

metaSEM with raw data

Arin Ayanian (modified by Mike Cheung)

4 May 2017

```
library(metaSEM)

s= read.csv("H.csv", head= TRUE)
s1=as.data.frame(na.omit(s))
H=cor(s1, use="complete.obs", method="pearson")
s= read.csv("R.csv", head= TRUE)
s2=as.data.frame(na.omit(s))
R=cor(s2, use="complete.obs", method="pearson")
s= read.csv("U.csv", head= TRUE)
s3=as.data.frame(na.omit(s))
U=cor(s3, use="complete.obs", method="pearson")
s= read.csv("T.csv", head= TRUE)
s4=as.data.frame(na.omit(s))
T=cor(s4, use="complete.obs", method="pearson")
v=c(115, 305, 136, 296)
corrlist <- list(H, R, U, T)
fixed1 <- tssem1(corrlist, v, method="FEM")
# fixed1 <- rerun(fixed1)
summary(fixed1)

##
## Call:
## tssem1FEM(my.df = my.df, n = n, cor.analysis = cor.analysis,
##   model.name = model.name, cluster = cluster, suppressWarnings = suppressWarnings,
##   silent = silent, run = run)
##
## Coefficients:
##           Estimate Std.Error z value Pr(>|z|)
## S[1,2]    0.147760  0.033934  4.3543 1.335e-05 ***
## S[1,3]    0.295782  0.031451  9.4045 < 2.2e-16 ***
## S[1,4]    0.100263  0.034330  2.9206 0.0034940 **
## S[1,5]    0.131974  0.033714  3.9145 9.058e-05 ***
## S[1,6]    0.216436  0.032698  6.6193 3.608e-11 ***
## S[1,7]    0.268443  0.032053  8.3750 < 2.2e-16 ***
## S[1,8]    0.376643  0.029601 12.7240 < 2.2e-16 ***
## S[1,9]    0.433077  0.027927 15.5076 < 2.2e-16 ***
## S[1,10]   0.439051  0.027696 15.8527 < 2.2e-16 ***
## S[2,3]    0.380689  0.029664 12.8334 < 2.2e-16 ***
## S[2,4]    0.427170  0.028137 15.1820 < 2.2e-16 ***
## S[2,5]   -0.058872  0.034930 -1.6854 0.0919120 .
## S[2,6]    0.163818  0.033910  4.8310 1.359e-06 ***
## S[2,7]    0.130616  0.034290  3.8091 0.0001395 ***
## S[2,8]    0.315251  0.031246 10.0893 < 2.2e-16 ***
## S[2,9]    0.348680  0.030441 11.4544 < 2.2e-16 ***
## S[2,10]   0.242994  0.032991  7.3655 1.765e-13 ***
## S[3,4]    0.376267  0.031013 12.1326 < 2.2e-16 ***
## S[3,5]    0.019953  0.034397  0.5801 0.5618506
```

```

## S[3,6] 0.245261 0.032351 7.5813 3.419e-14 ***
## S[3,7] 0.215738 0.033355 6.4678 9.942e-11 ***
## S[3,8] 0.384342 0.029615 12.9779 < 2.2e-16 ***
## S[3,9] 0.454370 0.027657 16.4285 < 2.2e-16 ***
## S[3,10] 0.425798 0.028556 14.9110 < 2.2e-16 ***
## S[4,5] -0.025787 0.034423 -0.7491 0.4537727
## S[4,6] 0.179169 0.033849 5.2932 1.202e-07 ***
## S[4,7] 0.084392 0.034256 2.4636 0.0137549 *
## S[4,8] 0.252432 0.032407 7.7893 6.661e-15 ***
## S[4,9] 0.258046 0.032924 7.8377 4.663e-15 ***
## S[4,10] 0.190140 0.035016 5.4301 5.633e-08 ***
## S[5,6] 0.425342 0.028202 15.0822 < 2.2e-16 ***
## S[5,7] 0.318530 0.031173 10.2181 < 2.2e-16 ***
## S[5,8] 0.155158 0.034190 4.5381 5.677e-06 ***
## S[5,9] 0.119101 0.034476 3.4546 0.0005511 ***
## S[5,10] 0.182926 0.033327 5.4888 4.046e-08 ***
## S[6,7] 0.427438 0.028255 15.1276 < 2.2e-16 ***
## S[6,8] 0.442620 0.027780 15.9330 < 2.2e-16 ***
## S[6,9] 0.377614 0.029666 12.7288 < 2.2e-16 ***
## S[6,10] 0.445277 0.027610 16.1274 < 2.2e-16 ***
## S[7,8] 0.462245 0.027438 16.8467 < 2.2e-16 ***
## S[7,9] 0.462782 0.027326 16.9354 < 2.2e-16 ***
## S[7,10] 0.405166 0.028980 13.9807 < 2.2e-16 ***
## S[8,9] 0.625527 0.021069 29.6890 < 2.2e-16 ***
## S[8,10] 0.581962 0.022835 25.4860 < 2.2e-16 ***
## S[9,10] 0.621379 0.021145 29.3859 < 2.2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Goodness-of-fit indices:
##
## Value
## Sample size 852.0000
## Chi-square of target model 591.2928
## DF of target model 135.0000
## p value of target model 0.0000
## Chi-square of independence model 3151.2053
## DF of independence model 180.0000
## RMSEA 0.1260
## RMSEA lower 95% CI 0.1159
## RMSEA upper 95% CI 0.1368
## SRMR 0.1543
## TLI 0.7952
## CFI 0.8464
## AIC 321.2928
## BIC -319.6313
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values may indicate problems.)
coef(fixed1)
## H L O F P C
## H 1.0000000 0.14776025 0.2957819 0.10026275 0.13197394 0.2164360
## L 0.1477603 1.00000000 0.3806891 0.42716961 -0.05887175 0.1638180
## O 0.2957819 0.38068910 1.0000000 0.37626749 0.01995350 0.2452606
## F 0.1002627 0.42716961 0.3762675 1.00000000 -0.02578736 0.1791691

