MASEM on Gnambs et al. (2018)

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May 08, 2019

Contents

Data preparation

```
library(metaSEM)

## Use more cores to speed up the analysis
mxOption(NULL, 'Number of Threads', parallel::detectCores()-2)

## Create a new dataset without missing value in Individualism
index_na <- is.na(Gnambs18$Individualism)
Gnambs18 <- lapply(Gnambs18, function(x) x[!index_na])

## Select data with the correlation matrices, i.e., exclude studies with factor loadings
index <- Gnambs18$CorMat==1
Gnambs18 <- lapply(Gnambs18, function(x) x[index])

my.df <- Cor2DataFrame(Gnambs18$data, Gnambs18$n, acov = "weighted")

## Add the standardized individualism as the moderator
## Standardization of the moderator improves the convergence.
my.df$data <- data.frame(my.df$data,
                         Individualism=scale(Gnambs18$Individualism),
                         check.names=FALSE)
summary(my.df)
```

```
##         Length Class      Mode
## data    1081   data.frame list
## n         34   -none-     numeric
## ylabels   45   -none-     character
## vlabels 1035   -none-     character
```

TSSEM

One general factor model

```
rand1 <- tssem1(Gnambs18$data, Gnambs18$n, method="REM", RE.type="Diag")
summary(rand1)
```

```
##
## Call:
## meta(y = ES, v = acovR, RE.constraints = Diag(paste0(RE.startvalues,
##     "*Tau2_", 1:no.es, "_", 1:no.es)), RE.lbound = RE.lbound,
##     I2 = I2, model.name = model.name, suppressWarnings = TRUE,
##     silent = silent, run = run)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##               Estimate  Std.Error     lbound     ubound z value  Pr(>|z|)
## Intercept1  0.40544055 0.01700775 0.37210597 0.43877512 23.8386 < 2.2e-16 ***
## Intercept2  0.42482126 0.01416908 0.39705038 0.45259214 29.9823 < 2.2e-16 ***
## Intercept3  0.38473667 0.01462387 0.35607440 0.41339893 26.3088 < 2.2e-16 ***
## Intercept4  0.36585954 0.01938278 0.32786998 0.40384910 18.8755 < 2.2e-16 ***
## Intercept5  0.39648010 0.01211330 0.37273847 0.42022173 32.7310 < 2.2e-16 ***
## Intercept6  0.43750256 0.01803679 0.40215110 0.47285401 24.2561 < 2.2e-16 ***
## Intercept7  0.30700218 0.02738439 0.25332976 0.36067461 11.2108 < 2.2e-16 ***
## Intercept8  0.43551422 0.01545539 0.40522222 0.46580622 28.1788 < 2.2e-16 ***
## Intercept9  0.61867585 0.01938998 0.58067219 0.65667951 31.9070 < 2.2e-16 ***
## Intercept10 0.31114730 0.01386313 0.28397607 0.33831853 22.4442 < 2.2e-16 ***
## Intercept11 0.28198735 0.01296440 0.25657760 0.30739710 21.7509 < 2.2e-16 ***
## Intercept12 0.46342211 0.01288567 0.43816666 0.48867756 35.9641 < 2.2e-16 ***
## Intercept13 0.65004513 0.01638497 0.61793118 0.68215908 39.6733 < 2.2e-16 ***
## Intercept14 0.33698735 0.01641119 0.30482201 0.36915269 20.5340 < 2.2e-16 ***
## Intercept15 0.42779144 0.02233831 0.38400916 0.47157372 19.1506 < 2.2e-16 ***
## Intercept16 0.53672363 0.01316727 0.51091626 0.56253101 40.7619 < 2.2e-16 ***
## Intercept17 0.43643912 0.01462204 0.40778044 0.46509779 29.8480 < 2.2e-16 ***
## Intercept18 0.47471441 0.01161691 0.45194568 0.49748315 40.8641 < 2.2e-16 ***
## Intercept19 0.34696485 0.01620640 0.31520089 0.37872882 21.4091 < 2.2e-16 ***
## Intercept20 0.29135152 0.01193883 0.26795184 0.31475120 24.4037 < 2.2e-16 ***
## Intercept21 0.53844704 0.02326922 0.49284021 0.58405388 23.1399 < 2.2e-16 ***
## Intercept22 0.20429815 0.02068885 0.16374876 0.24484755  9.8748 < 2.2e-16 ***
## Intercept23 0.35037665 0.01325983 0.32438787 0.37636543 26.4239 < 2.2e-16 ***
## Intercept24 0.46524618 0.01297894 0.43980792 0.49068444 35.8462 < 2.2e-16 ***
## Intercept25 0.28944857 0.01417704 0.26166208 0.31723506 20.4167 < 2.2e-16 ***
## Intercept26 0.26915783 0.01228368 0.24508227 0.29323339 21.9118 < 2.2e-16 ***
## Intercept27 0.41788659 0.01903209 0.38058438 0.45518880 21.9569 < 2.2e-16 ***
## Intercept28 0.18006937 0.02179438 0.13735318 0.22278556  8.2622 2.220e-16 ***
## Intercept29 0.30410740 0.01453273 0.27562377 0.33259103 20.9257 < 2.2e-16 ***
## Intercept30 0.40236856 0.01198724 0.37887400 0.42586312 33.5664 < 2.2e-16 ***
## Intercept31 0.45712719 0.01165852 0.43427692 0.47997747 39.2097 < 2.2e-16 ***
## Intercept32 0.33995868 0.01689886 0.30683753 0.37307983 20.1173 < 2.2e-16 ***
## Intercept33 0.35205637 0.01719227 0.31836015 0.38575260 20.4776 < 2.2e-16 ***
## Intercept34 0.48878581 0.01976504 0.45004706 0.52752457 24.7298 < 2.2e-16 ***
## Intercept35 0.38684001 0.01617000 0.35514738 0.41853264 23.9233 < 2.2e-16 ***
## Intercept36 0.31923260 0.01294727 0.29385641 0.34460879 24.6564 < 2.2e-16 ***
```

```
## Intercept37 0.41903434 0.02305630 0.37384482 0.46422386 18.1744 < 2.2e-16 ***
## Intercept38 0.53204070 0.01110241 0.51028038 0.55380102 47.9212 < 2.2e-16 ***
## Intercept39 0.41761883 0.01165537 0.39477472 0.44046295 35.8306 < 2.2e-16 ***
## Intercept40 0.23010709 0.02292391 0.18517706 0.27503712 10.0379 < 2.2e-16 ***
## Intercept41 0.37995430 0.01560349 0.34937201 0.41053658 24.3506 < 2.2e-16 ***
## Intercept42 0.48256538 0.01496389 0.45323669 0.51189407 32.2487 < 2.2e-16 ***
## Intercept43 0.40299461 0.02280683 0.35829404 0.44769519 17.6699 < 2.2e-16 ***
## Intercept44 0.33626600 0.03025824 0.27696095 0.39557106 11.1132 < 2.2e-16 ***
## Intercept45 0.47866923 0.01509767 0.44907834 0.50826013 31.7048 < 2.2e-16 ***
## Tau2_1_1    0.00899266 0.00234101 0.00440437 0.01358095  3.8414 0.0001224 ***
## Tau2_2_2    0.00597152 0.00156996 0.00289446 0.00904858  3.8036 0.0001426 ***
## Tau2_3_3    0.00634604 0.00167524 0.00306264 0.00962944  3.7881 0.0001518 ***
## Tau2_4_4    0.01183522 0.00305290 0.00585165 0.01781878  3.8767 0.0001059 ***
## Tau2_5_5    0.00418806 0.00115881 0.00191683 0.00645928  3.6141 0.0003014 ***
## Tau2_6_6    0.01017307 0.00259149 0.00509384 0.01525230  3.9256 8.653e-05 ***
## Tau2_7_7    0.02437030 0.00609225 0.01242971 0.03631089  4.0002 6.329e-05 ***
## Tau2_8_8    0.00731134 0.00190007 0.00358726 0.01103541  3.8479 0.0001191 ***
## Tau2_9_9    0.01223907 0.00308715 0.00618836 0.01828977  3.9645 7.354e-05 ***
## Tau2_10_10  0.00560364 0.00148242 0.00269816 0.00850913  3.7801 0.0001568 ***
## Tau2_11_11  0.00474986 0.00127093 0.00225888 0.00724085  3.7373 0.0001860 ***
## Tau2_12_12  0.00485441 0.00131436 0.00227830 0.00743051  3.6934 0.0002213 ***
## Tau2_13_13  0.00865215 0.00223547 0.00427071 0.01303360  3.8704 0.0001087 ***
## Tau2_14_14  0.00822599 0.00209877 0.00411248 0.01233950  3.9194 8.876e-05 ***
## Tau2_15_15  0.01599768 0.00407848 0.00800402 0.02399135  3.9225 8.765e-05 ***
## Tau2_16_16  0.00524269 0.00143224 0.00243554 0.00804984  3.6605 0.0002518 ***
## Tau2_17_17  0.00649359 0.00166440 0.00323142 0.00975575  3.9015 9.561e-05 ***
## Tau2_18_18  0.00382439 0.00104894 0.00176850 0.00588027  3.6460 0.0002664 ***
## Tau2_19_19  0.00796939 0.00208555 0.00388178 0.01205700  3.8212 0.0001328 ***
## Tau2_20_20  0.00393877 0.00109852 0.00178571 0.00609182  3.5855 0.0003364 ***
## Tau2_21_21  0.01764412 0.00444091 0.00894011 0.02634814  3.9731 7.095e-05 ***
## Tau2_22_22  0.01334154 0.00346405 0.00655213 0.02013096  3.8514 0.0001174 ***
## Tau2_23_23  0.00505723 0.00133777 0.00243526 0.00767921  3.7803 0.0001566 ***
## Tau2_24_24  0.00495243 0.00135888 0.00228907 0.00761578  3.6445 0.0002679 ***
## Tau2_25_25  0.00582706 0.00158028 0.00272977 0.00892435  3.6874 0.0002266 ***
## Tau2_26_26  0.00417661 0.00113886 0.00194448 0.00640874  3.6673 0.0002451 ***
## Tau2_27_27  0.01137501 0.00296825 0.00555736 0.01719267  3.8322 0.0001270 ***
## Tau2_28_28  0.01489638 0.00383464 0.00738063 0.02241213  3.8847 0.0001025 ***
## Tau2_29_29  0.00620242 0.00166277 0.00294346 0.00946138  3.7302 0.0001913 ***
## Tau2_30_30  0.00404341 0.00110875 0.00187029 0.00621652  3.6468 0.0002655 ***
## Tau2_31_31  0.00387686 0.00110638 0.00170839 0.00604533  3.5041 0.0004582 ***
## Tau2_32_32  0.00873833 0.00226105 0.00430675 0.01316991  3.8647 0.0001112 ***
## Tau2_33_33  0.00901036 0.00238153 0.00434265 0.01367806  3.7834 0.0001547 ***
## Tau2_34_34  0.01249894 0.00318584 0.00625480 0.01874308  3.9233 8.735e-05 ***
## Tau2_35_35  0.00800351 0.00208915 0.00390885 0.01209817  3.8310 0.0001276 ***
## Tau2_36_36  0.00479075 0.00126296 0.00231540 0.00726610  3.7933 0.0001487 ***
## Tau2_37_37  0.01708837 0.00438832 0.00848741 0.02568932  3.8941 9.858e-05 ***
## Tau2_38_38  0.00356708 0.00099375 0.00161937 0.00551479  3.5895 0.0003313 ***
## Tau2_39_39  0.00386891 0.00103494 0.00184046 0.00589736  3.7383 0.0001853 ***
## Tau2_40_40  0.01666874 0.00422698 0.00838401 0.02495346  3.9434 8.033e-05 ***
## Tau2_41_41  0.00737669 0.00187632 0.00369917 0.01105422  3.9315 8.443e-05 ***
## Tau2_42_42  0.00684164 0.00174956 0.00341257 0.01027070  3.9105 9.211e-05 ***
## Tau2_43_43  0.01670204 0.00424167 0.00838852 0.02501555  3.9376 8.230e-05 ***
## Tau2_44_44  0.03006370 0.00750570 0.01535280 0.04477460  4.0054 6.190e-05 ***
## Tau2_45_45  0.00701335 0.00182031 0.00344560 0.01058110  3.8528 0.0001168 ***
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Q statistic on the homogeneity of effect sizes: 30324.76
## Degrees of freedom of the Q statistic: 1485
## P value of the Q statistic: 0
##
## Heterogeneity indices (based on the estimated Tau2):
##                                Estimate
## Intercept1: I2 (Q statistic)    0.9748
## Intercept2: I2 (Q statistic)    0.9616
## Intercept3: I2 (Q statistic)    0.9606
## Intercept4: I2 (Q statistic)    0.9795
## Intercept5: I2 (Q statistic)    0.9463
## Intercept6: I2 (Q statistic)    0.9777
## Intercept7: I2 (Q statistic)    0.9887
## Intercept8: I2 (Q statistic)    0.9707
## Intercept9: I2 (Q statistic)    0.9893
## Intercept10: I2 (Q statistic)   0.9524
## Intercept11: I2 (Q statistic)   0.9416
## Intercept12: I2 (Q statistic)   0.9571
## Intercept13: I2 (Q statistic)   0.9867
## Intercept14: I2 (Q statistic)   0.9688
## Intercept15: I2 (Q statistic)   0.9853
## Intercept16: I2 (Q statistic)   0.9674
## Intercept17: I2 (Q statistic)   0.9672
## Intercept18: I2 (Q statistic)   0.9471
## Intercept19: I2 (Q statistic)   0.9679
## Intercept20: I2 (Q statistic)   0.9320
## Intercept21: I2 (Q statistic)   0.9896
## Intercept22: I2 (Q statistic)   0.9767
## Intercept23: I2 (Q statistic)   0.9493
## Intercept24: I2 (Q statistic)   0.9576
## Intercept25: I2 (Q statistic)   0.9529
## Intercept26: I2 (Q statistic)   0.9339
## Intercept27: I2 (Q statistic)   0.9792
## Intercept28: I2 (Q statistic)   0.9787
## Intercept29: I2 (Q statistic)   0.9558
## Intercept30: I2 (Q statistic)   0.9416
## Intercept31: I2 (Q statistic)   0.9476
## Intercept32: I2 (Q statistic)   0.9708
## Intercept33: I2 (Q statistic)   0.9710
## Intercept34: I2 (Q statistic)   0.9842
## Intercept35: I2 (Q statistic)   0.9705
## Intercept36: I2 (Q statistic)   0.9459
## Intercept37: I2 (Q statistic)   0.9859
## Intercept38: I2 (Q statistic)   0.9527
## Intercept39: I2 (Q statistic)   0.9446
## Intercept40: I2 (Q statistic)   0.9820
## Intercept41: I2 (Q statistic)   0.9669
## Intercept42: I2 (Q statistic)   0.9706
## Intercept43: I2 (Q statistic)   0.9857
## Intercept44: I2 (Q statistic)   0.9914
## Intercept45: I2 (Q statistic)   0.9720
```

```
##
## Number of studies (or clusters): 34
## Number of observed statistics: 1530
## Number of estimated parameters: 90
## Degrees of freedom: 1440
## -2 log likelihood: -2647.327
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values may indicate problems.)
```

```
## One general factor
model1 <- "G =~ g1*I1 + g2*I2 + g3*I3 + g4*I4 + g5*I5 +
               g6*I6 + g7*I7 + g8*I8 + g9*I9 + g10*I10"

RAM1 <- lavaan2RAM(model1, obs.variables = paste0("I", 1:10))
RAM1
```

```
## $A
##     I1  I2  I3  I4  I5  I6  I7  I8  I9  I10 G
## I1  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g1"
## I2  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g2"
## I3  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g3"
## I4  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g4"
## I5  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g5"
## I6  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g6"
## I7  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g7"
## I8  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g8"
## I9  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g9"
## I10 "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g10"
## G   "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"
##
## $S
##     I1           I2           I3           I4           I5           I6           I7
## I1  "0*I1WITHI1" "0"          "0"          "0"          "0"          "0"          "0"
## I2  "0"          "0*I2WITHI2" "0"          "0"          "0"          "0"          "0"
## I3  "0"          "0"          "0*I3WITHI3" "0"          "0"          "0"          "0"
## I4  "0"          "0"          "0"          "0*I4WITHI4" "0"          "0"          "0"
## I5  "0"          "0"          "0"          "0"          "0*I5WITHI5" "0"          "0"
## I6  "0"          "0"          "0"          "0"          "0"          "0*I6WITHI6" "0"
## I7  "0"          "0"          "0"          "0"          "0"          "0"          "0*I7WITHI7"
## I8  "0"          "0"          "0"          "0"          "0"          "0"          "0"
## I9  "0"          "0"          "0"          "0"          "0"          "0"          "0"
## I10 "0"          "0"          "0"          "0"          "0"          "0"          "0"
## G   "0"          "0"          "0"          "0"          "0"          "0"          "0"
##     I8           I9           I10            G
## I1  "0"          "0"          "0"            "0"
## I2  "0"          "0"          "0"            "0"
## I3  "0"          "0"          "0"            "0"
## I4  "0"          "0"          "0"            "0"
## I5  "0"          "0"          "0"            "0"
## I6  "0"          "0"          "0"            "0"
## I7  "0"          "0"          "0"            "0"
## I8  "0*I8WITHI8" "0"          "0"            "0"
## I9  "0"          "0*I9WITHI9" "0"            "0"
## I10 "0"          "0"          "0*I10WITHI10" "0"
## G   "0"          "0"          "0"            "1"
```

