701    0.000    0.659    0.659
##     cb3               0.934    0.198    4.715    0.000    0.449    0.449
##     cb4               1.371    0.269    5.095    0.000    0.659    0.659
##     cb5               0.922    0.199    4.631    0.000    0.443    0.443
##     cb6               0.814    0.186    4.378    0.000    0.391    0.391
##     cb7               0.983    0.222    4.431    0.000    0.472    0.472
```

```
##     cb8               1.175    0.226    5.193    0.000    0.565    0.565
##   f4 =~
##     rit1              1.000                               0.556    0.556
##     rit2              0.961    0.126    7.616    0.000    0.535    0.535
##     rit3              0.815    0.137    5.962    0.000    0.453    0.453
##     rit4              1.173    0.145    8.075    0.000    0.653    0.653
##     rit5              0.749    0.123    6.076    0.000    0.417    0.417
##     rit6              0.630    0.134    4.684    0.000    0.350    0.350
##   f5 =~
##     same1             1.000                               0.527    0.527
##     same2             0.957    0.175    5.459    0.000    0.505    0.505
##     same3             0.805    0.161    5.003    0.000    0.424    0.424
##     same4             0.779    0.160    4.873    0.000    0.411    0.411
##     same5             1.529    0.223    6.843    0.000    0.806    0.806
##     same6             1.250    0.170    7.360    0.000    0.659    0.659
##     same7             1.369    0.223    6.144    0.000    0.722    0.722
##     same8             0.854    0.153    5.594    0.000    0.450    0.450
##     same9             1.203    0.173    6.938    0.000    0.635    0.635
##     same10            1.614    0.210    7.688    0.000    0.851    0.851
##     same11            1.516    0.205    7.409    0.000    0.799    0.799
##   f6 =~
##     rb1               1.000                               0.500    0.500
##     rb2               1.127    0.179    6.312    0.000    0.564    0.564
##     rb3               1.398    0.237    5.902    0.000    0.699    0.699
##     rb4               0.680    0.175    3.895    0.000    0.340    0.340
##
## Covariances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 ~~
##     f2                0.268    0.046    5.891    0.000    0.714    0.714
##     f3                0.120    0.028    4.263    0.000    0.468    0.468
##     f4                0.125    0.031    3.963    0.000    0.418    0.418
##     f5                0.107    0.024    4.458    0.000    0.380    0.380
##     f6                0.116    0.032    3.628    0.000    0.433    0.433
##   f2 ~~
##     f3                0.111    0.034    3.291    0.001    0.330    0.330
##     f4                0.141    0.046    3.064    0.002    0.360    0.360
##     f5                0.058    0.034    1.717    0.086    0.158    0.158
##     f6                0.129    0.043    2.993    0.003    0.367    0.367
##   f3 ~~
##     f4                0.234    0.043    5.442    0.000    0.875    0.875
##     f5                0.170    0.041    4.180    0.000    0.672    0.672
##     f6                0.135    0.034    3.936    0.000    0.560    0.560
##   f4 ~~
##     f5                0.275    0.045    6.167    0.000    0.939    0.939
##     f6                0.221    0.043    5.168    0.000    0.793    0.793
##   f5 ~~
##     f6                0.156    0.037    4.152    0.000    0.590    0.590
##
## Thresholds:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1            0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2            0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3            1.214    0.103   11.765    0.000    1.214    1.214
```

```
##     sb2|t1           0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2           0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3           1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1          -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2           0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3           0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2           0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3           0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1          -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2           0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3           1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1          -0.010    0.078   -0.124    0.901   -0.010   -0.010
##     sb6|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3           1.174    0.101   11.592    0.000    1.174    1.174
##     sib1|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2          0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3          1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1          0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2          1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1          1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2          1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3          2.067    0.182   11.330    0.000    2.067    2.067
##     sib4|t1          0.586    0.083    7.034    0.000    0.586    0.586
##     sib4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3          1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1          1.155    0.100   11.502    0.000    1.155    1.155
##     sib5|t2          1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3          1.866    0.155   12.069    0.000    1.866    1.866
##     sib6|t1          0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1          0.357    0.080    4.464    0.000    0.357    0.357
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
```

```
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
##     rit2|t1          0.088    0.078    1.118    0.263    0.088    0.088
##     rit2|t2          0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3          0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1          0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2          1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3          1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1          0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3          1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1         -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2          0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3          1.322    0.109   12.146    0.000    1.322    1.322
##     rit6|t1         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2          0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3          0.967    0.093   10.398    0.000    0.967    0.967
##     same1|t1         0.782    0.088    8.937    0.000    0.782    0.782
##     same1|t2         1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3         1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1         0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2         0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3         1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1        -0.769    0.087   -8.820    0.000   -0.769   -0.769
##     same3|t2        -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3         0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1         0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2         0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3         1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1         0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2         1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3         1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1         0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2         1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3         1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1         1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2         1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3         2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1        -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2         0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3         0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1         0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2         0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3         1.118    0.099   11.315    0.000    1.118    1.118
```