```



```

"0*CovIF", 0, 0, "0.3*ErrVarP", "0*CovPC", "0*CovPE", "0*CovIP", 0, 0,
"0.3*ErrVarC", "0*CovCE", "0*CovIC", 0, 0, "0.3*ErrVarE", "0*CovIE", 0, 0,
"0.3*ErrVarI", 0, 0, "0.3*ErrVarM", 0, "0.3*ErrVarA"),
type="Symm", byrow=FALSE, as.mxMatrix=FALSE)
dimnames(S1) <- dimnames(corrlist[[1]])
S1

```

```

##   H   L           0           F           P
## H "1" "0"           "0"           "0"           "0"
## L "0" "0.3*ErrVarL" "0"           "0"           "0"
## O "0" "0"           "0.3*ErrVarO" "0"           "0"
## F "0" "0"           "0"           "0.3*ErrVarF" "0"
## P "0" "0"           "0"           "0"           "0.3*ErrVarP"
## C "0" "0"           "0"           "0"           "0*CovPC"
## E "0" "0"           "0"           "0"           "0*CovPE"
## I "0" "0"           "0*CovIO"      "0*CovIF"      "0*CovIP"
## M "0" "0"           "0"           "0"           "0"
## A "0" "0"           "0"           "0"           "0"
##   C           E           I           M           A
## H "0"           "0"           "0"           "0"           "0"
## L "0"           "0"           "0"           "0"           "0"
## O "0"           "0"           "0*CovIO"      "0"           "0"
## F "0"           "0"           "0*CovIF"      "0"           "0"
## P "0*CovPC"      "0*CovPE"      "0*CovIP"      "0"           "0"
## C "0.3*ErrVarC"  "0*CovCE"      "0*CovIC"      "0"           "0"
## E "0*CovCE"      "0.3*ErrVarE"  "0*CovIE"      "0"           "0"
## I "0*CovIC"      "0*CovIE"      "0.3*ErrVarI"  "0"           "0"
## M "0"           "0"           "0"           "0.3*ErrVarM" "0"
## A "0"           "0"           "0"           "0"           "0.3*ErrVarA"