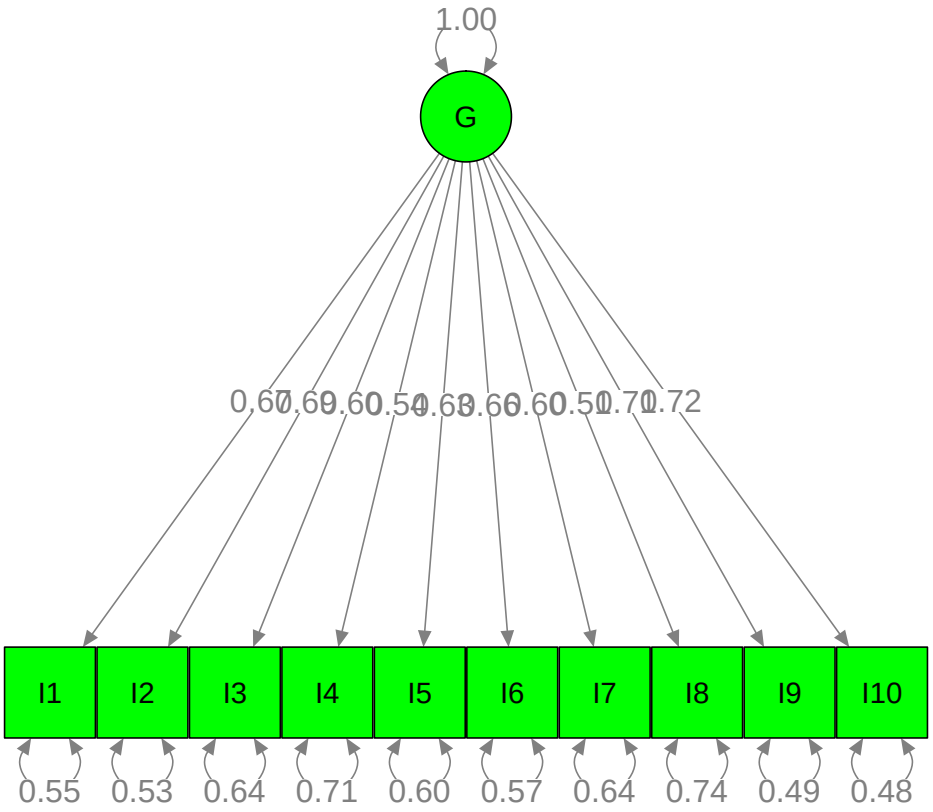
```
##
## $F
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10 G
## I1   1  0  0  0  0  0  0  0  0   0 0
## I2   0  1  0  0  0  0  0  0  0   0 0
## I3   0  0  1  0  0  0  0  0  0   0 0
## I4   0  0  0  1  0  0  0  0  0   0 0
## I5   0  0  0  0  1  0  0  0  0   0 0
## I6   0  0  0  0  0  1  0  0  0   0 0
## I7   0  0  0  0  0  0  1  0  0   0 0
## I8   0  0  0  0  0  0  0  1  0   0 0
## I9   0  0  0  0  0  0  0  0  1   0 0
## I10  0  0  0  0  0  0  0  0  0   1 0
##
## $M
##   I1 I2 I3 I4 I5 I6 I7 I8 I9 I10 G
## 1  0  0  0  0  0  0  0  0  0   0 0
```

```
rand2a <- tssem2(rand1, Amatrix = RAM1$A, Smatrix = RAM1$S, Fmatrix = RAM1$F)
summary(rand2a)
```

```
##
## Call:
## wls(Cov = pooledS, aCov = aCov, n = tssem1.obj$total.n, Amatrix = Amatrix,
##     Smatrix = Smatrix, Fmatrix = Fmatrix, diag.constraints = diag.constraints,
##     cor.analysis = cor.analysis, intervals.type = intervals.type,
##     mx.algebras = mx.algebras, model.name = model.name, suppressWarnings = suppressWarnings,
##     silent = silent, run = run)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##      Estimate Std.Error    lbound    ubound z value  Pr(>|z|)
## g1  0.6718556 0.0092050 0.6538141 0.6898972  72.988 < 2.2e-16 ***
## g10 0.7190273 0.0084648 0.7024366 0.7356181  84.943 < 2.2e-16 ***
## g2  0.6875413 0.0085786 0.6707275 0.7043550  80.146 < 2.2e-16 ***
## g3  0.5970888 0.0082731 0.5808739 0.6133037  72.173 < 2.2e-16 ***
## g4  0.5367388 0.0081165 0.5208308 0.5526468  66.130 < 2.2e-16 ***
## g5  0.6322051 0.0088255 0.6149074 0.6495028  71.634 < 2.2e-16 ***
## g6  0.6562607 0.0075211 0.6415197 0.6710017  87.257 < 2.2e-16 ***
## g7  0.5964114 0.0094532 0.5778833 0.6149394  63.091 < 2.2e-16 ***
## g8  0.5099195 0.0124636 0.4854912 0.5343478  40.913 < 2.2e-16 ***
## g9  0.7131049 0.0084101 0.6966213 0.7295884  84.791 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Goodness-of-fit indices:
##                                                 Value
## Sample size                                1.0468e+05
## Chi-square of target model                 1.0343e+03
## DF of target model                         3.5000e+01
## p value of target model                    0.0000e+00
## Number of constraints imposed on "Smatrix" 0.0000e+00
## DF manually adjusted                       0.0000e+00
## Chi-square of independence model           2.0602e+04
## DF of independence model                   4.5000e+01
```

```
## RMSEA                                          1.6500e-02
## RMSEA lower 95% CI                             1.5700e-02
## RMSEA upper 95% CI                             1.7400e-02
## SRMR                                           7.7500e-02
## TLI                                            9.3750e-01
## CFI                                            9.5140e-01
## AIC                                            9.6426e+02
## BIC                                            6.2970e+02
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values indicate problems.)
```

```
plot(rand2a, col="green")
```



Bifactor model with positive and negative Self-Esteem

```
model2 <- "G =~ g1*I1 + g2*I2 + g3*I3 + g4*I4 + g5*I5 +
               g6*I6 + g7*I7 + g8*I8 + g9*I9 + g10*I10
           POS =~ p1*I1 + p3*I3 + p4*I4 + p7*I7 + p10*I10
           NEG =~ n2*I2 + n5*I5 + n6*I6 + n8*I8 + n9*I9"

RAM2 <- lavaan2RAM(model2, obs.variables = paste0("I", 1:10))
RAM2
```

```
## $A
##     I1  I2  I3  I4  I5  I6  I7  I8  I9  I10 G       POS     NEG
## I1  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g1"  "0*p1"  "0"
## I2  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g2"  "0"     "0*n2"
## I3  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g3"  "0*p3"  "0"
```

```
## I4  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g4"  "0*p4"  "0"
## I5  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g5"  "0"     "0*n5"
## I6  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g6"  "0"     "0*n6"
## I7  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g7"  "0*p7"  "0"
## I8  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g8"  "0"     "0*n8"
## I9  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g9"  "0"     "0*n9"
## I10 "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*g10" "0*p10" "0"
## G   "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"     "0"     "0"
## POS "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"     "0"     "0"
## NEG "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"     "0"     "0"
##
## $S
##     I1           I2           I3           I4           I5           I6           I7
## I1  "0*I1WITHI1" "0"          "0"          "0"          "0"          "0"          "0"
## I2  "0"          "0*I2WITHI2" "0"          "0"          "0"          "0"          "0"
## I3  "0"          "0"          "0*I3WITHI3" "0"          "0"          "0"          "0"
## I4  "0"          "0"          "0"          "0*I4WITHI4" "0"          "0"          "0"
## I5  "0"          "0"          "0"          "0"          "0*I5WITHI5" "0"          "0"
## I6  "0"          "0"          "0"          "0"          "0"          "0*I6WITHI6" "0"
## I7  "0"          "0"          "0"          "0"          "0"          "0"          "0*I7WITHI7"
## I8  "0"          "0"          "0"          "0"          "0"          "0"          "0"
## I9  "0"          "0"          "0"          "0"          "0"          "0"          "0"
## I10 "0"          "0"          "0"          "0"          "0"          "0"          "0"
## G   "0"          "0"          "0"          "0"          "0"          "0"          "0"
## POS "0"          "0"          "0"          "0"          "0"          "0"          "0"
## NEG "0"          "0"          "0"          "0"          "0"          "0"          "0"
##     I8           I9           I10            G   POS NEG
## I1  "0"          "0"          "0"            "0" "0" "0"
## I2  "0"          "0"          "0"            "0" "0" "0"
## I3  "0"          "0"          "0"            "0" "0" "0"
## I4  "0"          "0"          "0"            "0" "0" "0"
## I5  "0"          "0"          "0"            "0" "0" "0"
## I6  "0"          "0"          "0"            "0" "0" "0"
## I7  "0"          "0"          "0"            "0" "0" "0"
## I8  "0*I8WITHI8" "0"          "0"            "0" "0" "0"
## I9  "0"          "0*I9WITHI9" "0"            "0" "0" "0"
## I10 "0"          "0"          "0*I10WITHI10" "0" "0" "0"
## G   "0"          "0"          "0"            "1" "0" "0"
## POS "0"          "0"          "0"            "0" "1" "0"
## NEG "0"          "0"          "0"            "0" "0" "1"
##
## $F
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10 G POS NEG
## I1   1  0  0  0  0  0  0  0  0   0 0   0   0
## I2   0  1  0  0  0  0  0  0  0   0 0   0   0
## I3   0  0  1  0  0  0  0  0  0   0 0   0   0
## I4   0  0  0  1  0  0  0  0  0   0 0   0   0
## I5   0  0  0  0  1  0  0  0  0   0 0   0   0
## I6   0  0  0  0  0  1  0  0  0   0 0   0   0
## I7   0  0  0  0  0  0  1  0  0   0 0   0   0
## I8   0  0  0  0  0  0  0  1  0   0 0   0   0
## I9   0  0  0  0  0  0  0  0  1   0 0   0   0
## I10  0  0  0  0  0  0  0  0  0   1 0   0   0
##
```

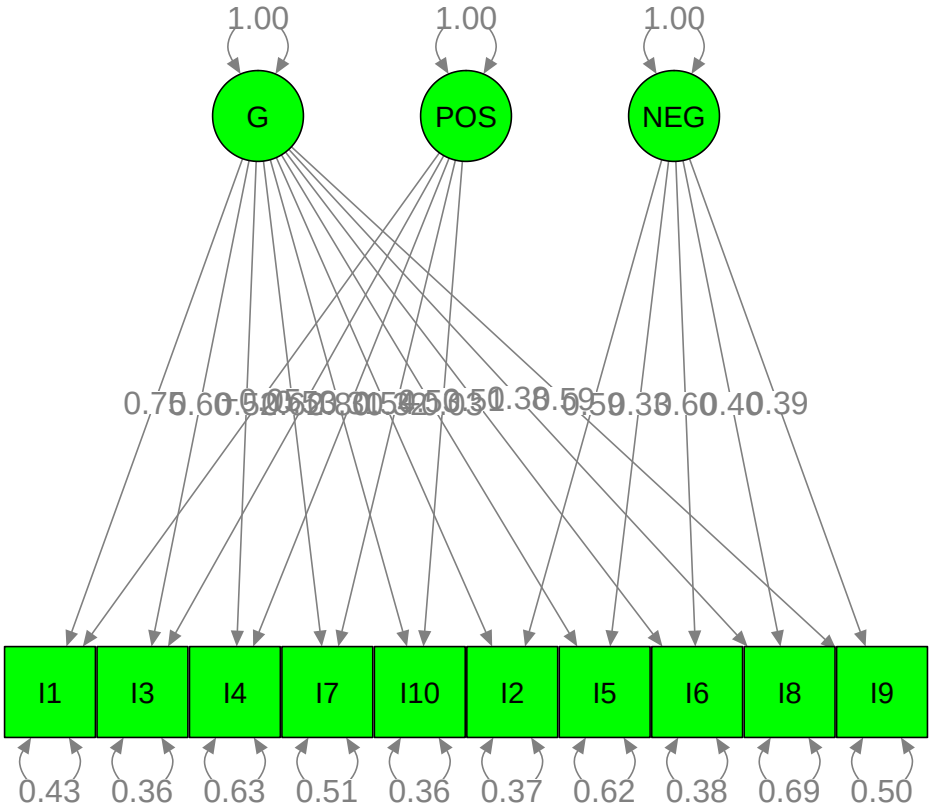
```
## $M
##   I1 I2 I3 I4 I5 I6 I7 I8 I9 I10 G POS NEG
## 1  0  0  0  0  0  0  0  0  0   0 0   0   0
```

```
rand2b <- tssem2(rand1, Amatrix = RAM2$A, Smatrix = RAM2$S, Fmatrix = RAM2$F)
summary(rand2b)
```

```
##
## Call:
## wls(Cov = pooledS, aCov = aCov, n = tssem1.obj$total.n, Amatrix = Amatrix,
##     Smatrix = Smatrix, Fmatrix = Fmatrix, diag.constraints = diag.constraints,
##     cor.analysis = cor.analysis, intervals.type = intervals.type,
##     mx.algebras = mx.algebras, model.name = model.name, suppressWarnings = suppressWarnings,
##     silent = silent, run = run)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##      Estimate Std.Error    lbound    ubound z value  Pr(>|z|)
## g1   0.752661  0.014051  0.725122  0.780201 53.5663 < 2.2e-16 ***
## p1  -0.047642  0.042723 -0.131378  0.036093 -1.1151    0.2648
## g10  0.801857  0.014489  0.773459  0.830254 55.3437 < 2.2e-16 ***
## p10 -0.034061  0.044048 -0.120393  0.052272 -0.7733    0.4394
## g2   0.535599  0.013252  0.509626  0.561573 40.4163 < 2.2e-16 ***
## n2   0.587800  0.024187  0.540395  0.635205 24.3026 < 2.2e-16 ***
## g3   0.595887  0.017363  0.561855  0.629919 34.3184 < 2.2e-16 ***
## p3   0.531256  0.070413  0.393249  0.669263  7.5449 4.530e-14 ***
## g4   0.522439  0.012647  0.497652  0.547226 41.3106 < 2.2e-16 ***
## p4   0.306156  0.037994  0.231688  0.380623  8.0579 6.661e-16 ***
## g5   0.527208  0.014154  0.499467  0.554950 37.2477 < 2.2e-16 ***
## n5   0.326078  0.021632  0.283680  0.368476 15.0737 < 2.2e-16 ***
## g6   0.514346  0.011523  0.491762  0.536929 44.6382 < 2.2e-16 ***
## n6   0.597995  0.022935  0.553043  0.642948 26.0731 < 2.2e-16 ***
## g7   0.620786  0.013671  0.593992  0.647580 45.4101 < 2.2e-16 ***
## p7   0.317101  0.041470  0.235822  0.398381  7.6465 2.065e-14 ***
## g8   0.384992  0.018314  0.349097  0.420887 21.0216 < 2.2e-16 ***
## n8   0.399932  0.030376  0.340396  0.459467 13.1661 < 2.2e-16 ***
## g9   0.594679  0.013887  0.567462  0.621896 42.8238 < 2.2e-16 ***
## n9   0.386960  0.022302  0.343249  0.430671 17.3509 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Goodness-of-fit indices:
##                                                Value
## Sample size                                104684.0000
## Chi-square of target model                     37.6208
## DF of target model                             25.0000
## p value of target model                         0.0504
## Number of constraints imposed on "Smatrix"      0.0000
## DF manually adjusted                            0.0000
## Chi-square of independence model            20601.6451
## DF of independence model                       45.0000
## RMSEA                                           0.0022
## RMSEA lower 95% CI                              0.0000
## RMSEA upper 95% CI                              0.0036
## SRMR                                            0.0161
```

```
## TLI                                                 0.9989
## CFI                                                 0.9994
## AIC                                               -12.3792
## BIC                                              -251.3468
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values indicate problems.)
```

```
plot(rand2b, col="green")
```




```
## Compare the one general factor to the bifactor model
anova(rand2b, rand2a)
```

```
##                  base         comparison ep   minus2LL  df AIC   diffLL diffdf             p
## 1 TSSEM2 Correlation               <NA> 20   37.62078 -20  NA       NA     NA            NA
## 2 TSSEM2 Correlation TSSEM2 Correlation 10 1034.25544 -10  NA 996.6347     10 9.927508e-208
```

Models with two subgroup analysis

```
# Data for studies with individualism below the mean
data_g1 <- Gnambs18$data[my.df$data$Individualism < 0 ]
n_g1 <- Gnambs18$n[my.df$data$Individualism < 0 ]

# Data for studies with individualism above or equal the mean
data_g2 <- Gnambs18$data[my.df$data$Individualism >= 0 ]
n_g2 <- Gnambs18$n[my.df$data$Individualism >= 0 ]
```