```
##     same10|t1         0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2         0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3         1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1         0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2         0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3         1.155    0.100   11.502    0.000    1.155    1.155
##     rb1|t1           -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2            0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3            0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1           -0.245    0.079   -3.104    0.002   -0.245   -0.245
##     rb2|t2            0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3            0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1            0.496    0.082    6.061    0.000    0.496    0.496
##     rb3|t2            1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3            1.605    0.128   12.500    0.000    1.605    1.605
##     rb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2            0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3            0.878    0.090    9.737    0.000    0.878    0.878
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1               0.713                              0.713    0.713
##    .sb2               0.543                              0.543    0.543
##    .sb3               0.560                              0.560    0.560
##    .sb4               0.538                              0.538    0.538
##    .sb5               0.659                              0.659    0.659
##    .sb6               0.759                              0.759    0.759
##    .sib1              0.508                              0.508    0.508
##    .sib2              0.634                              0.634    0.634
##    .sib3              0.639                              0.639    0.639
##    .sib4              0.797                              0.797    0.797
##    .sib5              0.360                              0.360    0.360
##    .sib6              0.516                              0.516    0.516
##    .sib7              0.763                              0.763    0.763
##    .sib8              0.693                              0.693    0.693
##    .cb1               0.769                              0.769    0.769
##    .cb2               0.565                              0.565    0.565
##    .cb3               0.799                              0.799    0.799
##    .cb4               0.566                              0.566    0.566
##    .cb5               0.804                              0.804    0.804
##    .cb6               0.847                              0.847    0.847
##    .cb7               0.777                              0.777    0.777
##    .cb8               0.681                              0.681    0.681
##    .rit1              0.691                              0.691    0.691
##    .rit2              0.714                              0.714    0.714
##    .rit3              0.795                              0.795    0.795
##    .rit4              0.574                              0.574    0.574
##    .rit5              0.826                              0.826    0.826
##    .rit6              0.877                              0.877    0.877
##    .same1             0.722                              0.722    0.722
##    .same2             0.745                              0.745    0.745
##    .same3             0.820                              0.820    0.820
##    .same4             0.831                              0.831    0.831
##    .same5             0.350                              0.350    0.350
```

```
##    .same6            0.565                                  0.565    0.565
##    .same7            0.479                                  0.479    0.479
##    .same8            0.797                                  0.797    0.797
##    .same9            0.597                                  0.597    0.597
##    .same10           0.276                                  0.276    0.276
##    .same11           0.361                                  0.361    0.361
##    .rb1              0.750                                  0.750    0.750
##    .rb2              0.682                                  0.682    0.682
##    .rb3              0.511                                  0.511    0.511
##    .rb4              0.884                                  0.884    0.884
##     f1               0.287    0.069    4.130    0.000       1.000    1.000
##     f2               0.492    0.085    5.818    0.000       1.000    1.000
##     f3               0.231    0.070    3.315    0.001       1.000    1.000
##     f4               0.309    0.061    5.059    0.000       1.000    1.000
##     f5               0.278    0.073    3.818    0.000       1.000    1.000
##     f6               0.250    0.065    3.852    0.000       1.000    1.000
```

2.8 Model modifications

```
# Calculate modification indices for model 2
mi <- modificationIndices(mod2_fit)

# Filter (mi > 10) and print top modifications
significant_mi <- mi %>%
  filter(mi > 10) %>%
  arrange(desc(mi))

print(head(significant_mi))
```

```
##      lhs op    rhs      mi   epc sepc.lv sepc.all sepc.nox
## 1    cb2 ~~    cb4 136.171 0.613   0.613    0.898    0.898
## 2 same10 ~~ same11 103.960 0.467   0.467    1.247    1.247
## 3     f1 =~    cb8  93.489 0.820   0.438    0.438    0.438
## 4   rit4 ~~  same5  64.380 0.443   0.443    0.901    0.901
## 5     f1 =~  same3  59.965 0.643   0.343    0.343    0.343
## 6     f2 =~    sb6  36.800 0.581   0.244    0.244    0.244
```

2.9 Modified model 2

```
mod2m <- 'f1 =~ sb1 +sb2 + sb3 + sb4 + sb5 + sb6 + cb8 +
                sib1 + sib2 + sib3 + sib4 + sib5 + sib6 + sib7 + sib8
          f2 =~ cb1 + cb2 + cb3 + cb4 + cb5 + cb6 + cb7 +
               rit1 + rit2 + rit3 + rit4 + rit5 + rit6 +
               same1 + same2 + same3 + same4 + same5 + same6 + same7 + same8 + same9 + same10 + same11 +
               rb1 + rb2 + rb3 + rb4'
mod2m_fit <- cfa(mod2m,
                 data = RBS,
                 estimator = "WLSMV",
                 ordered = RBS_items
                 )
summary(mod2m_fit,
        standardized = TRUE,
        fit.measures = TRUE
        )
```

```
## lavaan 0.6-20 ended normally after 68 iterations
##
##   Estimator                                         DWLS
##   Optimization method                           NLMINB
##   Number of model parameters                       173
##
##   Number of observations                           258
##
## Model Test User Model:
##                                               Standard      Scaled
##   Test Statistic                              1704.880    1328.443
##   Degrees of freedom                              859         859
##   P-value (Chi-square)                          0.000       0.000
##   Scaling correction factor                                   2.161
##   Shift parameter                                           539.643
##     simple second-order correction
##
## Model Test Baseline Model:
##
##   Test statistic                              8698.096    3258.042
##   Degrees of freedom                              903         903
##   P-value                                       0.000       0.000
##   Scaling correction factor                                   3.310
##
## User Model versus Baseline Model:
##
##   Comparative Fit Index (CFI)                   0.891       0.801
##   Tucker-Lewis Index (TLI)                      0.886       0.790
##
##   Robust Comparative Fit Index (CFI)                           NA
##   Robust Tucker-Lewis Index (TLI)                              NA
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                         0.062       0.046
```

