

Selecting variables in stage 2 analysis in TSSEM

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Link: <https://openmx.ssri.psu.edu/node/4522>

```
library(metaSEM)

random1 <- random1 <- tssem1(Digman97$data, Digman97$n)

## total sample size
n <- random1$total.n
n

## [1] 4496

## Average correlation matrix
Cov <- vec2symMat( coef(random1, select="fixed"), diag=FALSE)

## Add variable names for checking
var.names <- c("A", "C", "ES", "E", "I")
dimnames(Cov) <- list(var.names, var.names)
Cov

##           A           C           ES           E           I
## A  1.0000000  0.3897191  0.4326588  0.04945633  0.0960371
## C  0.38971908  1.0000000  0.4272424  0.11929320  0.1929243
## ES 0.43265880  0.4272424  1.0000000  0.22690166  0.1810557
## E  0.04945633  0.1192932  0.2269017  1.0000000  0.4361497
## I  0.09603710  0.1929243  0.1810557  0.43614968  1.0000000

## Sampling covariance matrix of the correlation vector
aCov <- vcov(random1, select="fixed")
aCov

##           Intercept1  Intercept2  Intercept3  Intercept4
## Intercept1  2.947682e-03  1.061319e-04  3.922895e-05  3.852784e-05
## Intercept2  1.061319e-04  1.718216e-03  7.455652e-05  3.595399e-05
## Intercept3  3.922895e-05  7.455652e-05  3.685801e-03  1.593657e-04
## Intercept4  3.852784e-05  3.595399e-05  1.593657e-04  2.005886e-03
## Intercept5  9.128582e-05  7.528534e-05  2.253377e-05  1.553300e-05
## Intercept6  2.212173e-05  1.978031e-05  1.217137e-04  4.539258e-05
## Intercept7  1.708752e-05  1.084870e-05  4.437879e-05  1.236779e-04
## Intercept8  1.040408e-05  1.369967e-05  1.246813e-04  4.661812e-05
## Intercept9  1.250645e-05  1.548778e-05  4.711111e-05  1.349123e-04
## Intercept10 2.582202e-06  3.118359e-06  1.594889e-05  2.227507e-05
##           Intercept5  Intercept6  Intercept7  Intercept8
## Intercept1  9.128582e-05  2.212173e-05  1.708752e-05  1.040408e-05
## Intercept2  7.528534e-05  1.978031e-05  1.084870e-05  1.369967e-05
## Intercept3  2.253377e-05  1.217137e-04  4.437879e-05  1.246813e-04
## Intercept4  1.553300e-05  4.539258e-05  1.236779e-04  4.661812e-05
## Intercept5  1.530078e-03  6.442200e-05  2.949793e-05  2.236300e-05
```

```

## Intercept6 6.442200e-05 1.686091e-03 1.485366e-04 1.279671e-04
## Intercept7 2.949793e-05 1.485366e-04 2.263821e-03 4.819836e-05
## Intercept8 2.236300e-05 1.279671e-04 4.819836e-05 1.050338e-03
## Intercept9 3.012233e-05 5.116190e-05 1.445539e-04 1.338507e-04
## Intercept10 5.534501e-06 2.834960e-05 3.041837e-05 1.975645e-05
##
## Intercept9 Intercept10
## Intercept1 1.250645e-05 2.582202e-06
## Intercept2 1.548778e-05 3.118359e-06
## Intercept3 4.711111e-05 1.594889e-05
## Intercept4 1.349123e-04 2.227507e-05
## Intercept5 3.012233e-05 5.534501e-06
## Intercept6 5.116190e-05 2.834960e-05
## Intercept7 1.445539e-04 3.041837e-05
## Intercept8 1.338507e-04 1.975645e-05
## Intercept9 1.813785e-03 6.284110e-05
## Intercept10 6.284110e-05 1.027818e-03

```

```

## Variables to keep
## Let's exclude "E"
var.to.keep <- c(TRUE, TRUE, TRUE, FALSE, TRUE)
names(var.to.keep) <- var.names
var.to.keep

```

```

## A C ES E I
## TRUE TRUE TRUE FALSE TRUE

```

```

## Correlation coefficients to keep
cor.to.keep <- vechs(outer(var.to.keep, var.to.keep, function(y, z) y&z))
names(cor.to.keep) <- colnames(aCov)
cor.to.keep

```

```

## Intercept1 Intercept2 Intercept3 Intercept4 Intercept5 Intercept6
## TRUE TRUE FALSE TRUE TRUE FALSE
## Intercept7 Intercept8 Intercept9 Intercept10
## TRUE FALSE TRUE FALSE