Fitting a random-effects Stage 1 model in two subgroups

```
## Stage 1 analysis per subgroup (random-effects analysis)
stage1_g1.fit <- tssem1(Cov = data_g1, n = n_g1, method = "REM", RE.type = "Diag")
stage1_g2.fit <- tssem1(Cov = data_g2, n = n_g2, method = "REM", RE.type = "Diag")

summary(stage1_g1.fit)
```

```
##
## Call:
## meta(y = ES, v = acovR, RE.constraints = Diag(paste0(RE.startvalues,
##     "*Tau2_", 1:no.es, "_", 1:no.es)), RE.lbound = RE.lbound,
##     I2 = I2, model.name = model.name, suppressWarnings = TRUE,
##     silent = silent, run = run)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##               Estimate  Std.Error     lbound     ubound z value  Pr(>|z|)
## Intercept1  0.33167737 0.02715327 0.27845793 0.38489680 12.2150 < 2.2e-16 ***
## Intercept2  0.40117738 0.01977340 0.36242222 0.43993254 20.2887 < 2.2e-16 ***
## Intercept3  0.38259225 0.01859871 0.34613945 0.41904504 20.5709 < 2.2e-16 ***
## Intercept4  0.31549556 0.03409825 0.24866421 0.38232691  9.2525 < 2.2e-16 ***
## Intercept5  0.32992999 0.01978123 0.29115949 0.36870049 16.6789 < 2.2e-16 ***
## Intercept6  0.41402900 0.02716891 0.36077891 0.46727910 15.2391 < 2.2e-16 ***
## Intercept7  0.20248357 0.04867381 0.10708466 0.29788247  4.1600 3.182e-05 ***
## Intercept8  0.38622668 0.02597706 0.33531257 0.43714079 14.8680 < 2.2e-16 ***
## Intercept9  0.55983957 0.02678694 0.50733813 0.61234102 20.8997 < 2.2e-16 ***
## Intercept10 0.27582911 0.02050943 0.23563137 0.31602685 13.4489 < 2.2e-16 ***
## Intercept11 0.26795214 0.01837358 0.23194058 0.30396370 14.5836 < 2.2e-16 ***
## Intercept12 0.45167020 0.02201451 0.40852256 0.49481784 20.5169 < 2.2e-16 ***
## Intercept13 0.61521150 0.02924590 0.55789058 0.67253242 21.0358 < 2.2e-16 ***
## Intercept14 0.28548168 0.02453116 0.23740150 0.33356186 11.6375 < 2.2e-16 ***
## Intercept15 0.35727093 0.04264728 0.27368380 0.44085806  8.3773 < 2.2e-16 ***
## Intercept16 0.49587823 0.02420559 0.44843615 0.54332031 20.4861 < 2.2e-16 ***
## Intercept17 0.38773485 0.02400236 0.34069109 0.43477862 16.1540 < 2.2e-16 ***
## Intercept18 0.45691609 0.01643025 0.42471340 0.48911878 27.8094 < 2.2e-16 ***
## Intercept19 0.31836882 0.02564595 0.26810369 0.36863396 12.4140 < 2.2e-16 ***
## Intercept20 0.25372239 0.02085400 0.21284930 0.29459548 12.1666 < 2.2e-16 ***
## Intercept21 0.51752911 0.03365533 0.45156587 0.58349234 15.3773 < 2.2e-16 ***
## Intercept22 0.13433159 0.03907142 0.05775302 0.21091017  3.4381 0.0005858 ***
## Intercept23 0.35092652 0.02103868 0.30969146 0.39216159 16.6801 < 2.2e-16 ***
## Intercept24 0.46380066 0.02090910 0.42281958 0.50478174 22.1818 < 2.2e-16 ***
## Intercept25 0.26522457 0.02410118 0.21798711 0.31246202 11.0046 < 2.2e-16 ***
## Intercept26 0.24760505 0.01770760 0.21289880 0.28231130 13.9830 < 2.2e-16 ***
## Intercept27 0.41562950 0.03266197 0.35161321 0.47964579 12.7252 < 2.2e-16 ***
## Intercept28 0.12945198 0.04324248 0.04469828 0.21420568  2.9936 0.0027568 **
## Intercept29 0.31701122 0.02237843 0.27315031 0.36087213 14.1659 < 2.2e-16 ***
## Intercept30 0.41581798 0.01407400 0.38823344 0.44340253 29.5451 < 2.2e-16 ***
## Intercept31 0.43547048 0.02011283 0.39605005 0.47489091 21.6514 < 2.2e-16 ***
## Intercept32 0.30333904 0.02913028 0.24624473 0.36043335 10.4132 < 2.2e-16 ***
## Intercept33 0.29160920 0.03325117 0.22643809 0.35678030  8.7699 < 2.2e-16 ***
## Intercept34 0.47252871 0.03919679 0.39570441 0.54935300 12.0553 < 2.2e-16 ***
## Intercept35 0.36672964 0.02867639 0.31052495 0.42293432 12.7886 < 2.2e-16 ***
## Intercept36 0.27445830 0.02144134 0.23243405 0.31648255 12.8004 < 2.2e-16 ***
```

```
## Intercept37 0.34424216 0.04385831 0.25828145 0.43020287  7.8490 4.219e-15 ***
## Intercept38 0.48485116 0.01917058 0.44727752 0.52242480 25.2914 < 2.2e-16 ***
## Intercept39 0.36024286 0.01925751 0.32249883 0.39798690 18.7066 < 2.2e-16 ***
## Intercept40 0.13863140 0.03705723 0.06600056 0.21126224  3.7410 0.0001833 ***
## Intercept41 0.36298056 0.02500655 0.31396862 0.41199250 14.5154 < 2.2e-16 ***
## Intercept42 0.46488876 0.02397517 0.41789829 0.51187923 19.3904 < 2.2e-16 ***
## Intercept43 0.30610636 0.03950090 0.22868601 0.38352671  7.7494 9.326e-15 ***
## Intercept44 0.21569754 0.05177798 0.11421458 0.31718051  4.1658 3.102e-05 ***
## Intercept45 0.44022049 0.02709321 0.38711877 0.49332222 16.2484 < 2.2e-16 ***
## Tau2_1_1    0.01071141 0.00402003 0.00283230 0.01859052  2.6645 0.0077100 **
## Tau2_2_2    0.00524167 0.00210850 0.00110909 0.00937426  2.4860 0.0129198 *
## Tau2_3_3    0.00447374 0.00192025 0.00071012 0.00823735  2.3298 0.0198182 *
## Tau2_4_4    0.01744213 0.00653044 0.00464270 0.03024156  2.6709 0.0075649 **
## Tau2_5_5    0.00516809 0.00203712 0.00117541 0.00916078  2.5370 0.0111820 *
## Tau2_6_6    0.01078899 0.00404597 0.00285903 0.01871895  2.6666 0.0076623 **
## Tau2_7_7    0.03634339 0.01316435 0.01054174 0.06214505  2.7607 0.0057670 **
## Tau2_8_8    0.00977135 0.00372090 0.00247851 0.01706419  2.6261 0.0086377 **
## Tau2_9_9    0.01083359 0.00403793 0.00291939 0.01874779  2.6830 0.0072974 **
## Tau2_10_10  0.00558481 0.00216820 0.00133521 0.00983441  2.5758 0.0100014 *
## Tau2_11_11  0.00422674 0.00171912 0.00085733 0.00759614  2.4587 0.0139453 *
## Tau2_12_12  0.00678975 0.00262802 0.00163892 0.01194058  2.5836 0.0097777 **
## Tau2_13_13  0.01315414 0.00485507 0.00363838 0.02266990  2.7094 0.0067413 **
## Tau2_14_14  0.00850183 0.00314473 0.00233828 0.01466538  2.7035 0.0068610 **
## Tau2_15_15  0.02773214 0.01021934 0.00770261 0.04776167  2.7137 0.0066538 **
## Tau2_16_16  0.00850957 0.00333741 0.00196838 0.01505077  2.5498 0.0107798 *
## Tau2_17_17  0.00821638 0.00305312 0.00223238 0.01420038  2.6911 0.0071208 **
## Tau2_18_18  0.00338436 0.00145456 0.00053347 0.00623525  2.3267 0.0199801 *
## Tau2_19_19  0.00932952 0.00352314 0.00242429 0.01623475  2.6481 0.0080953 **
## Tau2_20_20  0.00575008 0.00228884 0.00126403 0.01023612  2.5122 0.0119974 *
## Tau2_21_21  0.01736778 0.00642848 0.00476819 0.02996737  2.7017 0.0068987 **
## Tau2_22_22  0.02277675 0.00850892 0.00609957 0.03945393  2.6768 0.0074327 **
## Tau2_23_23  0.00593465 0.00227123 0.00148313 0.01038617  2.6130 0.0089759 **
## Tau2_24_24  0.00606868 0.00247641 0.00121501 0.01092235  2.4506 0.0142619 *
## Tau2_25_25  0.00799375 0.00316932 0.00178200 0.01420550  2.5222 0.0116613 *
## Tau2_26_26  0.00382326 0.00157925 0.00072798 0.00691853  2.4209 0.0154809 *
## Tau2_27_27  0.01601119 0.00602978 0.00419303 0.02782935  2.6554 0.0079226 **
## Tau2_28_28  0.02823365 0.01040549 0.00783926 0.04862804  2.7133 0.0066608 **
## Tau2_29_29  0.00681354 0.00266917 0.00158205 0.01204502  2.5527 0.0106899 *
## Tau2_30_30  0.00222395 0.00103960 0.00018638 0.00426152  2.1392 0.0324161 *
## Tau2_31_31  0.00547442 0.00222231 0.00111878 0.00983006  2.4634 0.0137628 *
## Tau2_32_32  0.01236865 0.00466230 0.00323071 0.02150659  2.6529 0.0079802 **
## Tau2_33_33  0.01623415 0.00615836 0.00416398 0.02830432  2.6361 0.0083861 **
## Tau2_34_34  0.02364781 0.00863919 0.00671530 0.04058032  2.7373 0.0061951 **
## Tau2_35_35  0.01204397 0.00456953 0.00308785 0.02100009  2.6357 0.0083961 **
## Tau2_36_36  0.00617134 0.00234373 0.00157771 0.01076498  2.6331 0.0084604 **
## Tau2_37_37  0.02938011 0.01085065 0.00811322 0.05064700  2.7077 0.0067755 **
## Tau2_38_38  0.00499652 0.00206100 0.00095703 0.00903601  2.4243 0.0153372 *
## Tau2_39_39  0.00489542 0.00187790 0.00121480 0.00857604  2.6069 0.0091379 **
## Tau2_40_40  0.02038531 0.00752315 0.00564020 0.03513041  2.7097 0.0067349 **
## Tau2_41_41  0.00890488 0.00329824 0.00244044 0.01536931  2.6999 0.0069363 **
## Tau2_42_42  0.00829844 0.00308980 0.00224255 0.01435433  2.6858 0.0072366 **
## Tau2_43_43  0.02352172 0.00867549 0.00651808 0.04052536  2.7113 0.0067023 **
## Tau2_44_44  0.04137021 0.01500032 0.01197012 0.07077030  2.7580 0.0058164 **
## Tau2_45_45  0.01075371 0.00404520 0.00282527 0.01868216  2.6584 0.0078515 **
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Q statistic on the homogeneity of effect sizes: 14908.81
## Degrees of freedom of the Q statistic: 675
## P value of the Q statistic: 0
##
## Heterogeneity indices (based on the estimated Tau2):
##                                Estimate
## Intercept1: I2 (Q statistic)    0.9656
## Intercept2: I2 (Q statistic)    0.9347
## Intercept3: I2 (Q statistic)    0.9185
## Intercept4: I2 (Q statistic)    0.9784
## Intercept5: I2 (Q statistic)    0.9279
## Intercept6: I2 (Q statistic)    0.9689
## Intercept7: I2 (Q statistic)    0.9866
## Intercept8: I2 (Q statistic)    0.9654
## Intercept9: I2 (Q statistic)    0.9811
## Intercept10: I2 (Q statistic)   0.9282
## Intercept11: I2 (Q statistic)   0.9022
## Intercept12: I2 (Q statistic)   0.9534
## Intercept13: I2 (Q statistic)   0.9874
## Intercept14: I2 (Q statistic)   0.9541
## Intercept15: I2 (Q statistic)   0.9847
## Intercept16: I2 (Q statistic)   0.9666
## Intercept17: I2 (Q statistic)   0.9582
## Intercept18: I2 (Q statistic)   0.9081
## Intercept19: I2 (Q statistic)   0.9571
## Intercept20: I2 (Q statistic)   0.9262
## Intercept21: I2 (Q statistic)   0.9864
## Intercept22: I2 (Q statistic)   0.9769
## Intercept23: I2 (Q statistic)   0.9344
## Intercept24: I2 (Q statistic)   0.9486
## Intercept25: I2 (Q statistic)   0.9450
## Intercept26: I2 (Q statistic)   0.8907
## Intercept27: I2 (Q statistic)   0.9783
## Intercept28: I2 (Q statistic)   0.9810
## Intercept29: I2 (Q statistic)   0.9394
## Intercept30: I2 (Q statistic)   0.8545
## Intercept31: I2 (Q statistic)   0.9399
## Intercept32: I2 (Q statistic)   0.9676
## Intercept33: I2 (Q statistic)   0.9720
## Intercept34: I2 (Q statistic)   0.9875
## Intercept35: I2 (Q statistic)   0.9695
## Intercept36: I2 (Q statistic)   0.9333
## Intercept37: I2 (Q statistic)   0.9854
## Intercept38: I2 (Q statistic)   0.9411
## Intercept39: I2 (Q statistic)   0.9264
## Intercept40: I2 (Q statistic)   0.9753
## Intercept41: I2 (Q statistic)   0.9583
## Intercept42: I2 (Q statistic)   0.9642
## Intercept43: I2 (Q statistic)   0.9808
## Intercept44: I2 (Q statistic)   0.9884
## Intercept45: I2 (Q statistic)   0.9693
```

```
##
## Number of studies (or clusters): 16
## Number of observed statistics: 720
## Number of estimated parameters: 90
## Degrees of freedom: 630
## -2 log likelihood: -1115.207
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values may indicate problems.)
```

```
summary(stage1_g2.fit)
```

```
##
## Call:
## meta(y = ES, v = acovR, RE.constraints = Diag(paste0(RE.startvalues,
##     "*Tau2_", 1:no.es, "_", 1:no.es)), RE.lbound = RE.lbound,
##     I2 = I2, model.name = model.name, suppressWarnings = TRUE,
##     silent = silent, run = run)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##               Estimate  Std.Error     lbound     ubound z value  Pr(>|z|)
## Intercept1  0.45259342 0.01574508 0.42173362 0.48345321 28.7451 < 2.2e-16 ***
## Intercept2  0.43684398 0.01924390 0.39912663 0.47456133 22.7004 < 2.2e-16 ***
## Intercept3  0.38096819 0.02095465 0.33989784 0.42203854 18.1806 < 2.2e-16 ***
## Intercept4  0.39633041 0.01974230 0.35763621 0.43502461 20.0752 < 2.2e-16 ***
## Intercept5  0.43659591 0.00917324 0.41861669 0.45457514 47.5945 < 2.2e-16 ***
## Intercept6  0.44828588 0.02312287 0.40296588 0.49360588 19.3871 < 2.2e-16 ***
## Intercept7  0.38104121 0.01694233 0.34783484 0.41424757 22.4905 < 2.2e-16 ***
## Intercept8  0.46421897 0.01571571 0.43341674 0.49502120 29.5385 < 2.2e-16 ***
## Intercept9  0.66187757 0.02395615 0.61492438 0.70883076 27.6287 < 2.2e-16 ***
## Intercept10 0.32825107 0.01727723 0.29438832 0.36211381 18.9991 < 2.2e-16 ***
## Intercept11 0.28549759 0.01727319 0.25164277 0.31935242 16.5284 < 2.2e-16 ***
## Intercept12 0.46107526 0.01340591 0.43480017 0.48735036 34.3934 < 2.2e-16 ***
## Intercept13 0.66907313 0.01607822 0.63756040 0.70058587 41.6136 < 2.2e-16 ***
## Intercept14 0.36845970 0.01940746 0.33042178 0.40649763 18.9855 < 2.2e-16 ***
## Intercept15 0.47021952 0.01292450 0.44488797 0.49555108 36.3820 < 2.2e-16 ***
## Intercept16 0.55896985 0.01058265 0.53822823 0.57971146 52.8195 < 2.2e-16 ***
## Intercept17 0.46372612 0.01408558 0.43611889 0.49133335 32.9220 < 2.2e-16 ***
## Intercept18 0.48640000 0.01576868 0.45549396 0.51730604 30.8460 < 2.2e-16 ***
## Intercept19 0.36191529 0.01952132 0.32365421 0.40017637 18.5395 < 2.2e-16 ***
## Intercept20 0.30950616 0.01213477 0.28572245 0.33328987 25.5057 < 2.2e-16 ***
## Intercept21 0.55026341 0.03193304 0.48767581 0.61285102 17.2318 < 2.2e-16 ***
## Intercept22 0.24997681 0.01243601 0.22560267 0.27435094 20.1010 < 2.2e-16 ***
## Intercept23 0.33965261 0.01495457 0.31034219 0.36896303 22.7123 < 2.2e-16 ***
## Intercept24 0.45903713 0.01508609 0.42946893 0.48860533 30.4278 < 2.2e-16 ***
## Intercept25 0.30407927 0.01531081 0.27407062 0.33408791 19.8604 < 2.2e-16 ***
## Intercept26 0.27913014 0.01623639 0.24730740 0.31095289 17.1916 < 2.2e-16 ***
## Intercept27 0.41464599 0.02121031 0.37307456 0.45621743 19.5493 < 2.2e-16 ***
## Intercept28 0.21615261 0.01184394 0.19293892 0.23936631 18.2501 < 2.2e-16 ***
## Intercept29 0.28709419 0.01718278 0.25341655 0.32077182 16.7082 < 2.2e-16 ***
## Intercept30 0.38605311 0.01637194 0.35396471 0.41814151 23.5802 < 2.2e-16 ***
## Intercept31 0.46548757 0.01224552 0.44148678 0.48948836 38.0129 < 2.2e-16 ***
## Intercept32 0.36127173 0.01780357 0.32637737 0.39616608 20.2921 < 2.2e-16 ***
## Intercept33 0.38906029 0.00947618 0.37048731 0.40763327 41.0566 < 2.2e-16 ***
## Intercept34 0.49230652 0.01531821 0.46228339 0.52232965 32.1387 < 2.2e-16 ***
```

```
## Intercept35 0.39232624 0.01676017 0.35947692 0.42517557 23.4083 < 2.2e-16 ***
## Intercept36 0.34442027 0.01271505 0.31949924 0.36934130 27.0876 < 2.2e-16 ***
## Intercept37 0.46358700 0.01451411 0.43513987 0.49203413 31.9404 < 2.2e-16 ***
## Intercept38 0.55994428 0.00959109 0.54114609 0.57874247 58.3817 < 2.2e-16 ***
## Intercept39 0.45220973 0.00867040 0.43521607 0.46920340 52.1556 < 2.2e-16 ***
## Intercept40 0.29470781 0.02008741 0.25533720 0.33407841 14.6713 < 2.2e-16 ***
## Intercept41 0.38424947 0.01833486 0.34831380 0.42018514 20.9573 < 2.2e-16 ***
## Intercept42 0.48964230 0.01774722 0.45485839 0.52442620 27.5898 < 2.2e-16 ***
## Intercept43 0.47182977 0.01202380 0.44826355 0.49539598 39.2413 < 2.2e-16 ***
## Intercept44 0.42645083 0.01955415 0.38812540 0.46477625 21.8087 < 2.2e-16 ***
## Intercept45 0.50090723 0.01294319 0.47553905 0.52627542 38.7004 < 2.2e-16 ***
## Tau2_1_1    0.00386968 0.00139179 0.00114183 0.00659753  2.7804  0.005430 **
## Tau2_2_2    0.00597748 0.00208781 0.00188545 0.01006951  2.8630  0.004196 **
## Tau2_3_3    0.00715112 0.00248274 0.00228503 0.01201720  2.8803  0.003973 **
## Tau2_4_4    0.00633005 0.00219854 0.00202100 0.01063911  2.8792  0.003987 **
## Tau2_5_5    0.00105286 0.00044341 0.00018380 0.00192193  2.3745  0.017574 *
## Tau2_6_6    0.00890483 0.00307531 0.00287733 0.01493232  2.8956  0.003784 **
## Tau2_7_7    0.00449426 0.00160027 0.00135779 0.00763073  2.8084  0.004978 **
## Tau2_8_8    0.00387557 0.00136215 0.00120581 0.00654532  2.8452  0.004438 **
## Tau2_9_9    0.00989321 0.00337412 0.00328006 0.01650636  2.9321  0.003367 **
## Tau2_10_10  0.00464479 0.00166743 0.00137669 0.00791289  2.7856  0.005343 **
## Tau2_11_11  0.00462166 0.00166728 0.00135385 0.00788948  2.7720  0.005572 **
## Tau2_12_12  0.00265694 0.00100887 0.00067959 0.00463430  2.6336  0.008449 **
## Tau2_13_13  0.00426624 0.00151297 0.00130088 0.00723160  2.8198  0.004806 **
## Tau2_14_14  0.00606052 0.00212775 0.00189020 0.01023084  2.8483  0.004395 **
## Tau2_15_15  0.00244256 0.00089825 0.00068203 0.00420310  2.7193  0.006543 **
## Tau2_16_16  0.00159226 0.00061818 0.00038066 0.00280386  2.5757  0.010003 *
## Tau2_17_17  0.00304267 0.00109354 0.00089937 0.00518596  2.7824  0.005396 **
## Tau2_18_18  0.00385933 0.00138205 0.00115056 0.00656809  2.7925  0.005231 **
## Tau2_19_19  0.00611557 0.00224611 0.00171328 0.01051786  2.7227  0.006474 **
## Tau2_20_20  0.00202118 0.00077249 0.00050713 0.00353523  2.6165  0.008885 **
## Tau2_21_21  0.01766581 0.00602104 0.00586478 0.02946685  2.9340  0.003346 **
## Tau2_22_22  0.00211286 0.00081801 0.00050959 0.00371612  2.5829  0.009797 **
## Tau2_23_23  0.00335972 0.00121995 0.00096866 0.00575078  2.7540  0.005888 **
## Tau2_24_24  0.00350634 0.00125016 0.00105607 0.00595660  2.8047  0.005036 **
## Tau2_25_25  0.00349711 0.00131374 0.00092223 0.00607199  2.6620  0.007769 **
## Tau2_26_26  0.00402195 0.00147692 0.00112725 0.00691665  2.7232  0.006465 **
## Tau2_27_27  0.00733885 0.00257684 0.00228834 0.01238937  2.8480  0.004399 **
## Tau2_28_28  0.00185178 0.00073595 0.00040934 0.00329421  2.5162  0.011864 *
## Tau2_29_29  0.00457903 0.00165447 0.00133633 0.00782172  2.7677  0.005646 **
## Tau2_30_30  0.00415779 0.00148192 0.00125327 0.00706230  2.8057  0.005021 **
## Tau2_31_31  0.00218965 0.00089891 0.00042782 0.00395149  2.4359  0.014855 *
## Tau2_32_32  0.00498748 0.00175729 0.00154325 0.00843171  2.8382  0.004537 **
## Tau2_33_33  0.00110327 0.00045263 0.00021614 0.00199040  2.4375  0.014790 *
## Tau2_34_34  0.00367618 0.00130020 0.00112783 0.00622453  2.8274  0.004693 **
## Tau2_35_35  0.00442328 0.00157327 0.00133974 0.00750683  2.8115  0.004931 **
## Tau2_36_36  0.00229156 0.00084954 0.00062648 0.00395663  2.6974  0.006988 **
## Tau2_37_37  0.00317701 0.00123440 0.00075763 0.00559638  2.5737  0.010061 *
## Tau2_38_38  0.00127287 0.00049937 0.00029412 0.00225162  2.5489  0.010805 *
## Tau2_39_39  0.00093720 0.00040015 0.00015291 0.00172148  2.3421  0.019176 *
## Tau2_40_40  0.00646973 0.00226574 0.00202895 0.01091050  2.8555  0.004297 **
## Tau2_41_41  0.00537067 0.00188056 0.00168483 0.00905651  2.8559  0.004292 **
## Tau2_42_42  0.00506098 0.00176904 0.00159372 0.00852824  2.8609  0.004225 **
## Tau2_43_43  0.00208100 0.00080287 0.00050741 0.00365459  2.5920  0.009543 **
```

```
## Tau2_44_44  0.00624531 0.00216688 0.00199830 0.01049233  2.8822  0.003950 **
## Tau2_45_45  0.00253723 0.00092873 0.00071695 0.00435752  2.7319  0.006296 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Q statistic on the homogeneity of effect sizes: 11626.31
## Degrees of freedom of the Q statistic: 765
## P value of the Q statistic: 0
##
## Heterogeneity indices (based on the estimated Tau2):
##                                Estimate
## Intercept1: I2 (Q statistic)    0.9510
## Intercept2: I2 (Q statistic)    0.9658
## Intercept3: I2 (Q statistic)    0.9686
## Intercept4: I2 (Q statistic)    0.9666
## Intercept5: I2 (Q statistic)    0.8408
## Intercept6: I2 (Q statistic)    0.9770
## Intercept7: I2 (Q statistic)    0.9527
## Intercept8: I2 (Q statistic)    0.9525
## Intercept9: I2 (Q statistic)    0.9884
## Intercept10: I2 (Q statistic)   0.9493
## Intercept11: I2 (Q statistic)   0.9469
## Intercept12: I2 (Q statistic)   0.9319
## Intercept13: I2 (Q statistic)   0.9754
## Intercept14: I2 (Q statistic)   0.9628
## Intercept15: I2 (Q statistic)   0.9271
## Intercept16: I2 (Q statistic)   0.9139
## Intercept17: I2 (Q statistic)   0.9414
## Intercept18: I2 (Q statistic)   0.9542
## Intercept19: I2 (Q statistic)   0.9636
## Intercept20: I2 (Q statistic)   0.8898
## Intercept21: I2 (Q statistic)   0.9900
## Intercept22: I2 (Q statistic)   0.8881
## Intercept23: I2 (Q statistic)   0.9335
## Intercept24: I2 (Q statistic)   0.9467
## Intercept25: I2 (Q statistic)   0.9336
## Intercept26: I2 (Q statistic)   0.9397
## Intercept27: I2 (Q statistic)   0.9709
## Intercept28: I2 (Q statistic)   0.8713
## Intercept29: I2 (Q statistic)   0.9473
## Intercept30: I2 (Q statistic)   0.9488
## Intercept31: I2 (Q statistic)   0.9224
## Intercept32: I2 (Q statistic)   0.9558
## Intercept33: I2 (Q statistic)   0.8330
## Intercept34: I2 (Q statistic)   0.9532
## Intercept35: I2 (Q statistic)   0.9537
## Intercept36: I2 (Q statistic)   0.9061
## Intercept37: I2 (Q statistic)   0.9417
## Intercept38: I2 (Q statistic)   0.8981
## Intercept39: I2 (Q statistic)   0.8324
## Intercept40: I2 (Q statistic)   0.9618
## Intercept41: I2 (Q statistic)   0.9599
## Intercept42: I2 (Q statistic)   0.9643
## Intercept43: I2 (Q statistic)   0.9180
```

```
## Intercept44: I2 (Q statistic)   0.9684
## Intercept45: I2 (Q statistic)   0.9372
##
## Number of studies (or clusters): 18
## Number of observed statistics: 810
## Number of estimated parameters: 90
## Degrees of freedom: 720
## -2 log likelihood: -1932.118
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values may indicate problems.)
```