```
##   90 Percent confidence interval - lower         0.058       0.041
##   90 Percent confidence interval - upper         0.066       0.051
##   P-value H_0: RMSEA <= 0.050                    0.000       0.908
##   P-value H_0: RMSEA >= 0.080                    0.000       0.000
##
##   Robust RMSEA                                                  NA
##   90 Percent confidence interval - lower                        NA
##   90 Percent confidence interval - upper                        NA
##   P-value H_0: Robust RMSEA <= 0.050                            NA
##   P-value H_0: Robust RMSEA >= 0.080                            NA
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.109       0.109
##
## Parameter Estimates:
##
##   Parameterization                                 Delta
##   Standard errors                            Robust.sem
##   Information                                  Expected
##   Information saturated (h1) model        Unstructured
##
## Latent Variables:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 =~
##     sb1              1.000                               0.522    0.522
##     sb2              1.240    0.150    8.285    0.000    0.647    0.647
##     sb3              1.233    0.172    7.160    0.000    0.644    0.644
##     sb4              1.229    0.171    7.188    0.000    0.641    0.641
##     sb5              1.082    0.183    5.912    0.000    0.564    0.564
##     sb6              0.901    0.168    5.361    0.000    0.470    0.470
##     cb8              1.173    0.204    5.743    0.000    0.612    0.612
##     sib1             1.162    0.190    6.117    0.000    0.606    0.606
##     sib2             0.975    0.195    4.999    0.000    0.509    0.509
##     sib3             1.037    0.252    4.115    0.000    0.541    0.541
##     sib4             0.803    0.151    5.305    0.000    0.419    0.419
##     sib5             1.318    0.249    5.290    0.000    0.688    0.688
##     sib6             1.134    0.202    5.615    0.000    0.592    0.592
##     sib7             0.795    0.151    5.275    0.000    0.415    0.415
##     sib8             0.855    0.181    4.729    0.000    0.446    0.446
##   f2 =~
##     cb1              1.000                               0.424    0.424
##     cb2              1.350    0.237    5.694    0.000    0.573    0.573
##     cb3              0.945    0.198    4.766    0.000    0.401    0.401
##     cb4              1.338    0.270    4.957    0.000    0.568    0.568
##     cb5              0.931    0.198    4.698    0.000    0.395    0.395
##     cb6              0.816    0.185    4.420    0.000    0.346    0.346
##     cb7              0.953    0.217    4.397    0.000    0.404    0.404
##     rit1             1.320    0.221    5.962    0.000    0.560    0.560
##     rit2             1.273    0.223    5.704    0.000    0.540    0.540
##     rit3             1.086    0.193    5.618    0.000    0.461    0.461
##     rit4             1.556    0.274    5.689    0.000    0.660    0.660
##     rit5             1.002    0.203    4.942    0.000    0.425    0.425
##     rit6             0.838    0.203    4.127    0.000    0.355    0.355
```

```
##     same1             1.167    0.197    5.927    0.000    0.495    0.495
##     same2             1.127    0.223    5.061    0.000    0.478    0.478
##     same3             0.987    0.200    4.937    0.000    0.419    0.419
##     same4             0.928    0.198    4.681    0.000    0.393    0.393
##     same5             1.800    0.292    6.164    0.000    0.763    0.763
##     same6             1.476    0.259    5.693    0.000    0.626    0.626
##     same7             1.592    0.315    5.060    0.000    0.675    0.675
##     same8             1.004    0.196    5.128    0.000    0.426    0.426
##     same9             1.416    0.238    5.954    0.000    0.601    0.601
##     same10            1.924    0.292    6.588    0.000    0.816    0.816
##     same11            1.822    0.283    6.440    0.000    0.773    0.773
##     rb1               0.920    0.184    5.005    0.000    0.390    0.390
##     rb2               0.982    0.189    5.193    0.000    0.417    0.417
##     rb3               1.238    0.226    5.474    0.000    0.525    0.525
##     rb4               0.574    0.176    3.260    0.001    0.244    0.244
##
## Covariances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##   f1 ~~
##     f2               0.089    0.022    4.008    0.000    0.401    0.401
##
## Thresholds:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##     sb1|t1           0.156    0.079    1.988    0.047    0.156    0.156
##     sb1|t2           0.644    0.084    7.636    0.000    0.644    0.644
##     sb1|t3           1.214    0.103   11.765    0.000    1.214    1.214
##     sb2|t1           0.127    0.078    1.615    0.106    0.127    0.127
##     sb2|t2           0.730    0.086    8.469    0.000    0.730    0.730
##     sb2|t3           1.396    0.113   12.325    0.000    1.396    1.396
##     sb3|t1          -0.265    0.079   -3.352    0.001   -0.265   -0.265
##     sb3|t2           0.235    0.079    2.980    0.003    0.235    0.235
##     sb3|t3           0.836    0.089    9.398    0.000    0.836    0.836
##     sb4|t1          -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     sb4|t2           0.326    0.080    4.094    0.000    0.326    0.326
##     sb4|t3           0.952    0.093   10.290    0.000    0.952    0.952
##     sb5|t1          -0.225    0.079   -2.856    0.004   -0.225   -0.225
##     sb5|t2           0.474    0.081    5.817    0.000    0.474    0.474
##     sb5|t3           1.234    0.104   11.848    0.000    1.234    1.234
##     sb6|t1          -0.010    0.078   -0.124    0.901   -0.010   -0.010
##     sb6|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     sb6|t3           1.174    0.101   11.592    0.000    1.174    1.174
##     cb8|t1          -0.068    0.078   -0.870    0.384   -0.068   -0.068
##     cb8|t2           0.431    0.081    5.326    0.000    0.431    0.431
##     cb8|t3           0.922    0.092   10.071    0.000    0.922    0.922
##     sib1|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     sib1|t2          0.864    0.090    9.625    0.000    0.864    0.864
##     sib1|t3          1.370    0.112   12.270    0.000    1.370    1.370
##     sib2|t1          0.718    0.086    8.351    0.000    0.718    0.718
##     sib2|t2          1.065    0.097   11.022    0.000    1.065    1.065
##     sib2|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib3|t1          1.422    0.115   12.374    0.000    1.422    1.422
##     sib3|t2          1.721    0.139   12.392    0.000    1.721    1.721
##     sib3|t3          2.067    0.182   11.330    0.000    2.067    2.067
##     sib4|t1          0.586    0.083    7.034    0.000    0.586    0.586
```