```

```

fixed2 <- tssem2(fixed1, Amatrix=A1, Smatrix=S1, intervals.type="LB", diag.constraints=TRUE,
  mx.algebras=list(LRA=mxAlgebra(L2O*O2A+L2F*F2A+L2P*P2A+L2C*C2A+L2E*E2A+L2I*I2A+L2M*M2A,
    name="LRA"),
    OMA=mxAlgebra(O2M*M2A, name="OMA"),
    FMA=mxAlgebra(F2M*M2A, name="FMA"),
    PMA=mxAlgebra(P2M*M2A, name="PMA"),
    CMA=mxAlgebra(C2M*M2A, name="CMA"),
    EMA=mxAlgebra(E2M*M2A, name="EMA"),
    IMA=mxAlgebra(I2M*M2A, name="IMA"),
    LOA=mxAlgebra(L2O*O2A, name="LOA"),
    LFA=mxAlgebra(L2F*F2A, name="LFA"),
    LPA=mxAlgebra(L2P*P2A, name="LPA"),
    LCA=mxAlgebra(L2C*C2A, name="LCA"),
    LEA=mxAlgebra(L2E*E2A, name="LEA"),
    LIA=mxAlgebra(L2I*I2A, name="LIA"),
    LMA=mxAlgebra(L2M*M2A, name="LMA")))
# fixed2 <- rerun(fixed2)
summary(fixed2)

```

```

##
## Call:
## wls(Cov = coef.tssem1FEM(tssem1.obj), asyCov = vcov.tssem1FEM(tssem1.obj),
##     n = sum(tssem1.obj$n), Amatrix = Amatrix, Smatrix = Smatrix,
##     Fmatrix = Fmatrix, diag.constraints = diag.constraints, cor.analysis = tssem1.obj$cor.analysis,
##     intervals.type = intervals.type, mx.algebras = mx.algebras,

```

```

##      model.name = model.name, suppressWarnings = suppressWarnings,
##      silent = silent, run = run)
##
## 95% confidence intervals: Likelihood-based statistic
## Coefficients:
##      Estimate Std.Error   lbound   ubound z value Pr(>|z|)
## C2A      0.161884      NA        NA        NA        NA        NA
## E2A      0.030862      NA        NA        NA        NA        NA
## F2A     -0.035959      NA        NA        NA        NA        NA
## H2A      0.153391      NA        NA        NA        NA        NA
## I2A      0.211682      NA        NA        NA        NA        NA
## L2A     -0.013761      NA        NA        NA        NA        NA
## M2A      0.301588      NA        NA        NA        NA        NA
## O2A      0.128477      NA        NA        NA        NA        NA
## P2A      0.011136      NA        NA        NA        NA        NA
## H2C      0.211369      NA        NA        NA        NA        NA
## L2C      0.163565      NA        NA        NA        NA        NA
## H2E      0.265540      NA        NA        NA        NA        NA
## L2E      0.109065      NA        NA        NA        NA        NA
## H2F      0.045861      NA        NA        NA        NA        NA
## L2F      0.477737      NA        NA        NA        NA        NA
## H2I      0.348997      NA        NA        NA        NA        NA
## L2I      0.290576      NA        NA        NA        NA        NA
## H2L      0.160343      NA    0.093734    0.226944    NA        NA
## C2M      0.058503      NA        NA        NA        NA        NA
## E2M      0.189861      NA        NA        NA        NA        NA
## F2M      0.013464      NA        NA        NA        NA        NA
## H2M      0.178392      NA        NA        NA        NA        NA
## I2M      0.349452      NA        NA        NA        NA        NA
## L2M      0.110028      NA        NA        NA        NA        NA
## O2M      0.163411      NA        NA        NA        NA        NA
## P2M     -0.040965      NA        NA        NA        NA        NA
## H2O      0.270103      NA    0.200358    NA        NA        NA
## L2O      0.403582      NA        NA        NA        NA        NA
## H2P      0.147421      NA        NA        NA        NA        NA
## L2P     -0.078224      NA        NA        NA        NA        NA
## ErrVarA  0.495130      NA        NA        NA        NA        NA
## ErrVarC  0.917483      NA        NA        NA        NA        NA
## CovPC    0.417204      NA        NA        NA        NA        NA
## CovCE    0.339423      NA        NA        NA        NA        NA
## ErrVarE  0.908306      NA        NA        NA        NA        NA
## CovPE    0.293543      NA        NA        NA        NA        NA
## ErrVarF  0.762638      NA        NA        NA        NA        NA
## CovIC    0.291108      NA        NA        NA        NA        NA
## CovIE    0.312678      NA        NA        NA        NA        NA
## CovIF    0.044819      NA        NA        NA        NA        NA
## ErrVarI  0.761246      NA        NA        NA        NA        NA
## CovIO    0.101944      NA        NA        NA        NA        NA
## CovIP    0.128317      NA        NA        NA        NA        NA
## ErrVarL  0.974290      NA        NA        NA        NA        NA
## ErrVarM  0.483998      NA        NA        NA        NA        NA
## ErrVarO  0.729209      NA        NA        NA        NA        NA
## ErrVarP  0.975846      NA        NA        NA        NA        NA
##