Fitting the Stage 2 bifactor model in both subgroups

```
## Stage 2 analysis per subgroup (random-effect analysis)
stage2_g1.fit <- tssem2(stage1_g1.fit, Amatrix=RAM2$A, Smatrix=RAM2$S, Fmatrix=RAM2$F)
stage2_g2.fit <- tssem2(stage1_g2.fit, Amatrix=RAM2$A, Smatrix=RAM2$S, Fmatrix=RAM2$F)

summary(stage2_g1.fit)
```

```
##
## Call:
## wls(Cov = pooledS, aCov = aCov, n = tssem1.obj$total.n, Amatrix = Amatrix,
##     Smatrix = Smatrix, Fmatrix = Fmatrix, diag.constraints = diag.constraints,
##     cor.analysis = cor.analysis, intervals.type = intervals.type,
##     mx.algebras = mx.algebras, model.name = model.name, suppressWarnings = suppressWarnings,
##     silent = silent, run = run)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##      Estimate Std.Error    lbound    ubound z value  Pr(>|z|)
## g1   0.703310  0.021985  0.660220  0.746399 31.9906 < 2.2e-16 ***
## p1  -0.040533  0.068555 -0.174898  0.093833 -0.5912    0.5544
## g10  0.785613  0.024000  0.738574  0.832652 32.7337 < 2.2e-16 ***
## p10 -0.038488  0.079227 -0.193771  0.116794 -0.4858    0.6271
## g2   0.476163  0.020282  0.436412  0.515915 23.4772 < 2.2e-16 ***
## n2   0.621037  0.039421  0.543773  0.698301 15.7539 < 2.2e-16 ***
## g3   0.603298  0.029138  0.546189  0.660406 20.7052 < 2.2e-16 ***
## p3   0.475223  0.119782  0.240455  0.709992  3.9674 7.266e-05 ***
## g4   0.548823  0.019713  0.510187  0.587459 27.8413 < 2.2e-16 ***
## p4   0.264588  0.063194  0.140731  0.388445  4.1869 2.827e-05 ***
## g5   0.488375  0.023388  0.442536  0.534215 20.8815 < 2.2e-16 ***
## n5   0.364434  0.033167  0.299427  0.429440 10.9878 < 2.2e-16 ***
## g6   0.452090  0.017943  0.416923  0.487258 25.1960 < 2.2e-16 ***
## n6   0.612244  0.037454  0.538835  0.685653 16.3464 < 2.2e-16 ***
## g7   0.610678  0.024081  0.563480  0.657876 25.3595 < 2.2e-16 ***
## p7   0.312817  0.077039  0.161823  0.463810  4.0605 4.897e-05 ***
## g8   0.254637  0.031566  0.192768  0.316506  8.0668 6.661e-16 ***
## n8   0.401006  0.050727  0.301582  0.500429  7.9051 2.665e-15 ***
## g9   0.573785  0.022536  0.529616  0.617954 25.4612 < 2.2e-16 ***
## n9   0.374162  0.034294  0.306948  0.441376 10.9106 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## Goodness-of-fit indices:
##                                                Value
## Sample size                                39984.0000
## Chi-square of target model                    10.4230
## DF of target model                            25.0000
## p value of target model                        0.9953
## Number of constraints imposed on "Smatrix"     0.0000
## DF manually adjusted                           0.0000
## Chi-square of independence model            6506.9227
## DF of independence model                      45.0000
## RMSEA                                          0.0000
## RMSEA lower 95% CI                             0.0000
## RMSEA upper 95% CI                             0.0000
## SRMR                                           0.0147
## TLI                                            1.0041
## CFI                                            1.0000
## AIC                                          -39.5770
## BIC                                         -254.4829
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values indicate problems.)
```

```
summary(stage2_g2.fit)
```

```
##
## Call:
## wls(Cov = pooledS, aCov = aCov, n = tssem1.obj$total.n, Amatrix = Amatrix,
##     Smatrix = Smatrix, Fmatrix = Fmatrix, diag.constraints = diag.constraints,
##     cor.analysis = cor.analysis, intervals.type = intervals.type,
##     mx.algebras = mx.algebras, model.name = model.name, suppressWarnings = suppressWarnings,
##     silent = silent, run = run)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##      Estimate Std.Error    lbound    ubound z value  Pr(>|z|)
## g1   0.780512  0.015989  0.749174  0.811851 48.8141 < 2.2e-16 ***
## p1  -0.023204  0.047417 -0.116140  0.069731 -0.4894    0.6246
## g10  0.811453  0.016224  0.779655  0.843251 50.0160 < 2.2e-16 ***
## p10 -0.013345  0.045178 -0.101894  0.075203 -0.2954    0.7677
## g2   0.572568  0.014856  0.543451  0.601685 38.5413 < 2.2e-16 ***
## n2   0.541137  0.023866  0.494361  0.587914 22.6739 < 2.2e-16 ***
## g3   0.569018  0.018897  0.531981  0.606055 30.1120 < 2.2e-16 ***
## p3   0.601697  0.084432  0.436213  0.767180  7.1264 1.030e-12 ***
## g4   0.490946  0.014440  0.462644  0.519248 33.9988 < 2.2e-16 ***
## p4   0.342472  0.045611  0.253077  0.431868  7.5086 5.973e-14 ***
## g5   0.549630  0.016325  0.517633  0.581626 33.6680 < 2.2e-16 ***
## n5   0.305603  0.026086  0.254476  0.356729 11.7154 < 2.2e-16 ***
## g6   0.555871  0.012223  0.531914  0.579827 45.4781 < 2.2e-16 ***
## n6   0.562851  0.021263  0.521178  0.604525 26.4715 < 2.2e-16 ***
## g7   0.619684  0.014714  0.590845  0.648524 42.1146 < 2.2e-16 ***
## p7   0.328311  0.045099  0.239917  0.416704  7.2797 3.346e-13 ***
## g8   0.479941  0.015573  0.449419  0.510464 30.8190 < 2.2e-16 ***
## n8   0.385426  0.024793  0.336834  0.434019 15.5461 < 2.2e-16 ***
## g9   0.611710  0.015837  0.580669  0.642751 38.6242 < 2.2e-16 ***
## n9   0.405910  0.025352  0.356221  0.455599 16.0111 < 2.2e-16 ***
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Goodness-of-fit indices:
##                                                Value
## Sample size                                64700.0000
## Chi-square of target model                    69.7343
## DF of target model                            25.0000
## p value of target model                        0.0000
## Number of constraints imposed on "Smatrix"     0.0000
## DF manually adjusted                           0.0000
## Chi-square of independence model           22862.4722
## DF of independence model                      45.0000
## RMSEA                                          0.0053
## RMSEA lower 95% CI                             0.0038
## RMSEA upper 95% CI                             0.0067
## SRMR                                           0.0199
## TLI                                            0.9965
## CFI                                            0.9980
## AIC                                           19.7343
## BIC                                         -207.2036
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values indicate problems.)
```