```
##     sib4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     sib4|t3          1.299    0.108   12.077    0.000    1.299    1.299
##     sib5|t1          1.155    0.100   11.502    0.000    1.155    1.155
##     sib5|t2          1.538    0.123   12.497    0.000    1.538    1.538
##     sib5|t3          1.866    0.155   12.070    0.000    1.866    1.866
##     sib6|t1          0.907    0.091    9.961    0.000    0.907    0.907
##     sib6|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     sib6|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     sib7|t1          0.357    0.080    4.464    0.000    0.357    0.357
##     sib7|t2          0.644    0.084    7.636    0.000    0.644    0.644
##     sib7|t3          1.100    0.098   11.219    0.000    1.100    1.100
##     sib8|t1          0.574    0.083    6.913    0.000    0.574    0.574
##     sib8|t2          0.893    0.091    9.849    0.000    0.893    0.893
##     sib8|t3          1.277    0.106   12.004    0.000    1.277    1.277
##     cb1|t1           0.068    0.078    0.870    0.384    0.068    0.068
##     cb1|t2           0.540    0.082    6.549    0.000    0.540    0.540
##     cb1|t3           0.983    0.094   10.504    0.000    0.983    0.983
##     cb2|t1           0.420    0.081    5.203    0.000    0.420    0.420
##     cb2|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb2|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb3|t1           0.609    0.084    7.276    0.000    0.609    0.609
##     cb3|t2           0.878    0.090    9.737    0.000    0.878    0.878
##     cb3|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb4|t1           0.983    0.094   10.504    0.000    0.983    0.983
##     cb4|t2           1.174    0.101   11.592    0.000    1.174    1.174
##     cb4|t3           1.571    0.126   12.504    0.000    1.571    1.571
##     cb5|t1           0.782    0.088    8.937    0.000    0.782    0.782
##     cb5|t2           1.422    0.115   12.374    0.000    1.422    1.422
##     cb5|t3           2.420    0.257    9.433    0.000    2.420    2.420
##     cb6|t1           0.507    0.082    6.183    0.000    0.507    0.507
##     cb6|t2           0.893    0.091    9.849    0.000    0.893    0.893
##     cb6|t3           1.370    0.112   12.270    0.000    1.370    1.370
##     cb7|t1          -0.078    0.078   -0.994    0.320   -0.078   -0.078
##     cb7|t2           0.485    0.082    5.939    0.000    0.485    0.485
##     cb7|t3           1.031    0.095   10.819    0.000    1.031    1.031
##     rit1|t1         -0.452    0.081   -5.571    0.000   -0.452   -0.452
##     rit1|t2          0.010    0.078    0.124    0.901    0.010    0.010
##     rit1|t3          0.551    0.083    6.670    0.000    0.551    0.551
##     rit2|t1          0.088    0.078    1.118    0.263    0.088    0.088
##     rit2|t2          0.496    0.082    6.061    0.000    0.496    0.496
##     rit2|t3          0.983    0.094   10.504    0.000    0.983    0.983
##     rit3|t1          0.656    0.085    7.756    0.000    0.656    0.656
##     rit3|t2          1.082    0.097   11.121    0.000    1.082    1.082
##     rit3|t3          1.680    0.135   12.446    0.000    1.680    1.680
##     rit4|t1          0.769    0.087    8.820    0.000    0.769    0.769
##     rit4|t2          1.136    0.100   11.409    0.000    1.136    1.136
##     rit4|t3          1.538    0.123   12.497    0.000    1.538    1.538
##     rit5|t1         -0.019    0.078   -0.249    0.804   -0.019   -0.019
##     rit5|t2          0.563    0.083    6.792    0.000    0.563    0.563
##     rit5|t3          1.322    0.109   12.146    0.000    1.322    1.322
##     rit6|t1         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     rit6|t2          0.368    0.080    4.587    0.000    0.368    0.368
##     rit6|t3          0.967    0.093   10.397    0.000    0.967    0.967
##     same1|t1         0.782    0.088    8.937    0.000    0.782    0.782
```