```

```

## mxAlgebras objects (and their 95% likelihood-based CIs):
##           lbound      Estimate ubound
## LRA[1,1]    NA  0.1583388181    NA
## OMA[1,1]    NA  0.0492828839    NA
## FMA[1,1]    NA  0.0040605077    NA
## PMA[1,1]    NA -0.0004561734    NA
## CMA[1,1]    NA  0.0094707009    NA
## EMA[1,1]    NA  0.0572599684    NA
## IMA[1,1]    NA  0.1053907490    NA
## LOA[1,1]    NA  0.0518511329    NA
## LFA[1,1]    NA -0.0171789602    NA
## LPA[1,1]    NA -0.0008710835    NA
## LCA[1,1]    NA  0.0264786233    NA
## LEA[1,1]    NA  0.0033659446    NA
## LIA[1,1]    NA  0.0615099171    NA
## LMA[1,1]    NA  0.0331832440    NA
##
## Goodness-of-fit indices:
##                                     Value
## Sample size                          852.0000
## Chi-square of target model            79.8199
## DF of target model                     7.0000
## p value of target model                0.0000
## Number of constraints imposed on "Smatrix" 9.0000
## DF manually adjusted                  0.0000
## Chi-square of independence model      2283.2090
## DF of independence model              45.0000
## RMSEA                                 0.1106
## RMSEA lower 95% CI                    0.0895
## RMSEA upper 95% CI                    0.1330
## SRMR                                  0.0388
## TLI                                   0.7908
## CFI                                   0.9675
## AIC                                   65.8199
## BIC                                   32.5868
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values indicate problems.)

```

```

s= read.csv("H.csv", head= TRUE)
s1=as.data.frame(na.omit(s))
H=cor(s1, use="complete.obs", method="pearson")
s= read.csv("R.csv", head= TRUE)
s2=as.data.frame(na.omit(s))
R=cor(s2, use="complete.obs", method="pearson")
s= read.csv("U.csv", head= TRUE)
s3=as.data.frame(na.omit(s))
U=cor(s3, use="complete.obs", method="pearson")
s= read.csv("T.csv", head= TRUE)
s4=as.data.frame(na.omit(s))
T=cor(s4, use="complete.obs", method="pearson")
v=c(115, 305, 136, 296)
corrlist <- list(H, R, U, T)
fixed1 <- tssem1(corrlist, v, method="FEM")
# fixed1 <- rerun(fixed1)