OSMASEM

One general factor model without any moderator

```
## Create matrices with implicit diagonal constraints
M0a <- create.vechsR(A0=RAM1$A, S0=RAM1$S, F0=RAM1$F)

## Create heterogeneity variances
T0a <- create.Tau2(RAM=RAM1, RE.type="Diag", Transform="expLog", RE.startvalues=0.05)

fit0a <- osmasem(model.name="No moderator", Mmatrix=M0a, Tmatrix=T0a, data=my.df)
summary(fit0a, Saturated=TRUE)
```

```
## Summary of No moderator
##
## free parameters:
##       name  matrix row col   Estimate  Std.Error A    z value Pr(>|z|)
## 1       g1      A0  I1   G  0.6910161 0.01493296    46.274571        0
## 2       g2      A0  I2   G  0.6461890 0.01717236    37.629594        0
## 3       g3      A0  I3   G  0.5589436 0.01440805    38.793834        0
## 4       g4      A0  I4   G  0.4978966 0.01274527    39.065217        0
## 5       g5      A0  I5   G  0.6500566 0.01499574    43.349406        0
## 6       g6      A0  I6   G  0.6029495 0.01618929    37.243727        0
## 7       g7      A0  I7   G  0.5862818 0.01402767    41.794673        0
## 8       g8      A0  I8   G  0.5099274 0.01744031    29.238434        0
## 9       g9      A0  I9   G  0.6908684 0.01721621    40.128955        0
## 10     g10      A0 I10   G  0.7437434 0.01590082    46.773900        0
## 11  Tau1_1 vecTau1   1   1 -2.2540641 0.13500210   -16.696512        0
## 12  Tau1_2 vecTau1   2   1 -2.4153265 0.14608902   -16.533252        0
```

```
## 13  Tau1_3 vecTau1   3   1 -2.4006419 0.14378359   -16.696217        0
## 14  Tau1_4 vecTau1   4   1 -1.9794166 0.13932917   -14.206763        0
## 15  Tau1_5 vecTau1   5   1 -2.6637302 0.14125710   -18.857319        0
## 16  Tau1_6 vecTau1   6   1 -2.2158010 0.13292883   -16.669079        0
## 17  Tau1_7 vecTau1   7   1 -1.8032845 0.12666348   -14.236815        0
## 18  Tau1_8 vecTau1   8   1 -2.3426904 0.13766688   -17.017095        0
## 19  Tau1_9 vecTau1   9   1 -1.8633570 0.14719540   -12.659071        0
## 20 Tau1_10 vecTau1  10   1 -2.4060830 0.14030265   -17.149234        0
## 21 Tau1_11 vecTau1  11   1 -2.5330005 0.13978968   -18.120083        0
## 22 Tau1_12 vecTau1  12   1 -2.4914474 0.16333094   -15.253983        0
## 23 Tau1_13 vecTau1  13   1 -1.2787829 0.13556908    -9.432703        0
## 24 Tau1_14 vecTau1  14   1 -2.2868218 0.13178299   -17.352937        0
## 25 Tau1_15 vecTau1  15   1 -1.8106188 0.13695421   -13.220615        0
## 26 Tau1_16 vecTau1  16   1 -2.1126321 0.17695636   -11.938718        0
## 27 Tau1_17 vecTau1  17   1 -2.3882527 0.13771914   -17.341472        0
## 28 Tau1_18 vecTau1  18   1 -1.5822181 0.13327037   -11.872243        0
## 29 Tau1_19 vecTau1  19   1 -2.3555515 0.13096016   -17.986779        0
## 30 Tau1_20 vecTau1  20   1 -2.5788521 0.14879477   -17.331604        0
## 31 Tau1_21 vecTau1  21   1 -1.3839147 0.12974942   -10.666056        0
## 32 Tau1_22 vecTau1  22   1 -1.9675004 0.13547349   -14.523140        0
## 33 Tau1_23 vecTau1  23   1 -2.5222895 0.13808076   -18.266770        0
## 34 Tau1_24 vecTau1  24   1 -2.4153444 0.16427653   -14.702919        0
## 35 Tau1_25 vecTau1  25   1 -2.4614392 0.13874692   -17.740496        0
## 36 Tau1_26 vecTau1  26   1 -2.6581296 0.14122723   -18.821651        0
## 37 Tau1_27 vecTau1  27   1 -1.7847444 0.13428910   -13.290314        0
## 38 Tau1_28 vecTau1  28   1 -1.9568372 0.13224237   -14.797355        0
## 39 Tau1_29 vecTau1  29   1 -2.4297465 0.13878270   -17.507560        0
## 40 Tau1_30 vecTau1  30   1 -2.6107979 0.15599327   -16.736606        0
## 41 Tau1_31 vecTau1  31   1 -2.3704404 0.17266634   -13.728445        0
## 42 Tau1_32 vecTau1  32   1 -2.2676745 0.13369240   -16.961880        0
## 43 Tau1_33 vecTau1  33   1 -2.2955537 0.13477735   -17.032192        0
## 44 Tau1_34 vecTau1  34   1 -2.0937526 0.13356776   -15.675583        0
## 45 Tau1_35 vecTau1  35   1 -2.0313857 0.14932961   -13.603369        0
## 46 Tau1_36 vecTau1  36   1 -2.5486923 0.13732264   -18.559884        0
## 47 Tau1_37 vecTau1  37   1 -1.7405990 0.13527586   -12.867034        0
## 48 Tau1_38 vecTau1  38   1 -2.0166777 0.17471464   -11.542694        0
## 49 Tau1_39 vecTau1  39   1 -2.6621398 0.14286248   -18.634282        0
## 50 Tau1_40 vecTau1  40   1 -1.9188694 0.13083824   -14.665967        0
## 51 Tau1_41 vecTau1  41   1 -2.3943125 0.12889037   -18.576349        0
## 52 Tau1_42 vecTau1  42   1 -2.3283809 0.14701494   -15.837717        0
## 53 Tau1_43 vecTau1  43   1 -1.9370047 0.13222571   -14.649229        0
## 54 Tau1_44 vecTau1  44   1 -1.7084397 0.12601800   -13.557108        0
## 55 Tau1_45 vecTau1  45   1 -2.3856615 0.13575301   -17.573543        0
##
## Model Statistics:
##                |  Parameters  |  Degrees of Freedom  |  Fit (-2lnL units)
##        Model:             55                  1475            -2050.362
##    Saturated:             90                  1440            -2647.334
## Independence:             90                  1440                   NA
## Number of observations/statistics: 104684/1530
##
## chi-square:   ² ( df=35 ) = 596.972,  p = 1.983287e-103
## Information Criteria:
##       |  df Penalty  |  Parameters Penalty  |  Sample-Size Adjusted
```

```
## AIC:      -5000.362              -1940.362                -1940.303
## BIC:     -19099.447              -1414.633                -1589.425
## CFI: NA
## TLI: NA   (also known as NNFI)
## RMSEA:  0.01238463  [95% CI (0.01135532, 0.01343402)]
## Prob(RMSEA <= 0.05): 1
## To get additional fit indices, see help(mxRefModels)
## timestamp: 2019-05-08 16:16:07
## Wall clock time: 76.10404 secs
## optimizer:  SLSQP
## OpenMx version number: 2.12.2
## Need help?  See help(mxSummary)
```

```
## SRMR
osmasemSRMR(fit0a)
```

```
## [1] 0.08210598
```

```
## Show the heterogeneity variances
diag(VarCorr(fit0a))
```

```
##      Tau2_1      Tau2_2      Tau2_3      Tau2_4      Tau2_5      Tau2_6      Tau2_7      Tau2_8
## 0.011019066 0.007981307 0.008219188 0.019085371 0.004856388 0.011895417 0.027144822 0.009229219
##      Tau2_9     Tau2_10     Tau2_11     Tau2_12     Tau2_13     Tau2_14     Tau2_15     Tau2_16
## 0.024071808 0.008130231 0.006307594 0.006854193 0.077493150 0.010320288 0.026749549 0.014621472
##     Tau2_17     Tau2_18     Tau2_19     Tau2_20     Tau2_21     Tau2_22     Tau2_23     Tau2_24
## 0.008425392 0.042237945 0.008994851 0.005754897 0.062798172 0.019545682 0.006444173 0.007981022
##     Tau2_25     Tau2_26     Tau2_27     Tau2_28     Tau2_29     Tau2_30     Tau2_31     Tau2_32
## 0.007278151 0.004911091 0.028170251 0.019966998 0.007754414 0.005398707 0.008730953 0.010723164
##     Tau2_33     Tau2_34     Tau2_35     Tau2_36     Tau2_37     Tau2_38     Tau2_39     Tau2_40
## 0.010141622 0.015184119 0.017201280 0.006112713 0.030770524 0.017714791 0.004871860 0.021542259
##     Tau2_41     Tau2_42     Tau2_43     Tau2_44     Tau2_45
## 0.008323894 0.009497166 0.020774906 0.032814679 0.008469169
```