```
##     same1|t2          1.255    0.105   11.927    0.000    1.255    1.255
##     same1|t3          1.721    0.139   12.392    0.000    1.721    1.721
##     same2|t1          0.452    0.081    5.571    0.000    0.452    0.452
##     same2|t2          0.769    0.087    8.820    0.000    0.769    0.769
##     same2|t3          1.255    0.105   11.927    0.000    1.255    1.255
##     same3|t1         -0.769    0.087   -8.820    0.000   -0.769   -0.769
##     same3|t2         -0.049    0.078   -0.621    0.534   -0.049   -0.049
##     same3|t3          0.718    0.086    8.351    0.000    0.718    0.718
##     same4|t1          0.496    0.082    6.061    0.000    0.496    0.496
##     same4|t2          0.952    0.093   10.290    0.000    0.952    0.952
##     same4|t3          1.234    0.104   11.848    0.000    1.234    1.234
##     same5|t1          0.795    0.088    9.053    0.000    0.795    0.795
##     same5|t2          1.277    0.106   12.004    0.000    1.277    1.277
##     same5|t3          1.605    0.128   12.500    0.000    1.605    1.605
##     same6|t1          0.809    0.088    9.168    0.000    0.809    0.809
##     same6|t2          1.422    0.115   12.374    0.000    1.422    1.422
##     same6|t3          1.991    0.171   11.646    0.000    1.991    1.991
##     same7|t1          1.370    0.112   12.270    0.000    1.370    1.370
##     same7|t2          1.813    0.149   12.209    0.000    1.813    1.813
##     same7|t3          2.663    0.337    7.912    0.000    2.663    2.663
##     same8|t1         -0.127    0.078   -1.615    0.106   -0.127   -0.127
##     same8|t2          0.215    0.079    2.732    0.006    0.215    0.215
##     same8|t3          0.922    0.092   10.071    0.000    0.922    0.922
##     same9|t1          0.117    0.078    1.491    0.136    0.117    0.117
##     same9|t2          0.621    0.084    7.396    0.000    0.621    0.621
##     same9|t3          1.118    0.099   11.315    0.000    1.118    1.118
##     same10|t1         0.196    0.079    2.484    0.013    0.196    0.196
##     same10|t2         0.656    0.085    7.756    0.000    0.656    0.656
##     same10|t3         1.136    0.100   11.409    0.000    1.136    1.136
##     same11|t1         0.357    0.080    4.464    0.000    0.357    0.357
##     same11|t2         0.743    0.087    8.586    0.000    0.743    0.743
##     same11|t3         1.155    0.100   11.502    0.000    1.155    1.155
##     rb1|t1           -0.347    0.080   -4.341    0.000   -0.347   -0.347
##     rb1|t2            0.166    0.079    2.112    0.035    0.166    0.166
##     rb1|t3            0.743    0.087    8.586    0.000    0.743    0.743
##     rb2|t1           -0.245    0.079   -3.104    0.002   -0.245   -0.245
##     rb2|t2            0.186    0.079    2.360    0.018    0.186    0.186
##     rb2|t3            0.937    0.092   10.181    0.000    0.937    0.937
##     rb3|t1            0.496    0.082    6.061    0.000    0.496    0.496
##     rb3|t2            1.082    0.097   11.121    0.000    1.082    1.082
##     rb3|t3            1.605    0.128   12.500    0.000    1.605    1.605
##     rb4|t1           -0.275    0.079   -3.475    0.001   -0.275   -0.275
##     rb4|t2            0.306    0.080    3.847    0.000    0.306    0.306
##     rb4|t3            0.878    0.090    9.737    0.000    0.878    0.878
##
## Variances:
##                   Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .sb1              0.728                              0.728    0.728
##    .sb2              0.581                              0.581    0.581
##    .sb3              0.586                              0.586    0.586
##    .sb4              0.589                              0.589    0.589
##    .sb5              0.681                              0.681    0.681
##    .sb6              0.779                              0.779    0.779
##    .cb8              0.625                              0.625    0.625
```