```

```
summary(fixed1)
```

```
##
## Call:
## tssem1FEM(my.df = my.df, n = n, cor.analysis = cor.analysis,
##   model.name = model.name, cluster = cluster, suppressWarnings = suppressWarnings,
##   silent = silent, run = run)
##
## Coefficients:
##           Estimate Std. Error z value Pr(>|z|)
## S[1,2]  0.147760  0.033934  4.3543 1.335e-05 ***
## S[1,3]  0.295782  0.031451  9.4045 < 2.2e-16 ***
## S[1,4]  0.100263  0.034330  2.9206 0.0034940 **
## S[1,5]  0.131974  0.033714  3.9145 9.058e-05 ***
## S[1,6]  0.216436  0.032698  6.6193 3.608e-11 ***
## S[1,7]  0.268443  0.032053  8.3750 < 2.2e-16 ***
## S[1,8]  0.376643  0.029601 12.7240 < 2.2e-16 ***
## S[1,9]  0.433077  0.027927 15.5076 < 2.2e-16 ***
## S[1,10] 0.439051  0.027696 15.8527 < 2.2e-16 ***
## S[2,3]  0.380689  0.029664 12.8334 < 2.2e-16 ***
## S[2,4]  0.427170  0.028137 15.1820 < 2.2e-16 ***
## S[2,5] -0.058872  0.034930 -1.6854 0.0919120 .
## S[2,6]  0.163818  0.033910  4.8310 1.359e-06 ***
## S[2,7]  0.130616  0.034290  3.8091 0.0001395 ***
## S[2,8]  0.315251  0.031246 10.0893 < 2.2e-16 ***
## S[2,9]  0.348680  0.030441 11.4544 < 2.2e-16 ***
## S[2,10] 0.242994  0.032991  7.3655 1.765e-13 ***
## S[3,4]  0.376267  0.031013 12.1326 < 2.2e-16 ***
## S[3,5]  0.019953  0.034397  0.5801 0.5618506
## S[3,6]  0.245261  0.032351  7.5813 3.419e-14 ***
## S[3,7]  0.215738  0.033355  6.4678 9.942e-11 ***
## S[3,8]  0.384342  0.029615 12.9779 < 2.2e-16 ***
## S[3,9]  0.454370  0.027657 16.4285 < 2.2e-16 ***
## S[3,10] 0.425798  0.028556 14.9110 < 2.2e-16 ***
## S[4,5] -0.025787  0.034423 -0.7491 0.4537727
## S[4,6]  0.179169  0.033849  5.2932 1.202e-07 ***
## S[4,7]  0.084392  0.034256  2.4636 0.0137549 *
## S[4,8]  0.252432  0.032407  7.7893 6.661e-15 ***
## S[4,9]  0.258046  0.032924  7.8377 4.663e-15 ***
## S[4,10] 0.190140  0.035016  5.4301 5.633e-08 ***
## S[5,6]  0.425342  0.028202 15.0822 < 2.2e-16 ***
## S[5,7]  0.318530  0.031173 10.2181 < 2.2e-16 ***
## S[5,8]  0.155158  0.034190  4.5381 5.677e-06 ***
## S[5,9]  0.119101  0.034476  3.4546 0.0005511 ***
## S[5,10] 0.182926  0.033327  5.4888 4.046e-08 ***
## S[6,7]  0.427438  0.028255 15.1276 < 2.2e-16 ***
## S[6,8]  0.442620  0.027780 15.9330 < 2.2e-16 ***
## S[6,9]  0.377614  0.029666 12.7288 < 2.2e-16 ***
## S[6,10] 0.445277  0.027610 16.1274 < 2.2e-16 ***
## S[7,8]  0.462245  0.027438 16.8467 < 2.2e-16 ***
## S[7,9]  0.462782  0.027326 16.9354 < 2.2e-16 ***
## S[7,10] 0.405166  0.028980 13.9807 < 2.2e-16 ***
## S[8,9]  0.625527  0.021069 29.6890 < 2.2e-16 ***
## S[8,10] 0.581962  0.022835 25.4860 < 2.2e-16 ***
```