One general factor model with `Individualism` as a moderator on the A matrix

```
## Replace the A matrix with the moderator "Individualism"
Ax1a <- RAM1$A
Ax1a[grep("\\*", Ax1a)] <- "0*data.Individualism"
Ax1a
```

```
##     I1  I2  I3  I4  I5  I6  I7  I8  I9  I10 G
## I1  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I2  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I3  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I4  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I5  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I6  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I7  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I8  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I9  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## I10 "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism"
## G   "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"
```

```r
## Create matrices with implicit diagonal constraints
M1a <- create.vechsR(A0=RAM1$A, S0=RAM1$S, F0=RAM1$F, Ax=Ax1a)

fit1a <- osmasem(model.name="Moderator with individualism", Mmatrix=M1a, Tmatrix=T0a, data=my.df)
summary(fit1a)
```

```
## Summary of Moderator with individualism
##
## free parameters:
##       name  matrix row col     Estimate  Std.Error A     z value     Pr(>|z|)
## 1       g1      A0  I1   G  0.687246252 0.01624066    42.3164053 0.000000e+00
## 2       g2      A0  I2   G  0.637168128 0.02038676    31.2540099 0.000000e+00
## 3       g3      A0  I3   G  0.558814569 0.01591009    35.1232719 0.000000e+00
## 4       g4      A0  I4   G  0.500826319 0.01345485    37.2227392 0.000000e+00
## 5       g5      A0  I5   G  0.641999272 0.01743015    36.8326940 0.000000e+00
## 6       g6      A0  I6   G  0.592492553 0.01776917    33.3438573 0.000000e+00
## 7       g7      A0  I7   G  0.583595377 0.01521851    38.3477220 0.000000e+00
## 8       g8      A0  I8   G  0.502523121 0.01699466    29.5694687 0.000000e+00
## 9       g9      A0  I9   G  0.689461863 0.02012425    34.2602567 0.000000e+00
## 10     g10      A0 I10   G  0.742174629 0.01766563    42.0123384 0.000000e+00
## 11    g1_1      A1  I1   G  0.044378033 0.01135319     3.9088587 9.273318e-05
## 12    g2_1      A1  I2   G  0.052195882 0.01227056     4.2537480 2.102218e-05
## 13    g3_1      A1  I3   G  0.009687839 0.01189345     0.8145523 4.153286e-01
## 14    g4_1      A1  I4   G -0.009776237 0.01132192    -0.8634784 3.878745e-01
## 15    g5_1      A1  I5   G  0.016024568 0.01414535     1.1328505 2.572771e-01
## 16    g6_1      A1  I6   G  0.053063830 0.01069029     4.9637417 6.914790e-07
## 17    g7_1      A1  I7   G  0.026103073 0.01221233     2.1374367 3.256249e-02
## 18    g8_1      A1  I8   G  0.141438680 0.01414693     9.9978384 0.000000e+00
## 19    g9_1      A1  I9   G  0.027559441 0.01189914     2.3160871 2.055351e-02
## 20   g10_1      A1 I10   G  0.016788186 0.01130512     1.4850078 1.375418e-01
## 21  Tau1_1 vecTau1   1   1 -2.380469153 0.13597410   -17.5067840 0.000000e+00
## 22  Tau1_2 vecTau1   2   1 -2.421533265 0.15495066   -15.6277702 0.000000e+00
## 23  Tau1_3 vecTau1   3   1 -2.402894458 0.14876070   -16.1527508 0.000000e+00
## 24  Tau1_4 vecTau1   4   1 -2.034682540 0.13972591   -14.5619556 0.000000e+00
## 25  Tau1_5 vecTau1   5   1 -2.884380977 0.14421965   -19.9999160 0.000000e+00
## 26  Tau1_6 vecTau1   6   1 -2.223763779 0.13766374   -16.1535915 0.000000e+00
## 27  Tau1_7 vecTau1   7   1 -2.005570700 0.12855119   -15.6013391 0.000000e+00
## 28  Tau1_8 vecTau1   8   1 -2.420636974 0.13920828   -17.3885991 0.000000e+00
## 29  Tau1_9 vecTau1   9   1 -1.906636758 0.16052295   -11.8776582 0.000000e+00
## 30 Tau1_10 vecTau1  10   1 -2.448786367 0.14006621   -17.4830626 0.000000e+00
## 31 Tau1_11 vecTau1  11   1 -2.560210761 0.14046983   -18.2260545 0.000000e+00
## 32 Tau1_12 vecTau1  12   1 -2.396750470 0.19484839   -12.3005918 0.000000e+00
## 33 Tau1_13 vecTau1  13   1 -1.246954780 0.13977051    -8.9214440 0.000000e+00
## 34 Tau1_14 vecTau1  14   1 -2.362430408 0.13194121   -17.9051753 0.000000e+00
## 35 Tau1_15 vecTau1  15   1 -1.898643895 0.14396362   -13.1883587 0.000000e+00
## 36 Tau1_16 vecTau1  16   1 -2.111665159 0.20517773   -10.2918829 0.000000e+00
## 37 Tau1_17 vecTau1  17   1 -2.491218806 0.13866453   -17.9657966 0.000000e+00
## 38 Tau1_18 vecTau1  18   1 -1.589945376 0.13571615   -11.7152260 0.000000e+00
## 39 Tau1_19 vecTau1  19   1 -2.371802838 0.13255740   -17.8926481 0.000000e+00
## 40 Tau1_20 vecTau1  20   1 -2.642058276 0.14785857   -17.8688206 0.000000e+00
## 41 Tau1_21 vecTau1  21   1 -1.384512475 0.13180875   -10.5039499 0.000000e+00
## 42 Tau1_22 vecTau1  22   1 -2.113300671 0.13884060   -15.2210568 0.000000e+00
## 43 Tau1_23 vecTau1  23   1 -2.533350726 0.13852554   -18.2879688 0.000000e+00
## 44 Tau1_24 vecTau1  24   1 -2.416834795 0.18170627   -13.3007778 0.000000e+00
```

```
## 45 Tau1_25 vecTau1  25   1 -2.455876768 0.14255335   -17.2277731 0.000000e+00
## 46 Tau1_26 vecTau1  26   1 -2.700596207 0.14094039   -19.1612659 0.000000e+00
## 47 Tau1_27 vecTau1  27   1 -1.789044938 0.13701004   -13.0577648 0.000000e+00
## 48 Tau1_28 vecTau1  28   1 -2.064421481 0.13446194   -15.3532037 0.000000e+00
## 49 Tau1_29 vecTau1  29   1 -2.441084205 0.13951747   -17.4966206 0.000000e+00
## 50 Tau1_30 vecTau1  30   1 -2.644674574 0.16693606   -15.8424407 0.000000e+00
## 51 Tau1_31 vecTau1  31   1 -2.268798680 0.19260852   -11.7793268 0.000000e+00
## 52 Tau1_32 vecTau1  32   1 -2.311614294 0.13444668   -17.1935396 0.000000e+00
## 53 Tau1_33 vecTau1  33   1 -2.388658949 0.14338597   -16.6589445 0.000000e+00
## 54 Tau1_34 vecTau1  34   1 -2.075517681 0.14186208   -14.6305322 0.000000e+00
## 55 Tau1_35 vecTau1  35   1 -2.072211514 0.14903267   -13.9044108 0.000000e+00
## 56 Tau1_36 vecTau1  36   1 -2.652656939 0.13756590   -19.2828085 0.000000e+00
## 57 Tau1_37 vecTau1  37   1 -1.833252887 0.14044933   -13.0527707 0.000000e+00
## 58 Tau1_38 vecTau1  38   1 -1.999865001 0.19176738   -10.4285982 0.000000e+00
## 59 Tau1_39 vecTau1  39   1 -2.862005123 0.14612328   -19.5862371 0.000000e+00
## 60 Tau1_40 vecTau1  40   1 -2.096275544 0.13343322   -15.7102971 0.000000e+00
## 61 Tau1_41 vecTau1  41   1 -2.429811553 0.12923169   -18.8019796 0.000000e+00
## 62 Tau1_42 vecTau1  42   1 -2.326612457 0.15831261   -14.6963184 0.000000e+00
## 63 Tau1_43 vecTau1  43   1 -2.156905322 0.14433623   -14.9436169 0.000000e+00
## 64 Tau1_44 vecTau1  44   1 -1.957609681 0.12804315   -15.2886721 0.000000e+00
## 65 Tau1_45 vecTau1  45   1 -2.451270694 0.13871158   -17.6717098 0.000000e+00
##
## Model Statistics:
##                |  Parameters  |  Degrees of Freedom  |  Fit (-2lnL units)
##        Model:             65                  1465             -2246.394
##    Saturated:           1080                   450                    NA
## Independence:             90                  1440                    NA
## Number of observations/statistics: 104684/1530
##
## Information Criteria:
##       |  df Penalty  |  Parameters Penalty  |  Sample-Size Adjusted
## AIC:      -5176.394              -2116.394               -2116.312
## BIC:     -19179.892              -1495.079               -1701.651
## To get additional fit indices, see help(mxRefModels)
## timestamp: 2019-05-08 16:24:35
## Wall clock time: 121.3213 secs
## optimizer:  SLSQP
## OpenMx version number: 2.12.2
## Need help?  See help(mxSummary)
```

```
## Get the R2
osmasemR2(fit1a, fit0a)
```

```
## $Tau2.0
##    Tau2_1_1    Tau2_2_2    Tau2_3_3    Tau2_4_4    Tau2_5_5    Tau2_6_6    Tau2_7_7    Tau2_8_8
## 0.011019066 0.007981307 0.008219188 0.019085371 0.004856388 0.011895417 0.027144822 0.009229219
##    Tau2_9_9  Tau2_10_10  Tau2_11_11  Tau2_12_12  Tau2_13_13  Tau2_14_14  Tau2_15_15  Tau2_16_16
## 0.024071808 0.008130231 0.006307594 0.006854193 0.077493150 0.010320288 0.026749549 0.014621472
##  Tau2_17_17  Tau2_18_18  Tau2_19_19  Tau2_20_20  Tau2_21_21  Tau2_22_22  Tau2_23_23  Tau2_24_24
## 0.008425392 0.042237945 0.008994851 0.005754897 0.062798172 0.019545682 0.006444173 0.007981022
##  Tau2_25_25  Tau2_26_26  Tau2_27_27  Tau2_28_28  Tau2_29_29  Tau2_30_30  Tau2_31_31  Tau2_32_32
## 0.007278151 0.004911091 0.028170251 0.019966998 0.007754414 0.005398707 0.008730953 0.010723164
##  Tau2_33_33  Tau2_34_34  Tau2_35_35  Tau2_36_36  Tau2_37_37  Tau2_38_38  Tau2_39_39  Tau2_40_40
## 0.010141622 0.015184119 0.017201280 0.006112713 0.030770524 0.017714791 0.004871860 0.021542259
##  Tau2_41_41  Tau2_42_42  Tau2_43_43  Tau2_44_44  Tau2_45_45
```

```
## 0.008323894 0.009497166 0.020774906 0.032814679 0.008469169
##
## $Tau2.1
##    Tau2_1_1    Tau2_2_2    Tau2_3_3    Tau2_4_4    Tau2_5_5    Tau2_6_6    Tau2_7_7    Tau2_8_8
## 0.008557576 0.007882844 0.008182243 0.017088235 0.003123622 0.011707477 0.018112710 0.007896987
##    Tau2_9_9   Tau2_10_10   Tau2_11_11   Tau2_12_12   Tau2_13_13   Tau2_14_14   Tau2_15_15   Tau2_16_16
## 0.022075795 0.007464680 0.005973504 0.008283407 0.082586458 0.008871949 0.022431528 0.014649775
##   Tau2_17_17   Tau2_18_18   Tau2_19_19   Tau2_20_20   Tau2_21_21   Tau2_22_22   Tau2_23_23   Tau2_24_24
## 0.006857327 0.041590199 0.008707194 0.005071511 0.062723133 0.014601933 0.006303177 0.007957268
##   Tau2_25_25   Tau2_26_26   Tau2_27_27   Tau2_28_28   Tau2_29_29   Tau2_30_30   Tau2_31_31   Tau2_32_32
## 0.007359572 0.004511199 0.027928995 0.016101498 0.007580558 0.005045043 0.010699082 0.009821037
##   Tau2_33_33   Tau2_34_34   Tau2_35_35   Tau2_36_36   Tau2_37_37   Tau2_38_38   Tau2_39_39   Tau2_40_40
## 0.008418548 0.015748103 0.015852580 0.004965140 0.025565646 0.018320585 0.003266585 0.015107695
##   Tau2_41_41   Tau2_42_42   Tau2_43_43   Tau2_44_44   Tau2_45_45
## 0.007753406 0.009530816 0.013382457 0.019936175 0.007427682
##
## $R2
##    Tau2_1_1    Tau2_2_2    Tau2_3_3    Tau2_4_4    Tau2_5_5    Tau2_6_6    Tau2_7_7    Tau2_8_8
## 0.223384615 0.012336716 0.004494973 0.104642246 0.356801345 0.015799359 0.332737946 0.144349340
##    Tau2_9_9   Tau2_10_10   Tau2_11_11   Tau2_12_12   Tau2_13_13   Tau2_14_14   Tau2_15_15   Tau2_16_16
## 0.082919112 0.081861287 0.052966316 0.000000000 0.000000000 0.140339051 0.161424039 0.000000000
##   Tau2_17_17   Tau2_18_18   Tau2_19_19   Tau2_20_20   Tau2_21_21   Tau2_22_22   Tau2_23_23   Tau2_24_24
## 0.186111830 0.015335649 0.031980182 0.118748692 0.001194924 0.252933029 0.021879580 0.002976341
##   Tau2_25_25   Tau2_26_26   Tau2_27_27   Tau2_28_28   Tau2_29_29   Tau2_30_30   Tau2_31_31   Tau2_32_32
## 0.000000000 0.081426369 0.008564214 0.193594445 0.022420211 0.065509074 0.000000000 0.084128840
##   Tau2_33_33   Tau2_34_34   Tau2_35_35   Tau2_36_36   Tau2_37_37   Tau2_38_38   Tau2_39_39   Tau2_40_40
## 0.169901201 0.000000000 0.078406972 0.187735530 0.169151421 0.000000000 0.329499420 0.298694960
##   Tau2_41_41   Tau2_42_42   Tau2_43_43   Tau2_44_44   Tau2_45_45
## 0.068536296 0.000000000 0.355835523 0.392461674 0.122973856
```

```
## Compare the models with and without Individualism
anova(fit1a, fit0a)
```

```
##                             base   comparison ep  minus2LL   df       AIC   diffLL diffdf           p
## 1 Moderator with individualism         <NA> 65 -2246.394 1465 -5176.394       NA     NA          NA
## 2 Moderator with individualism No moderator 55 -2050.362 1475 -5000.362 196.0324     10 1.08392e-36
```