```
##    .sib1              0.632                                  0.632    0.632
##    .sib2              0.741                                  0.741    0.741
##    .sib3              0.707                                  0.707    0.707
##    .sib4              0.824                                  0.824    0.824
##    .sib5              0.527                                  0.527    0.527
##    .sib6              0.650                                  0.650    0.650
##    .sib7              0.828                                  0.828    0.828
##    .sib8              0.801                                  0.801    0.801
##    .cb1               0.820                                  0.820    0.820
##    .cb2               0.672                                  0.672    0.672
##    .cb3               0.839                                  0.839    0.839
##    .cb4               0.678                                  0.678    0.678
##    .cb5               0.844                                  0.844    0.844
##    .cb6               0.880                                  0.880    0.880
##    .cb7               0.837                                  0.837    0.837
##    .rit1              0.687                                  0.687    0.687
##    .rit2              0.709                                  0.709    0.709
##    .rit3              0.788                                  0.788    0.788
##    .rit4              0.564                                  0.564    0.564
##    .rit5              0.819                                  0.819    0.819
##    .rit6              0.874                                  0.874    0.874
##    .same1             0.755                                  0.755    0.755
##    .same2             0.771                                  0.771    0.771
##    .same3             0.825                                  0.825    0.825
##    .same4             0.845                                  0.845    0.845
##    .same5             0.417                                  0.417    0.417
##    .same6             0.608                                  0.608    0.608
##    .same7             0.544                                  0.544    0.544
##    .same8             0.819                                  0.819    0.819
##    .same9             0.639                                  0.639    0.639
##    .same10            0.334                                  0.334    0.334
##    .same11            0.403                                  0.403    0.403
##    .rb1               0.848                                  0.848    0.848
##    .rb2               0.826                                  0.826    0.826
##    .rb3               0.724                                  0.724    0.724
##    .rb4               0.941                                  0.941    0.941
##     f1                0.272    0.067    4.043    0.000       1.000    1.000
##     f2                0.180    0.053    3.390    0.001       1.000    1.000
```

2.10 Relative fitness compared to model 1

```
lavTestLRT(mod1_fit, mod2_fit)
```

```
##
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
##    lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##    robust test that should be reported per model. A robust difference test is
##    a function of two standard (not robust) statistics.
##
##           Df AIC BIC  Chisq Chisq diff  RMSEA Df diff Pr(>Chisq)
## mod2_fit 859         1763.3
## mod1_fit 860         2462.0      74.62 1.6444       1  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lavTestLRT(mod1_fit, mod3_fit)
```

```
##
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
##    lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##    robust test that should be reported per model. A robust difference test is
##    a function of two standard (not robust) statistics.
##
##           Df AIC BIC  Chisq Chisq diff   RMSEA Df diff Pr(>Chisq)
## mod3_fit 857         1704.3
## mod1_fit 860         2462.0     127.06 0.98744       3  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lavTestLRT(mod1_fit, mod4_fit)
```

```
##
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
##    lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##    robust test that should be reported per model. A robust difference test is
##    a function of two standard (not robust) statistics.
##
##           Df AIC BIC  Chisq Chisq diff   RMSEA Df diff Pr(>Chisq)
## mod4_fit 857         1806.5
## mod1_fit 860         2462.0     116.55 0.91815       3  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lavTestLRT(mod1_fit, mod5_fit)
```

```
##
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
##    lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##    robust test that should be reported per model. A robust difference test is
##    a function of two standard (not robust) statistics.
##
##           Df AIC BIC  Chisq Chisq diff   RMSEA Df diff Pr(>Chisq)
## mod5_fit 854         1743.9
## mod1_fit 860         2462.0     162.46 0.67821       6  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lavTestLRT(mod1_fit, mod6_fit)
```

```
##
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
##    lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##    robust test that should be reported per model. A robust difference test is
##    a function of two standard (not robust) statistics.
##
##           Df AIC BIC  Chisq Chisq diff   RMSEA Df diff Pr(>Chisq)
## mod6_fit 850         1585.5
## mod1_fit 860         2462.0     219.56 0.57951      10  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lavTestLRT(mod1_fit, mod7_fit)
```

```
##
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
##    lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##    robust test that should be reported per model. A robust difference test is
##    a function of two standard (not robust) statistics.
##
##           Df AIC BIC Chisq Chisq diff   RMSEA Df diff Pr(>Chisq)
## mod7_fit 845          1547
## mod1_fit 860          2462     271.38 0.48223      15  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lavTestLRT(mod1_fit, mod2m_fit)
```

```
##
```

```
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
##    lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##    robust test that should be reported per model. A robust difference test is
##    a function of two standard (not robust) statistics.
##
##            Df AIC BIC  Chisq Chisq diff  RMSEA Df diff Pr(>Chisq)
## mod2m_fit 859         1704.9
## mod1_fit  860         2462.0     73.266 1.7119       1  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

3 Reliability analysis

3.1 Spearman's correlation between subscales

3.1.1 Model 2: 2-factor solution

```
mod2_corr <- cor(RBS[,mod2_factors], method = "spearman")
print(mod2_corr)
```

```
##           rsmb        is
## rsmb 1.0000000 0.3821366
## is   0.3821366 1.0000000
```

3.1.2 Model 7: 6-factor solution

```
mod7_corr <- cor(RBS[,mod7_factors], method = "spearman")
print(mod7_corr)
```

```
##             sb       sib        cb       rit      same        rb
## sb   1.0000000 0.4801689 0.3556833 0.2839153 0.3382236 0.2361552
## sib  0.4801689 1.0000000 0.2362260 0.2153503 0.1337620 0.1619763
## cb   0.3556833 0.2362260 1.0000000 0.5773194 0.5077722 0.3404419
## rit  0.2839153 0.2153503 0.5773194 1.0000000 0.5764909 0.4004596
## same 0.3382236 0.1337620 0.5077722 0.5764909 1.0000000 0.3732290
## rb   0.2361552 0.1619763 0.3404419 0.4004596 0.3732290 1.0000000
```

3.1.3 Modified Model 2: alternative 2-factor solution

```
mod2m_corr <- cor(RBS[,mod2m_factors], method = "spearman")
print(mod2m_corr)
```

```
##           rsmbm       ism
## rsmbm 1.0000000 0.3831305
## ism   0.3831305 1.0000000
```