```

## S[9,10] 0.621379 0.021145 29.3859 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Goodness-of-fit indices:
##
##                               Value
## Sample size                   852.0000
## Chi-square of target model    591.2928
## DF of target model           135.0000
## p value of target model      0.0000
## Chi-square of independence model 3151.2053
## DF of independence model     180.0000
## RMSEA                        0.1260
## RMSEA lower 95% CI          0.1159
## RMSEA upper 95% CI         0.1368
## SRMR                        0.1543
## TLI                         0.7952
## CFI                         0.8464
## AIC                         321.2928
## BIC                        -319.6313
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values may indicate problems.)

A1 <- create.mxMatrix(c(0, ".1*H2L", ".1*H2O", "0*H2F", "0*H2P", "0*H2C", "0*H2E", ".1*H2I",
".1*H2M", ".1*H2A", 0, 0, ".1*L2O", ".1*L2F", "0*L2P", ".1*L2C",
".1*L2E", ".1*L2I", ".1*L2M", "-.1*L2A", 0, 0, 0, 0, 0, 0, 0, 0, 0,
".1*O2M", ".1*O2A", 0, 0, 0, 0, 0, 0, 0, 0, "-.1*F2M", "-.1*F2A", 0, 0, 0, 0, 0, 0, 0, 0,
".1*P2M", ".1*P2A", 0, 0, 0, 0, 0, 0, 0, 0, 0,
".1*C2M", ".1*C2A", 0, 0, 0, 0, 0, 0, 0, 0, ".1*E2M", ".1*E2A",
0, 0, 0, 0, 0, 0, 0, 0, ".1*I2M", ".1*I2A", 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
".1*M2A", 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0),
type="Full", ncol=10, nrow=10, as.mxMatrix=FALSE)
dimnames(A1) <- dimnames(corrlist[[1]])
S1 <- create.mxMatrix(c(1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, "0.3*ErrVarL", 0, 0, 0, 0, 0, 0, 0, 0, 0,
"0.3*ErrVarO", 0, 0, 0, 0, "0*CovIO", 0, 0, "0.3*ErrVarF", 0, 0, 0,
"0*CovIF", 0, 0, "0.3*ErrVarP", "0*CovPC", "0*CovPE", "0*CovIP", 0, 0,
"0.3*ErrVarC", "0*CovCE", "0*CovIC", 0, 0, "0.3*ErrVarE", "0*CovIE", 0, 0,
"0.3*ErrVarI", 0, 0, "0.3*ErrVarM", 0, "0.3*ErrVarA"),
type="Symm", byrow=FALSE, as.mxMatrix=FALSE)
dimnames(S1) <- dimnames(corrlist[[1]])
fixed2 <- tssem2(fixed1, Amatrix=A1, Smatrix=S1, intervals.type="LB", diag.constraints=TRUE,
mx.algebras=list(LRA=mxAlgebra(L2O*O2A+L2F*F2A+L2P*P2A+L2C*C2A+L2E*E2A+
L2I*I2A+L2M*M2A, name="LRA"),
OMA=mxAlgebra(O2M*M2A, name="OMA"),
FMA=mxAlgebra(F2M*M2A, name="FMA"),
PMA=mxAlgebra(P2M*P2A, name="PMA"),
CMA=mxAlgebra(C2M*C2A, name="CMA"),
EMA=mxAlgebra(E2M*M2A, name="EMA"),
IMA=mxAlgebra(I2M*M2A, name="IMA"),
LOA=mxAlgebra(L2O*O2A, name="LOA"),
LFA=mxAlgebra(L2F*F2A, name="LFA"),
LPA=mxAlgebra(L2P*P2A, name="LPA"),
LCA=mxAlgebra(L2C*C2A, name="LCA"),
LEA=mxAlgebra(L2E*E2A, name="LEA"),