```
## Get the estimated A0 and A1
A0 <- mxEval(A0, fit1a$mx.fit)
A0
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G
## I1   0  0  0  0  0  0  0  0  0   0 0.6872463
## I2   0  0  0  0  0  0  0  0  0   0 0.6371681
## I3   0  0  0  0  0  0  0  0  0   0 0.5588146
## I4   0  0  0  0  0  0  0  0  0   0 0.5008263
## I5   0  0  0  0  0  0  0  0  0   0 0.6419993
## I6   0  0  0  0  0  0  0  0  0   0 0.5924926
## I7   0  0  0  0  0  0  0  0  0   0 0.5835954
## I8   0  0  0  0  0  0  0  0  0   0 0.5025231
## I9   0  0  0  0  0  0  0  0  0   0 0.6894619
## I10  0  0  0  0  0  0  0  0  0   0 0.7421746
## G    0  0  0  0  0  0  0  0  0   0 0.0000000
```

```
A1 <- mxEval(A1, fit1a$mx.fit)
A1
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10           G
## I1   0  0  0  0  0  0  0  0  0   0  0.044378033
## I2   0  0  0  0  0  0  0  0  0   0  0.052195882
## I3   0  0  0  0  0  0  0  0  0   0  0.009687839
## I4   0  0  0  0  0  0  0  0  0   0 -0.009776237
## I5   0  0  0  0  0  0  0  0  0   0  0.016024568
## I6   0  0  0  0  0  0  0  0  0   0  0.053063830
## I7   0  0  0  0  0  0  0  0  0   0  0.026103073
## I8   0  0  0  0  0  0  0  0  0   0  0.141438680
## I9   0  0  0  0  0  0  0  0  0   0  0.027559441
## I10  0  0  0  0  0  0  0  0  0   0  0.016788186
## G    0  0  0  0  0  0  0  0  0   0  0.000000000
```

```
## Compute the estimated A matrix at -1SD (-1) of the standardized individualism
A0 - A1
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G
## I1   0  0  0  0  0  0  0  0  0   0 0.6428682
## I2   0  0  0  0  0  0  0  0  0   0 0.5849722
## I3   0  0  0  0  0  0  0  0  0   0 0.5491267
## I4   0  0  0  0  0  0  0  0  0   0 0.5106026
## I5   0  0  0  0  0  0  0  0  0   0 0.6259747
## I6   0  0  0  0  0  0  0  0  0   0 0.5394287
## I7   0  0  0  0  0  0  0  0  0   0 0.5574923
## I8   0  0  0  0  0  0  0  0  0   0 0.3610844
## I9   0  0  0  0  0  0  0  0  0   0 0.6619024
## I10  0  0  0  0  0  0  0  0  0   0 0.7253864
## G    0  0  0  0  0  0  0  0  0   0 0.0000000
```

```
## Compute the estimated A matrix at 0 (mean) of the standardized individualism
A0
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G
## I1   0  0  0  0  0  0  0  0  0   0 0.6872463
## I2   0  0  0  0  0  0  0  0  0   0 0.6371681
## I3   0  0  0  0  0  0  0  0  0   0 0.5588146
## I4   0  0  0  0  0  0  0  0  0   0 0.5008263
## I5   0  0  0  0  0  0  0  0  0   0 0.6419993
## I6   0  0  0  0  0  0  0  0  0   0 0.5924926
## I7   0  0  0  0  0  0  0  0  0   0 0.5835954
## I8   0  0  0  0  0  0  0  0  0   0 0.5025231
## I9   0  0  0  0  0  0  0  0  0   0 0.6894619
## I10  0  0  0  0  0  0  0  0  0   0 0.7421746
## G    0  0  0  0  0  0  0  0  0   0 0.0000000
```

```
## Compute the estimated A matrix at +1SD (+1) of the standardized individualism
A0 + A1
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G
## I1   0  0  0  0  0  0  0  0  0   0 0.7316243
## I2   0  0  0  0  0  0  0  0  0   0 0.6893640
## I3   0  0  0  0  0  0  0  0  0   0 0.5685024
## I4   0  0  0  0  0  0  0  0  0   0 0.4910501
## I5   0  0  0  0  0  0  0  0  0   0 0.6580238
## I6   0  0  0  0  0  0  0  0  0   0 0.6455564
## I7   0  0  0  0  0  0  0  0  0   0 0.6096984
## I8   0  0  0  0  0  0  0  0  0   0 0.6439618
```

```
## I9   0  0  0  0  0  0  0  0  0   0 0.7170213
## I10  0  0  0  0  0  0  0  0  0   0 0.7589628
## G    0  0  0  0  0  0  0  0  0   0 0.0000000
```

Bifactor model without any moderator

```
## Create matrices with implicit diagonal constraints
M0b <- create.vechsR(A0=RAM2$A, S0=RAM2$S, F0=RAM2$F)

## Create heterogeneity variances
T0b <- create.Tau2(RAM=RAM2, RE.type="Diag", Transform="expLog", RE.startvalues=0.05)

fit0b <- osmasem(model.name="No moderator", Mmatrix=M0b, Tmatrix=T0b, data=my.df)
summary(fit0b, Saturated=TRUE)
```

```
## Summary of No moderator
##
## free parameters:
##       name  matrix row col    Estimate  Std.Error A     z value     Pr(>|z|)
## 1       g1      A0  I1   G  0.75244750 0.01446323    52.0248654 0.000000e+00
## 2       g2      A0  I2   G  0.53608138 0.01349397    39.7274708 0.000000e+00
## 3       g3      A0  I3   G  0.59497570 0.01812562    32.8251189 0.000000e+00
## 4       g4      A0  I4   G  0.52191845 0.01293407    40.3522341 0.000000e+00
## 5       g5      A0  I5   G  0.52813055 0.01556586    33.9287709 0.000000e+00
## 6       g6      A0  I6   G  0.51469170 0.01182049    43.5423453 0.000000e+00
## 7       g7      A0  I7   G  0.62026895 0.01400766    44.2806825 0.000000e+00
## 8       g8      A0  I8   G  0.38546378 0.01892844    20.3642690 0.000000e+00
## 9       g9      A0  I9   G  0.59453822 0.01423267    41.7727920 0.000000e+00
## 10     g10      A0 I10   G  0.80265351 0.01495072    53.6866289 0.000000e+00
## 11      p1      A0  I1 POS -0.04575678 0.04371488    -1.0467095 2.952336e-01
## 12      p3      A0  I3 POS  0.53259717 0.07105313     7.4957594 6.594725e-14
## 13      p4      A0  I4 POS  0.30699588 0.03823719     8.0287249 8.881784e-16
## 14      p7      A0  I7 POS  0.31793510 0.04172778     7.6192679 2.553513e-14
## 15     p10      A0 I10 POS -0.03367284 0.04534079    -0.7426611 4.576869e-01
## 16      n2      A0  I2 NEG  0.58803096 0.02531047    23.2327188 0.000000e+00
## 17      n5      A0  I5 NEG  0.32329286 0.02319230    13.9396638 0.000000e+00
## 18      n6      A0  I6 NEG  0.59884671 0.02421493    24.7304734 0.000000e+00
## 19      n8      A0  I8 NEG  0.39899599 0.03153379    12.6529671 0.000000e+00
## 20      n9      A0  I9 NEG  0.38519626 0.02312971    16.6537414 0.000000e+00
## 21  Tau1_1 vecTau1   1   1 -2.35056214 0.13014474   -18.0611380 0.000000e+00
## 22  Tau1_2 vecTau1   2   1 -2.55664654 0.13146098   -19.4479505 0.000000e+00
## 23  Tau1_3 vecTau1   3   1 -2.52515744 0.13230784   -19.0854706 0.000000e+00
## 24  Tau1_4 vecTau1   4   1 -2.17354996 0.13170662   -16.5029663 0.000000e+00
## 25  Tau1_5 vecTau1   5   1 -2.71991742 0.13902176   -19.5646883 0.000000e+00
## 26  Tau1_6 vecTau1   6   1 -2.27957773 0.12784329   -17.8310315 0.000000e+00
## 27  Tau1_7 vecTau1   7   1 -1.84782422 0.12524384   -14.7538134 0.000000e+00
## 28  Tau1_8 vecTau1   8   1 -2.44594890 0.13081350   -18.6979849 0.000000e+00
## 29  Tau1_9 vecTau1   9   1 -2.19253553 0.12784467   -17.1499958 0.000000e+00
## 30 Tau1_10 vecTau1  10   1 -2.58090417 0.13242011   -19.4902729 0.000000e+00
## 31 Tau1_11 vecTau1  11   1 -2.67044214 0.13382676   -19.9544708 0.000000e+00
## 32 Tau1_12 vecTau1  12   1 -2.64663345 0.13600194   -19.4602623 0.000000e+00
## 33 Tau1_13 vecTau1  13   1 -2.34564451 0.13584699   -17.2668129 0.000000e+00
## 34 Tau1_14 vecTau1  14   1 -2.39552343 0.12763916   -18.7679349 0.000000e+00
```

```
## 35 Tau1_15 vecTau1  15   1 -2.05948008 0.12808161   -16.0794366 0.000000e+00
## 36 Tau1_16 vecTau1  16   1 -2.61226101 0.13731750   -19.0235119 0.000000e+00
## 37 Tau1_17 vecTau1  17   1 -2.51183523 0.12844378   -19.5559122 0.000000e+00
## 38 Tau1_18 vecTau1  18   1 -2.78116747 0.13708268   -20.2882489 0.000000e+00
## 39 Tau1_19 vecTau1  19   1 -2.34791317 0.13428810   -17.4841493 0.000000e+00
## 40 Tau1_20 vecTau1  20   1 -2.73824517 0.14075205   -19.4543891 0.000000e+00
## 41 Tau1_21 vecTau1  21   1 -2.01794227 0.12584562   -16.0350613 0.000000e+00
## 42 Tau1_22 vecTau1  22   1 -2.13511972 0.13108441   -16.2881280 0.000000e+00
## 43 Tau1_23 vecTau1  23   1 -2.63653905 0.13213043   -19.9540637 0.000000e+00
## 44 Tau1_24 vecTau1  24   1 -2.64702052 0.13780772   -19.2080717 0.000000e+00
## 45 Tau1_25 vecTau1  25   1 -2.55205337 0.13651309   -18.6945684 0.000000e+00
## 46 Tau1_26 vecTau1  26   1 -2.73494482 0.13613756   -20.0895689 0.000000e+00
## 47 Tau1_27 vecTau1  27   1 -2.23644281 0.13055922   -17.1297188 0.000000e+00
## 48 Tau1_28 vecTau1  28   1 -2.08845092 0.12935910   -16.1445999 0.000000e+00
## 49 Tau1_29 vecTau1  29   1 -2.53509025 0.13405320   -18.9110761 0.000000e+00
## 50 Tau1_30 vecTau1  30   1 -2.74817600 0.13738435   -20.0035600 0.000000e+00
## 51 Tau1_31 vecTau1  31   1 -2.76148891 0.14356650   -19.2349109 0.000000e+00
## 52 Tau1_32 vecTau1  32   1 -2.35287111 0.12975601   -18.1330414 0.000000e+00
## 53 Tau1_33 vecTau1  33   1 -2.32744153 0.13326914   -17.4642198 0.000000e+00
## 54 Tau1_34 vecTau1  34   1 -2.09259312 0.13008000   -16.0869709 0.000000e+00
## 55 Tau1_35 vecTau1  35   1 -2.32912656 0.13729324   -16.9646127 0.000000e+00
## 56 Tau1_36 vecTau1  36   1 -2.66554728 0.13172579   -20.2355759 0.000000e+00
## 57 Tau1_37 vecTau1  37   1 -2.02207124 0.12939237   -15.6274380 0.000000e+00
## 58 Tau1_38 vecTau1  38   1 -2.81011388 0.13973532   -20.1102614 0.000000e+00
## 59 Tau1_39 vecTau1  39   1 -2.76843802 0.13396225   -20.6658071 0.000000e+00
## 60 Tau1_40 vecTau1  40   1 -2.04200125 0.12698413   -16.0807594 0.000000e+00
## 61 Tau1_41 vecTau1  41   1 -2.44276786 0.12767394   -19.1328619 0.000000e+00
## 62 Tau1_42 vecTau1  42   1 -2.48741799 0.12792762   -19.4439479 0.000000e+00
## 63 Tau1_43 vecTau1  43   1 -2.02989495 0.12748798   -15.9222456 0.000000e+00
## 64 Tau1_44 vecTau1  44   1 -1.73666585 0.12526855   -13.8635428 0.000000e+00
## 65 Tau1_45 vecTau1  45   1 -2.47512022 0.12975606   -19.0751804 0.000000e+00
##
## Model Statistics:
##                |  Parameters  |  Degrees of Freedom  |  Fit (-2lnL units)
##        Model:             65                  1465             -2611.396
##    Saturated:             90                  1440             -2647.334
## Independence:             90                  1440                    NA
## Number of observations/statistics: 104684/1530
##
## chi-square:  ² ( df=25 ) = 35.93825,  p = 0.07254207
## Information Criteria:
##       |  df Penalty  |  Parameters Penalty  |  Sample-Size Adjusted
## AIC:      -5541.396             -2481.396               -2481.314
## BIC:     -19544.893             -1860.080               -2066.652
## CFI: NA
## TLI: NA   (also known as NNFI)
## RMSEA:  0.00204439  [95% CI (0, 0.003674957)]
## Prob(RMSEA <= 0.05): 1
## To get additional fit indices, see help(mxRefModels)
## timestamp: 2019-05-08 16:26:19
## Wall clock time: 100.9194 secs
## optimizer:  SLSQP
## OpenMx version number: 2.12.2
## Need help?  See help(mxSummary)
```

```
## SRMR
osmasemSRMR(fit0b)
```

```
## [1] 0.01620709
```

```
diag(VarCorr(fit0b))
```

```
##      Tau2_1      Tau2_2      Tau2_3      Tau2_4      Tau2_5      Tau2_6      Tau2_7      Tau2_8
## 0.009085057 0.006016238 0.006407316 0.012944298 0.004340200 0.010470898 0.024831347 0.007507162
##      Tau2_9     Tau2_10     Tau2_11     Tau2_12     Tau2_13     Tau2_14     Tau2_15     Tau2_16
## 0.012462003 0.005731326 0.004791632 0.005025316 0.009174852 0.008303760 0.016261415 0.005382932
##     Tau2_17     Tau2_18     Tau2_19     Tau2_20     Tau2_21     Tau2_22     Tau2_23     Tau2_24
## 0.006580329 0.003839800 0.009133317 0.004183988 0.017670043 0.013978436 0.005127802 0.005021427
##     Tau2_25     Tau2_26     Tau2_27     Tau2_28     Tau2_29     Tau2_30     Tau2_31     Tau2_32
## 0.006071760 0.004211697 0.011414331 0.015345978 0.006281286 0.004101707 0.003993937 0.009043200
##     Tau2_33     Tau2_34     Tau2_35     Tau2_36     Tau2_37     Tau2_38     Tau2_39     Tau2_40
## 0.009515026 0.015219371 0.009483014 0.004838771 0.017524726 0.003623816 0.003938812 0.016839929
##     Tau2_41     Tau2_42     Tau2_43     Tau2_44     Tau2_45
## 0.007555075 0.006909652 0.017252644 0.031013531 0.007081706
```