3.2 Corrected item-total spearman's correlation

3.2.1 Store items of each factors

```
# Model 2
RSMB <- RBS %>% select(all_of(RSMB_items))
IS <- RBS %>% select(all_of(IS_items))

# Model 7
SB <- RBS %>% select(all_of(sb_items))
SIB <- RBS %>% select(all_of(sib_items))
CB <- RBS %>% select(all_of(cb_items))
Rit <- RBS %>% select(all_of(rit_items))
Same <- RBS %>% select(all_of(same_items))
RB <- RBS %>% select(all_of(rb_items))

# Modified Model 2
RSMBm <- RBS %>% select(all_of(RSMB_items), "cb8")
ISm <- RBS %>% select(all_of(IS_items), -"cb8")
```

3.2.2 Model 2: 2-factor solution

```
RSMB_rel <- alpha(cor(RSMB, method = "spearman"))
RSMB_rel$item.stats
```

```
##              r     r.cor    r.drop
## sb1  0.5215429 0.4673921 0.4055704
## sb2  0.5913832 0.5574460 0.4859921
## sb3  0.5676237 0.5326709 0.4584163
## sb4  0.5528271 0.5101365 0.4413567
## sb5  0.5329001 0.4790997 0.4185181
## sb6  0.3825757 0.2942539 0.2510340
## sib1 0.5468753 0.4959989 0.4345190
## sib2 0.4792435 0.4140404 0.3577803
## sib3 0.4000540 0.3180765 0.2700875
## sib4 0.4176879 0.3279172 0.2894195
## sib5 0.5228988 0.4662924 0.4071136
## sib6 0.5103646 0.4621330 0.3928751
## sib7 0.4780419 0.4082271 0.3564325
## sib8 0.4906196 0.4328468 0.3705667
```

```
IS_rel <- alpha(cor(IS, method = "spearman"))
IS_rel$item.stats
```

```
##                r     r.cor    r.drop
## cb1    0.4240169 0.3910951 0.3547382
## cb2    0.4608547 0.4463854 0.3940140
## cb3    0.3734503 0.3339473 0.3012326
## cb4    0.3691281 0.3399892 0.2966807
## cb5    0.3318065 0.2863878 0.2575166
## cb6    0.3389946 0.2984375 0.2650402
## cb7    0.3674785 0.3232542 0.2949444
## cb8    0.3870138 0.3474689 0.3155385
## rit1   0.4934320 0.4671091 0.4289590
## rit2   0.5171543 0.5013985 0.4545320
## rit3   0.4223707 0.3914186 0.3529889
## rit4   0.4778608 0.4642297 0.4122311
## rit5   0.4140638 0.3836632 0.3441696
## rit6   0.3563151 0.3172246 0.2832070
## same1  0.4396360 0.4107725 0.3713601
## same2  0.4001635 0.3665711 0.3294401
## same3  0.3698692 0.3326951 0.2974610
## same4  0.3535633 0.3084739 0.2803172
## same5  0.5570914 0.5542570 0.4978291
## same6  0.4785404 0.4561103 0.4129602
## same7  0.4643718 0.4414428 0.3977771
## same8  0.4272228 0.3917661 0.3581463
## same9  0.5054951 0.4934445 0.4419498
## same10 0.6093761 0.6164149 0.5549825
## same11 0.5611590 0.5580282 0.5022562
## rb1    0.3973777 0.3635981 0.3264924
## rb2    0.4225591 0.3908897 0.3531890
```

```
## rb3    0.4572166 0.4239138 0.3901238
## rb4    0.2602509 0.2068131 0.1831200
```

3.2.3 Model 7: 6-factor solution

```
SB_rel <- alpha(cor(SB, method = "spearman"))
SB_rel$item.stats
```

```
##             r     r.cor    r.drop
## sb1 0.6057089 0.4821449 0.3922619
## sb2 0.6922169 0.6122835 0.5081695
## sb3 0.7040631 0.6347329 0.5246700
## sb4 0.6574021 0.5629373 0.4605779
## sb5 0.6050933 0.4729856 0.3914645
## sb6 0.4893144 0.2990460 0.2476459
```

```
SIB_rel <- alpha(cor(SIB, method = "spearman"))
SIB_rel$item.stats
```

```
##              r     r.cor    r.drop
## sib1 0.5937536 0.5038579 0.4122846
## sib2 0.5727948 0.4780699 0.3861789
## sib3 0.4414458 0.2982714 0.2297553
## sib4 0.4584803 0.3059611 0.2493822
## sib5 0.6113766 0.5325719 0.4344980
## sib6 0.5614290 0.4783647 0.3721607
## sib7 0.5198557 0.3988280 0.3216909
## sib8 0.5958383 0.5182118 0.4148996
```

```
CB_rel <- alpha(cor(CB, method = "spearman"))
CB_rel$item.stats
```

```
##             r     r.cor    r.drop
## cb1 0.5295505 0.4178531 0.3098635
## cb2 0.5870627 0.5470806 0.3813639
## cb3 0.4169251 0.2431737 0.1773866
## cb4 0.5468554 0.4867287 0.3310861
## cb5 0.4830441 0.3380196 0.2540088
## cb6 0.4740606 0.3301413 0.2434111
## cb7 0.4767199 0.3278440 0.2465419
## cb8 0.4368977 0.2716616 0.2002015
```

```
Rit_rel <- alpha(cor(Rit, method = "spearman"))
Rit_rel$item.stats
```

```
##              r     r.cor    r.drop
## rit1 0.5326596 0.3592561 0.2660314
## rit2 0.5585877 0.4204960 0.2985824
## rit3 0.5733122 0.4214825 0.3173809
## rit4 0.5985989 0.4682313 0.3502138
## rit5 0.5505972 0.3966493 0.2884770
## rit6 0.5296901 0.3682704 0.2623470
```

```r
Same_rel <- alpha(cor(Same, method = "spearman"))
Same_rel$item.stats
```

```
##                r     r.cor    r.drop
## same1  0.5115846 0.4306210 0.3695581
## same2  0.5125054 0.4308103 0.3706217
## same3  0.3626800 0.2365140 0.2026196
## same4  0.4015031 0.2843881 0.2452070
## same5  0.6171903 0.5667903 0.4942437
## same6  0.6095987 0.5598968 0.4850930
## same7  0.5168172 0.4390624 0.3756074
## same8  0.4517563 0.3478014 0.3012975
## same9  0.6172501 0.5850014 0.4943159
## same10 0.6775959 0.6837149 0.5681449
## same11 0.6088439 0.5858083 0.4841848
```

```r
RB_rel <- alpha(cor(RB, method = "spearman"))
RB_rel$item.stats
```

```
##             r     r.cor    r.drop
## rb1 0.6418287 0.4358598 0.3073538
## rb2 0.7017590 0.5569430 0.3964137
## rb3 0.6213842 0.3955319 0.2785487
## rb4 0.5721587 0.2990164 0.2121118
```