```

```

## New correlation matrix
Cov_new <- Cov[var.to.keep, var.to.keep]
Cov_new

```

```

## A C ES I
## A 1.000000 0.3897191 0.4326588 0.0960371
## C 0.3897191 1.000000 0.4272424 0.1929243
## ES 0.4326588 0.4272424 1.000000 0.1810557
## I 0.0960371 0.1929243 0.1810557 1.000000

```

```

## New sampling covariance matrix
aCov_new <- aCov[cor.to.keep, cor.to.keep]
aCov_new

```

```

## Intercept1 Intercept2 Intercept4 Intercept5
## Intercept1 2.947682e-03 1.061319e-04 3.852784e-05 9.128582e-05
## Intercept2 1.061319e-04 1.718216e-03 3.595399e-05 7.528534e-05
## Intercept4 3.852784e-05 3.595399e-05 2.005886e-03 1.553300e-05
## Intercept5 9.128582e-05 7.528534e-05 1.553300e-05 1.530078e-03
## Intercept7 1.708752e-05 1.084870e-05 1.236779e-04 2.949793e-05
## Intercept9 1.250645e-05 1.548778e-05 1.349123e-04 3.012233e-05

```

```

##          Intercept7  Intercept9
## Intercept1 1.708752e-05 1.250645e-05
## Intercept2 1.084870e-05 1.548778e-05
## Intercept4 1.236779e-04 1.349123e-04
## Intercept5 2.949793e-05 3.012233e-05
## Intercept7 2.263821e-03 1.445539e-04
## Intercept9 1.445539e-04 1.813785e-03

## Fit a one-factor CFA model on the new data
model <- "f =~ A + C + ES + I"

## Make sure that the model follows the order of "A" "C" "ES" "I"; otherwise, the results are incorrect
RAM <- lavaan2RAM(model, obs.variables = var.names[var.to.keep])
RAM

## $A
##   A  C  ES  I  f
## A "0" "0" "0" "0" "0*AONf"
## C "0" "0" "0" "0" "0*CONf"
## ES "0" "0" "0" "0" "0*ESONf"
## I "0" "0" "0" "0" "0*IONf"
## f "0" "0" "0" "0" "0"
##
## $S
##   A          C          ES          I          f
## A "0*AWITHA" "0"          "0"          "0"          "0"
## C "0"          "0*CWITHC" "0"          "0"          "0"
## ES "0"          "0"          "0*ESWITHE" "0"          "0"
## I "0"          "0"          "0"          "0*IWITHI" "0"
## f "0"          "0"          "0"          "0"          "1"
##
## $F
##   A C ES I f
## A 1 0 0 0 0
## C 0 1 0 0 0
## ES 0 0 1 0 0
## I 0 0 0 1 0
##
## $M
##   A C ES I f
## 1 0 0 0 0 0

fit <- wls(Cov=Cov_new, aCov=aCov_new, n=n, RAM=RAM)
summary(fit)

##
## Call:
## wls(Cov = Cov_new, aCov = aCov_new, n = n, RAM = RAM)
##
## 95% confidence intervals: z statistic approximation
## Coefficients:
##      Estimate Std.Error  lbound  ubound z value Pr(>|z|)
## AONf  0.604942  0.054969  0.497204  0.712680 11.0051 < 2.2e-16 ***
## CONf  0.630667  0.057461  0.518046  0.743288 10.9756 < 2.2e-16 ***
## ESONf 0.697764  0.061112  0.577988  0.817541 11.4179 < 2.2e-16 ***
## IONf  0.243327  0.043160  0.158735  0.327918  5.6378 1.722e-08 ***

```

```

## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Goodness-of-fit indices:
##
##                                     Value
## Sample size                          4496.0000
## Chi-square of target model            2.4143
## DF of target model                    2.0000
## p value of target model                0.2991
## Number of constraints imposed on "Smatrix" 0.0000
## DF manually adjusted                  0.0000
## Chi-square of independence model      287.2054
## DF of independence model              6.0000
## RMSEA                                 0.0068
## RMSEA lower 95% CI                    0.0000
## RMSEA upper 95% CI                    0.0312
## SRMR                                  0.0278
## TLI                                   0.9956
## CFI                                   0.9985
## AIC                                   -1.5857
## BIC                                   -14.4076
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values indicate problems.)

```

```
plot(fit)
```