Bifactor model with `Individualism` as a moderator on the A matrix

```
## Replace the A matrix with the moderator "Individualism"
Ax1b <- RAM2$A
Ax1b[grep("\\*", Ax1b)] <- "0*data.Individualism"
Ax1b
```

```
##     I1  I2  I3  I4  I5  I6  I7  I8  I9  I10 G                     POS
## I1  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0*data.Individualism"
## I2  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0"
## I3  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0*data.Individualism"
## I4  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0*data.Individualism"
## I5  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0"
## I6  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0"
## I7  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0*data.Individualism"
## I8  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0"
## I9  "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0"
## I10 "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0*data.Individualism" "0*data.Individualism"
## G   "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"                     "0"
## POS "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"                     "0"
## NEG "0" "0" "0" "0" "0" "0" "0" "0" "0" "0" "0"                     "0"
##     NEG
## I1  "0"
## I2  "0*data.Individualism"
## I3  "0"
## I4  "0"
## I5  "0*data.Individualism"
## I6  "0*data.Individualism"
## I7  "0"
## I8  "0*data.Individualism"
## I9  "0*data.Individualism"
## I10 "0"
## G   "0"
## POS "0"
```

```
## NEG "0"
```

```
## Create matrices with implicit diagonal constraints
M1b <- create.vechsR(A0=RAM2$A, S0=RAM2$S, F0=RAM2$F, Ax=Ax1b)

fit1b <- osmasem(model.name="Moderator with individualism", Mmatrix=M1b, Tmatrix=T0b, data=my.df)
summary(fit1b)
```

```
## Summary of Moderator with individualism
##
## free parameters:
##       name  matrix row col      Estimate  Std.Error A      z value     Pr(>|z|)
## 1       g1      A0  I1   G  0.7267698257 0.01945660    37.35337703 0.000000e+00
## 2       g2      A0  I2   G  0.5513958207 0.01850659    29.79456576 0.000000e+00
## 3       g3      A0  I3   G  0.5685767628 0.02076035    27.38762994 0.000000e+00
## 4       g4      A0  I4   G  0.5043277944 0.01818249    27.73700684 0.000000e+00
## 5       g5      A0  I5   G  0.5462120046 0.02102739    25.97621855 0.000000e+00
## 6       g6      A0  I6   G  0.5307439070 0.01691029    31.38586044 0.000000e+00
## 7       g7      A0  I7   G  0.5959699205 0.01882200    31.66347073 0.000000e+00
## 8       g8      A0  I8   G  0.3917114645 0.01951369    20.07367479 0.000000e+00
## 9       g9      A0  I9   G  0.6162429309 0.02143666    28.74715700 0.000000e+00
## 10     g10      A0 I10   G  0.7773660010 0.02123722    36.60394453 0.000000e+00
## 11      p1      A0  I1 POS  0.0032426601 0.05182083     0.06257445 9.501054e-01
## 12      p3      A0  I3 POS  0.5045007628 0.04440465    11.36143881 0.000000e+00
## 13      p4      A0  I4 POS  0.3537940055 0.03871718     9.13790723 0.000000e+00
## 14      p7      A0  I7 POS  0.3585442007 0.04183021     8.57141838 0.000000e+00
## 15     p10      A0 I10 POS  0.0157751106 0.05396812     0.29230424 7.700540e-01
## 16      n2      A0  I2 NEG  0.5690596338 0.02840234    20.03566056 0.000000e+00
## 17      n5      A0  I5 NEG  0.3003208953 0.03141421     9.56003282 0.000000e+00
## 18      n6      A0  I6 NEG  0.5804922110 0.02622157    22.13796908 0.000000e+00
## 19      n8      A0  I8 NEG  0.3904778063 0.03059079    12.76455617 0.000000e+00
## 20      n9      A0  I9 NEG  0.3578797899 0.03401969    10.51978312 0.000000e+00
## 21    g1_1      A1  I1   G  0.0875110873 0.02096105     4.17493827 2.980669e-05
## 22    g2_1      A1  I2   G  0.0221078249 0.01956009     1.13025171 2.583702e-01
## 23    g3_1      A1  I3   G  0.0727639719 0.01649108     4.41232383 1.022670e-05
## 24    g4_1      A1  I4   G  0.0353546940 0.01633798     2.16395728 3.046763e-02
## 25    g5_1      A1  I5   G  0.0006437977 0.02102212     0.03062478 9.755688e-01
## 26    g6_1      A1  I6   G  0.0200886961 0.01811540     1.10892918 2.674607e-01
## 27    g7_1      A1  I7   G  0.0727065885 0.01761998     4.12637278 3.685297e-05
## 28    g8_1      A1  I8   G  0.1228593408 0.02008009     6.11846511 9.448096e-10
## 29    g9_1      A1  I9   G -0.0168871089 0.02261572    -0.74669781 4.552460e-01
## 30   g10_1      A1 I10   G  0.0658330285 0.02271697     2.89796656 3.755906e-03
## 31    p1_1      A1  I1 POS -0.1620758346 0.03394798    -4.77424046 1.803867e-06
## 32    p3_1      A1  I3 POS -0.0600530867 0.02963871    -2.02617056 4.274731e-02
## 33    p4_1      A1  I4 POS -0.0424612643 0.02578734    -1.64659350 9.964163e-02
## 34    p7_1      A1  I7 POS -0.0749928724 0.03046888    -2.46129389 1.384369e-02
## 35   p10_1      A1 I10 POS -0.1798656675 0.03488728    -5.15562306 2.527890e-07
## 36    n2_1      A1  I2 NEG  0.0067374271 0.02955341     0.22797464 8.196660e-01
## 37    n5_1      A1  I5 NEG -0.0012610865 0.03076772    -0.04098733 9.673060e-01
## 38    n6_1      A1  I6 NEG  0.0045891427 0.02693384     0.17038579 8.647068e-01
## 39    n8_1      A1  I8 NEG  0.0329756364 0.03050513     1.08098671 2.797030e-01
## 40    n9_1      A1  I9 NEG  0.0650167374 0.03508241     1.85325763 6.384544e-02
## 41  Tau1_1 vecTau1   1   1 -2.4636024235 0.13083694   -18.82956276 0.000000e+00
## 42  Tau1_2 vecTau1   2   1 -2.6007013250 0.13325901   -19.51613938 0.000000e+00
## 43  Tau1_3 vecTau1   3   1 -2.5348905414 0.13286376   -19.07887169 0.000000e+00
```

```
## 44  Tau1_4 vecTau1   4   1 -2.2190685538 0.13199846   -16.81132208 0.000000e+00
## 45  Tau1_5 vecTau1   5   1 -2.9220516326 0.14420729   -20.26285588 0.000000e+00
## 46  Tau1_6 vecTau1   6   1 -2.3322063396 0.12888066   -18.09586017 0.000000e+00
## 47  Tau1_7 vecTau1   7   1 -2.0583338194 0.12605906   -16.32832903 0.000000e+00
## 48  Tau1_8 vecTau1   8   1 -2.5190415442 0.13232183   -19.03723268 0.000000e+00
## 49  Tau1_9 vecTau1   9   1 -2.3464748614 0.13988129   -16.77475824 0.000000e+00
## 50 Tau1_10 vecTau1  10   1 -2.6106610145 0.13184492   -19.80099771 0.000000e+00
## 51 Tau1_11 vecTau1  11   1 -2.6943319350 0.13390911   -20.12060166 0.000000e+00
## 52 Tau1_12 vecTau1  12   1 -2.6587943918 0.13646588   -19.48321711 0.000000e+00
## 53 Tau1_13 vecTau1  13   1 -2.3464182832 0.13840658   -16.95308312 0.000000e+00
## 54 Tau1_14 vecTau1  14   1 -2.4655244782 0.12765136   -19.31451834 0.000000e+00
## 55 Tau1_15 vecTau1  15   1 -2.2225450651 0.12863205   -17.27831546 0.000000e+00
## 56 Tau1_16 vecTau1  16   1 -2.7004897578 0.14093292   -19.16152621 0.000000e+00
## 57 Tau1_17 vecTau1  17   1 -2.6053338497 0.12953229   -20.11339221 0.000000e+00
## 58 Tau1_18 vecTau1  18   1 -2.8028661371 0.13852427   -20.23375478 0.000000e+00
## 59 Tau1_19 vecTau1  19   1 -2.3747337290 0.13528850   -17.55310889 0.000000e+00
## 60 Tau1_20 vecTau1  20   1 -2.7833414677 0.14052371   -19.80691676 0.000000e+00
## 61 Tau1_21 vecTau1  21   1 -2.0491937650 0.12737627   -16.08771951 0.000000e+00
## 62 Tau1_22 vecTau1  22   1 -2.2997359147 0.13308128   -17.28068731 0.000000e+00
## 63 Tau1_23 vecTau1  23   1 -2.6497408049 0.13501494   -19.62553773 0.000000e+00
## 64 Tau1_24 vecTau1  24   1 -2.7070548021 0.13721459   -19.72862151 0.000000e+00
## 65 Tau1_25 vecTau1  25   1 -2.5952824934 0.13860035   -18.72493459 0.000000e+00
## 66 Tau1_26 vecTau1  26   1 -2.7737778666 0.13634665   -20.34357215 0.000000e+00
## 67 Tau1_27 vecTau1  27   1 -2.2379980287 0.13303136   -16.82308573 0.000000e+00
## 68 Tau1_28 vecTau1  28   1 -2.2050000236 0.13157039   -16.75908963 0.000000e+00
## 69 Tau1_29 vecTau1  29   1 -2.5703188473 0.13419007   -19.15431523 0.000000e+00
## 70 Tau1_30 vecTau1  30   1 -2.8158044488 0.13780914   -20.43263909 0.000000e+00
## 71 Tau1_31 vecTau1  31   1 -2.8081918930 0.14351444   -19.56731258 0.000000e+00
## 72 Tau1_32 vecTau1  32   1 -2.4049056919 0.13015310   -18.47751363 0.000000e+00
## 73 Tau1_33 vecTau1  33   1 -2.4778733479 0.13554297   -18.28109048 0.000000e+00
## 74 Tau1_34 vecTau1  34   1 -2.1210739691 0.13031516   -16.27649392 0.000000e+00
## 75 Tau1_35 vecTau1  35   1 -2.3359286574 0.13875244   -16.83522585 0.000000e+00
## 76 Tau1_36 vecTau1  36   1 -2.7616326538 0.13292234   -20.77628647 0.000000e+00
## 77 Tau1_37 vecTau1  37   1 -2.1925727983 0.12998814   -16.86748351 0.000000e+00
## 78 Tau1_38 vecTau1  38   1 -2.9215473671 0.14367538   -20.33436343 0.000000e+00
## 79 Tau1_39 vecTau1  39   1 -2.9584780662 0.13861701   -21.34282180 0.000000e+00
## 80 Tau1_40 vecTau1  40   1 -2.2524464045 0.12755223   -17.65901272 0.000000e+00
## 81 Tau1_41 vecTau1  41   1 -2.4862438602 0.12824341   -19.38691377 0.000000e+00
## 82 Tau1_42 vecTau1  42   1 -2.5311859601 0.12819329   -19.74507361 0.000000e+00
## 83 Tau1_43 vecTau1  43   1 -2.2889279830 0.13088322   -17.48832250 0.000000e+00
## 84 Tau1_44 vecTau1  44   1 -1.9861077343 0.12672403   -15.67270028 0.000000e+00
## 85 Tau1_45 vecTau1  45   1 -2.5404078097 0.13271029   -19.14250801 0.000000e+00
##
## Model Statistics:
##                |  Parameters  |  Degrees of Freedom  |  Fit (-2lnL units)
##        Model:             85                  1445             -2882.287
##    Saturated:           1080                   450                    NA
## Independence:             90                  1440                    NA
## Number of observations/statistics: 104684/1530
##
## Information Criteria:
##       |  df Penalty  |  Parameters Penalty  |  Sample-Size Adjusted
## AIC:      -5772.287             -2712.287               -2712.148
## BIC:     -19584.611             -1899.798               -2169.931
```

```
## To get additional fit indices, see help(mxRefModels)
## timestamp: 2019-05-08 16:37:08
## Wall clock time: 235.1484 secs
## optimizer:  SLSQP
## OpenMx version number: 2.12.2
## Need help?  See help(mxSummary)
```

```
## Get the R2
osmasemR2(fit1b, fit0b)
```

```
## $Tau2.0
##    Tau2_1_1    Tau2_2_2    Tau2_3_3    Tau2_4_4    Tau2_5_5    Tau2_6_6    Tau2_7_7    Tau2_8_8
## 0.009085057 0.006016238 0.006407316 0.012944298 0.004340200 0.010470898 0.024831347 0.007507162
##    Tau2_9_9  Tau2_10_10  Tau2_11_11  Tau2_12_12  Tau2_13_13  Tau2_14_14  Tau2_15_15  Tau2_16_16
## 0.012462003 0.005731326 0.004791632 0.005025316 0.009174852 0.008303760 0.016261415 0.005382932
##  Tau2_17_17  Tau2_18_18  Tau2_19_19  Tau2_20_20  Tau2_21_21  Tau2_22_22  Tau2_23_23  Tau2_24_24
## 0.006580329 0.003839800 0.009133317 0.004183988 0.017670043 0.013978436 0.005127802 0.005021427
##  Tau2_25_25  Tau2_26_26  Tau2_27_27  Tau2_28_28  Tau2_29_29  Tau2_30_30  Tau2_31_31  Tau2_32_32
## 0.006071760 0.004211697 0.011414331 0.015345978 0.006281286 0.004101707 0.003993937 0.009043200
##  Tau2_33_33  Tau2_34_34  Tau2_35_35  Tau2_36_36  Tau2_37_37  Tau2_38_38  Tau2_39_39  Tau2_40_40
## 0.009515026 0.015219371 0.009483014 0.004838771 0.017524726 0.003623816 0.003938812 0.016839929
##  Tau2_41_41  Tau2_42_42  Tau2_43_43  Tau2_44_44  Tau2_45_45
## 0.007555075 0.006909652 0.017252644 0.031013531 0.007081706
##
## $Tau2.1
##    Tau2_1_1    Tau2_2_2    Tau2_3_3    Tau2_4_4    Tau2_5_5    Tau2_6_6    Tau2_7_7    Tau2_8_8
## 0.007246731 0.005508832 0.006283796 0.011817934 0.002896931 0.009424782 0.016298737 0.006486170
##    Tau2_9_9  Tau2_10_10  Tau2_11_11  Tau2_12_12  Tau2_13_13  Tau2_14_14  Tau2_15_15  Tau2_16_16
## 0.009159628 0.005400185 0.004568073 0.004904565 0.009160664 0.007218927 0.011736048 0.004512159
##  Tau2_17_17  Tau2_18_18  Tau2_19_19  Tau2_20_20  Tau2_21_21  Tau2_22_22  Tau2_23_23  Tau2_24_24
## 0.005458028 0.003676727 0.008656304 0.003823141 0.016599420 0.010057146 0.004994182 0.004453301
##  Tau2_25_25  Tau2_26_26  Tau2_27_27  Tau2_28_28  Tau2_29_29  Tau2_30_30  Tau2_31_31  Tau2_32_32
## 0.005568860 0.003896971 0.011378882 0.012155178 0.005853955 0.003582806 0.003637772 0.008149397
##  Tau2_33_33  Tau2_34_34  Tau2_35_35  Tau2_36_36  Tau2_37_37  Tau2_38_38  Tau2_39_39  Tau2_40_40
## 0.007042819 0.014376678 0.009354878 0.003992789 0.012461074 0.002899854 0.002693386 0.011054775
##  Tau2_41_41  Tau2_42_42  Tau2_43_43  Tau2_44_44  Tau2_45_45
## 0.006925897 0.006330526 0.010276907 0.018831666 0.006214838
##
## $R2
##    Tau2_1_1    Tau2_2_2    Tau2_3_3    Tau2_4_4    Tau2_5_5    Tau2_6_6    Tau2_7_7    Tau2_8_8
## 0.202346167 0.084339458 0.019277968 0.087016245 0.332535071 0.099907030 0.343622498 0.136002399
##    Tau2_9_9  Tau2_10_10  Tau2_11_11  Tau2_12_12  Tau2_13_13  Tau2_14_14  Tau2_15_15  Tau2_16_16
## 0.264995505 0.057777366 0.046656109 0.024028496 0.001546347 0.130643590 0.278288627 0.161765599
##  Tau2_17_17  Tau2_18_18  Tau2_19_19  Tau2_20_20  Tau2_21_21  Tau2_22_22  Tau2_23_23  Tau2_24_24
## 0.170553971 0.042469145 0.052227809 0.086244825 0.060589741 0.280524200 0.026057979 0.113140369
##  Tau2_25_25  Tau2_26_26  Tau2_27_27  Tau2_28_28  Tau2_29_29  Tau2_30_30  Tau2_31_31  Tau2_32_32
## 0.082826153 0.074726667 0.003105609 0.207924218 0.068032364 0.126508509 0.089176331 0.098837026
##  Tau2_33_33  Tau2_34_34  Tau2_35_35  Tau2_36_36  Tau2_37_37  Tau2_38_38  Tau2_39_39  Tau2_40_40
## 0.259821306 0.055369748 0.013512072 0.174834041 0.288943310 0.199778702 0.316193365 0.343537901
##  Tau2_41_41  Tau2_42_42  Tau2_43_43  Tau2_44_44  Tau2_45_45
## 0.083278903 0.083814059 0.404328580 0.392791933 0.122409494
```

```
## Compare the models with and without Individualism
anova(fit1b, fit0b)
```

```
##                          base   comparison ep  minus2LL   df       AIC   diffLL diffdf
```

```
## 1 Moderator with individualism         <NA> 85 -2882.287 1445 -5772.287       NA      NA
## 2 Moderator with individualism No moderator 65 -2611.396 1465 -5541.396 270.8919      20
##               p
## 1            NA
## 2 6.797156e-46
```

```
## Get the estimated A0 and A1
A0 <- mxEval(A0, fit1b$mx.fit)
A0
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G         POS       NEG
## I1   0  0  0  0  0  0  0  0  0   0 0.7267698 0.00324266 0.0000000
## I2   0  0  0  0  0  0  0  0  0   0 0.5513958 0.00000000 0.5690596
## I3   0  0  0  0  0  0  0  0  0   0 0.5685768 0.50450076 0.0000000
## I4   0  0  0  0  0  0  0  0  0   0 0.5043278 0.35379401 0.0000000
## I5   0  0  0  0  0  0  0  0  0   0 0.5462120 0.00000000 0.3003209
## I6   0  0  0  0  0  0  0  0  0   0 0.5307439 0.00000000 0.5804922
## I7   0  0  0  0  0  0  0  0  0   0 0.5959699 0.35854420 0.0000000
## I8   0  0  0  0  0  0  0  0  0   0 0.3917115 0.00000000 0.3904778
## I9   0  0  0  0  0  0  0  0  0   0 0.6162429 0.00000000 0.3578798
## I10  0  0  0  0  0  0  0  0  0   0 0.7773660 0.01577511 0.0000000
## G    0  0  0  0  0  0  0  0  0   0 0.0000000 0.00000000 0.0000000
## POS  0  0  0  0  0  0  0  0  0   0 0.0000000 0.00000000 0.0000000
## NEG  0  0  0  0  0  0  0  0  0   0 0.0000000 0.00000000 0.0000000
```

```
A1 <- mxEval(A1, fit1b$mx.fit)
A1
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10             G          POS          NEG
## I1   0  0  0  0  0  0  0  0  0   0  0.0875110873 -0.16207583  0.000000000
## I2   0  0  0  0  0  0  0  0  0   0  0.0221078249  0.00000000  0.006737427
## I3   0  0  0  0  0  0  0  0  0   0  0.0727639719 -0.06005309  0.000000000
## I4   0  0  0  0  0  0  0  0  0   0  0.0353546940 -0.04246126  0.000000000
## I5   0  0  0  0  0  0  0  0  0   0  0.0006437977  0.00000000 -0.001261086
## I6   0  0  0  0  0  0  0  0  0   0  0.0200886961  0.00000000  0.004589143
## I7   0  0  0  0  0  0  0  0  0   0  0.0727065885 -0.07499287  0.000000000
## I8   0  0  0  0  0  0  0  0  0   0  0.1228593408  0.00000000  0.032975636
## I9   0  0  0  0  0  0  0  0  0   0 -0.0168871089  0.00000000  0.065016737
## I10  0  0  0  0  0  0  0  0  0   0  0.0658330285 -0.17986567  0.000000000
## G    0  0  0  0  0  0  0  0  0   0  0.0000000000  0.00000000  0.000000000
## POS  0  0  0  0  0  0  0  0  0   0  0.0000000000  0.00000000  0.000000000
## NEG  0  0  0  0  0  0  0  0  0   0  0.0000000000  0.00000000  0.000000000
```

```
## Compute the estimated A matrix at -1SD (-1) of the standardized individualism
A0 - A1
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G       POS       NEG
## I1   0  0  0  0  0  0  0  0  0   0 0.6392587 0.1653185 0.0000000
## I2   0  0  0  0  0  0  0  0  0   0 0.5292880 0.0000000 0.5623222
## I3   0  0  0  0  0  0  0  0  0   0 0.4958128 0.5645538 0.0000000
## I4   0  0  0  0  0  0  0  0  0   0 0.4689731 0.3962553 0.0000000
## I5   0  0  0  0  0  0  0  0  0   0 0.5455682 0.0000000 0.3015820
## I6   0  0  0  0  0  0  0  0  0   0 0.5106552 0.0000000 0.5759031
## I7   0  0  0  0  0  0  0  0  0   0 0.5232633 0.4335371 0.0000000
## I8   0  0  0  0  0  0  0  0  0   0 0.2688521 0.0000000 0.3575022
## I9   0  0  0  0  0  0  0  0  0   0 0.6331300 0.0000000 0.2928631
## I10  0  0  0  0  0  0  0  0  0   0 0.7115330 0.1956408 0.0000000
```

```
## G    0  0  0  0  0  0  0  0  0   0 0.0000000 0.0000000 0.0000000
## POS  0  0  0  0  0  0  0  0  0   0 0.0000000 0.0000000 0.0000000
## NEG  0  0  0  0  0  0  0  0  0   0 0.0000000 0.0000000 0.0000000
```

```
## Compute the estimated A matrix at 0 (mean) of the standardized individualism
A0
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G        POS       NEG
## I1   0  0  0  0  0  0  0  0  0   0 0.7267698 0.00324266 0.0000000
## I2   0  0  0  0  0  0  0  0  0   0 0.5513958 0.00000000 0.5690596
## I3   0  0  0  0  0  0  0  0  0   0 0.5685768 0.50450076 0.0000000
## I4   0  0  0  0  0  0  0  0  0   0 0.5043278 0.35379401 0.0000000
## I5   0  0  0  0  0  0  0  0  0   0 0.5462120 0.00000000 0.3003209
## I6   0  0  0  0  0  0  0  0  0   0 0.5307439 0.00000000 0.5804922
## I7   0  0  0  0  0  0  0  0  0   0 0.5959699 0.35854420 0.0000000
## I8   0  0  0  0  0  0  0  0  0   0 0.3917115 0.00000000 0.3904778
## I9   0  0  0  0  0  0  0  0  0   0 0.6162429 0.00000000 0.3578798
## I10  0  0  0  0  0  0  0  0  0   0 0.7773660 0.01577511 0.0000000
## G    0  0  0  0  0  0  0  0  0   0 0.0000000 0.00000000 0.0000000
## POS  0  0  0  0  0  0  0  0  0   0 0.0000000 0.00000000 0.0000000
## NEG  0  0  0  0  0  0  0  0  0   0 0.0000000 0.00000000 0.0000000
```

```
## Compute the estimated A matrix at +1SD (+1) of the standardized individualism
A0 + A1
```

```
##     I1 I2 I3 I4 I5 I6 I7 I8 I9 I10         G         POS       NEG
## I1   0  0  0  0  0  0  0  0  0   0 0.8142809 -0.1588332 0.0000000
## I2   0  0  0  0  0  0  0  0  0   0 0.5735036  0.0000000 0.5757971
## I3   0  0  0  0  0  0  0  0  0   0 0.6413407  0.4444477 0.0000000
## I4   0  0  0  0  0  0  0  0  0   0 0.5396825  0.3113327 0.0000000
## I5   0  0  0  0  0  0  0  0  0   0 0.5468558  0.0000000 0.2990598
## I6   0  0  0  0  0  0  0  0  0   0 0.5508326  0.0000000 0.5850814
## I7   0  0  0  0  0  0  0  0  0   0 0.6686765  0.2835513 0.0000000
## I8   0  0  0  0  0  0  0  0  0   0 0.5145708  0.0000000 0.4234534
## I9   0  0  0  0  0  0  0  0  0   0 0.5993558  0.0000000 0.4228965
## I10  0  0  0  0  0  0  0  0  0   0 0.8431990 -0.1640906 0.0000000
## G    0  0  0  0  0  0  0  0  0   0 0.0000000  0.0000000 0.0000000
## POS  0  0  0  0  0  0  0  0  0   0 0.0000000  0.0000000 0.0000000
## NEG  0  0  0  0  0  0  0  0  0   0 0.0000000  0.0000000 0.0000000
```

```
save.image(file="Gnambs2018.RData")

sessionInfo()
```

```
## R version 3.5.1 (2018-07-02)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Ubuntu 18.04.2 LTS
##
## Matrix products: default
## BLAS: /opt/microsoft/ropen/3.5.1/lib64/R/lib/libRblas.so
## LAPACK: /opt/microsoft/ropen/3.5.1/lib64/R/lib/libRlapack.so
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C                   LC_TIME=en_US.UTF-8
##  [4] LC_COLLATE=en_US.UTF-8     LC_MONETARY=en_US.UTF-8        LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=en_US.UTF-8       LC_NAME=C                      LC_ADDRESS=C
## [10] LC_TELEPHONE=C             LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C
```

```
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
## [1] metaSEM_1.2.1.1      OpenMx_2.12.2        RevoUtils_11.0.1     RevoUtilsMath_11.0.0
##
## loaded via a namespace (and not attached):
##  [1] nlme_3.1-137        RColorBrewer_1.1-2  mi_1.0              tools_3.5.1
##  [5] backports_1.1.3     R6_2.4.0            d3Network_0.5.2.1   rpart_4.1-13
##  [9] Hmisc_4.2-0         lazyeval_0.2.1      colorspace_1.4-0    nnet_7.3-12
## [13] tidyselect_0.2.5    gridExtra_2.3       mnormt_1.5-5        compiler_3.5.1
## [17] qgraph_1.6.1        fdrtool_1.2.15      htmlTable_1.13.1    scales_1.0.0
## [21] checkmate_1.9.1     mvtnorm_1.0-9       psych_1.8.12        pbapply_1.4-0
## [25] sem_3.1-9           stringr_1.4.0       digest_0.6.18       pbivnorm_0.6.0
## [29] foreign_0.8-71      minqa_1.2.4         rmarkdown_1.11      base64enc_0.1-3
## [33] jpeg_0.1-8          pkgconfig_2.0.2     htmltools_0.3.6     lme4_1.1-20
## [37] lisrelToR_0.1.4     htmlwidgets_1.3     rlang_0.3.1         rstudioapi_0.9.0
## [41] huge_1.3.0          gtools_3.8.1        acepack_1.4.1       dplyr_0.8.0.1
## [45] zip_2.0.0           magrittr_1.5        Formula_1.2-3       Matrix_1.2-15
## [49] Rcpp_1.0.0          munsell_0.5.0       abind_1.4-5         rockchalk_1.8.140
## [53] whisker_0.3-2       stringi_1.3.1       yaml_2.2.0          carData_3.0-2
## [57] MASS_7.3-51.1       plyr_1.8.4          matrixcalc_1.0-3    lavaan_0.6-3
## [61] grid_3.5.1          parallel_3.5.1      crayon_1.3.4        lattice_0.20-38
## [65] semPlot_1.1         kutils_1.64         splines_3.5.1       knitr_1.21
## [69] pillar_1.3.1        igraph_1.2.4        rjson_0.2.20        boot_1.3-20
## [73] corpcor_1.6.9       BDgraph_2.55        reshape2_1.4.3      stats4_3.5.1
## [77] XML_3.98-1.17       glue_1.3.0          evaluate_0.13       latticeExtra_0.6-28
## [81] data.table_1.12.0   png_0.1-7           nloptr_1.2.1        gtable_0.2.0
## [85] purrr_0.3.0         assertthat_0.2.0    ggplot2_3.1.0       xfun_0.5
## [89] openxlsx_4.1.0      xtable_1.8-3        semTools_0.5-1      coda_0.19-2
## [93] survival_2.43-3     glasso_1.10         tibble_2.0.1        arm_1.10-1
## [97] ggm_2.3             ellipse_0.4.1       cluster_2.0.7-1
```