3.2.4 Modified Model 2: alternative 2-factor solution

```
RSMBm_rel <- alpha(cor(RSMBm, method = "spearman"))
RSMBm_rel$item.stats
```

```
##              r     r.cor    r.drop
## sb1  0.5100614 0.4575575 0.4001891
## sb2  0.5836466 0.5500662 0.4840578
## sb3  0.5781926 0.5506759 0.4777738
## sb4  0.5512260 0.5105265 0.4468643
## sb5  0.5416491 0.4941532 0.4359512
## sb6  0.3995658 0.3240310 0.2778153
## sib1 0.5310232 0.4809590 0.4238812
## sib2 0.4513901 0.3882639 0.3346940
## sib3 0.3933046 0.3156034 0.2710036
## sib4 0.4289578 0.3509551 0.3099639
## sib5 0.5197310 0.4674860 0.4110988
## sib6 0.5015160 0.4546512 0.3905754
## sib7 0.4762307 0.4113392 0.3622784
## sib8 0.4740967 0.4174291 0.3599004
## cb8  0.4968365 0.4472176 0.3853217
```

```
ISm_rel <- alpha(cor(ISm, method = "spearman"))
ISm_rel$item.stats
```

```
##                r     r.cor    r.drop
## cb1    0.4273492 0.3935117 0.3561715
## cb2    0.4682263 0.4536998 0.3998674
## cb3    0.3695358 0.3278940 0.2949152
## cb4    0.3749096 0.3451239 0.3005825
## cb5    0.3399376 0.2930551 0.2637968
## cb6    0.3421297 0.3002082 0.2660959
## cb7    0.3611442 0.3139534 0.2860760
## rit1   0.4879261 0.4595834 0.4210413
## rit2   0.5156235 0.4989190 0.4509397
## rit3   0.4269075 0.3951596 0.3557011
## rit4   0.4783647 0.4640560 0.4107550
## rit5   0.4245007 0.3933595 0.3531385
## rit6   0.3612318 0.3211046 0.2861683
## same1  0.4405273 0.4102584 0.3702232
## same2  0.4070687 0.3726116 0.3346112
## same3  0.3585010 0.3181984 0.2832946
## same4  0.3481533 0.2998893 0.2724181
## same5  0.5596809 0.5567603 0.4988120
## same6  0.4813191 0.4582402 0.4139314
## same7  0.4691083 0.4456001 0.4008138
## same8  0.4248442 0.3878773 0.3535042
## same9  0.5033286 0.4904681 0.4376491
## same10 0.6115165 0.6186638 0.5556373
## same11 0.5680518 0.5649880 0.5079516
## rb1    0.4025426 0.3677580 0.3298102
## rb2    0.4286787 0.3961394 0.3575876
```

```
## rb3    0.4498440 0.4130199 0.3801777
## rb4    0.2550925 0.1989488 0.1754836
```

3.3 Composite reliability

3.3.1 Model 2: 2-factor solution

```
rel_mod2 <- compRelSEM(mod2_fit)
print(rel_mod2, digits = 3)
```

```
##    f1    f2
## 0.801 0.908
```

3.3.2 Model 7: 6-factor solution

```
rel_mod7 <- compRelSEM(mod7_fit)
print(rel_mod7, digits = 3)
```

```
##    f1    f2    f3    f4    f5    f6
## 0.745 0.704 0.733 0.565 0.872 0.507
```

3.3.3 Modified Model 2: alternative 2-factor solution

```
rel_mod2m <- compRelSEM(mod2m_fit)
print(rel_mod2m, digits = 3)
```

```
##    f1    f2
## 0.812 0.906
```