```



```

LIA=mxAlgebra(L2I*I2A, name="LIA"),
LMA=mxAlgebra(L2M*M2A, name="LMA"))
# fixed2 <- rerun(fixed2)
summary(fixed2)

##
## Call:
## wls(Cov = coef.tssem1FEM(tssem1.obj), asyCov = vcov.tssem1FEM(tssem1.obj),
##     n = sum(tssem1.obj$n), Amatrix = Amatrix, Smatrix = Smatrix,
##     Fmatrix = Fmatrix, diag.constraints = diag.constraints, cor.analysis = tssem1.obj$cor.analysis,
##     intervals.type = intervals.type, mx.algebras = mx.algebras,
##     model.name = model.name, suppressWarnings = suppressWarnings,
##     silent = silent, run = run)
##
## 95% confidence intervals: Likelihood-based statistic
## Coefficients:
##      Estimate Std. Error   lbound   ubound z value Pr(>|z|)
## C2A      0.161884      NA      NA      NA      NA      NA
## E2A      0.030862      NA      NA      NA      NA      NA
## F2A     -0.035959      NA      NA      NA      NA      NA
## H2A      0.153391      NA      NA      NA      NA      NA
## I2A      0.211682      NA      NA      NA      NA      NA
## L2A     -0.013761      NA      NA      NA      NA      NA
## M2A      0.301588      NA      NA      NA      NA      NA
## O2A      0.128477      NA      NA      NA      NA      NA
## P2A      0.011136      NA      NA      NA      NA      NA
## H2C      0.211369      NA      NA      NA      NA      NA
## L2C      0.163565      NA      NA      NA      NA      NA
## H2E      0.265540      NA      NA      NA      NA      NA
## L2E      0.109065      NA      NA      NA      NA      NA
## H2F      0.045861      NA      NA      NA      NA      NA
## L2F      0.477737      NA      NA      NA      NA      NA
## H2I      0.348997      NA      NA      NA      NA      NA
## L2I      0.290576      NA      NA      NA      NA      NA
## H2L      0.160343      NA  0.093734  0.226944  NA      NA
## C2M      0.058503      NA      NA      NA      NA      NA
## E2M      0.189861      NA      NA      NA      NA      NA
## F2M      0.013464      NA      NA      NA      NA      NA
## H2M      0.178392      NA      NA      NA      NA      NA
## I2M      0.349452      NA      NA      NA      NA      NA
## L2M      0.110028      NA      NA      NA      NA      NA
## O2M      0.163411      NA      NA      NA      NA      NA
## P2M     -0.040965      NA      NA      NA      NA      NA
## H2O      0.270103      NA  0.200358  NA      NA      NA
## L2O      0.403582      NA      NA      NA      NA      NA
## H2P      0.147421      NA      NA      NA      NA      NA
## L2P     -0.078224      NA      NA      NA      NA      NA
## ErrVarA  0.495130      NA      NA      NA      NA      NA
## ErrVarC  0.917483      NA      NA      NA      NA      NA
## CovPC    0.417204      NA      NA      NA      NA      NA
## CovCE    0.339423      NA      NA      NA      NA      NA
## ErrVarE  0.908306      NA      NA      NA      NA      NA
## CovPE    0.293543      NA      NA      NA      NA      NA
## ErrVarF  0.762638      NA      NA      NA      NA      NA

```

```

## CovIC      0.291108      NA      NA      NA      NA      NA
## CovIE      0.312678      NA      NA      NA      NA      NA
## CovIF      0.044819      NA      NA      NA      NA      NA
## ErrVarI    0.761246      NA      NA      NA      NA      NA
## CovIO      0.101944      NA      NA      NA      NA      NA
## CovIP      0.128317      NA      NA      NA      NA      NA
## ErrVarL    0.974290      NA      NA      NA      NA      NA
## ErrVarM    0.483998      NA      NA      NA      NA      NA
## ErrVarO    0.729209      NA      NA      NA      NA      NA
## ErrVarP    0.975846      NA      NA      NA      NA      NA
##
## mxAlgebras objects (and their 95% likelihood-based CIs):
##          lbound      Estimate ubound
## LRA[1,1]      NA  0.1583388181      NA
## OMA[1,1]      NA  0.0492828839      NA
## FMA[1,1]      NA  0.0040605077      NA
## PMA[1,1]      NA -0.0004561734      NA
## CMA[1,1]      NA  0.0094707009      NA
## EMA[1,1]      NA  0.0572599684      NA
## IMA[1,1]      NA  0.1053907490      NA
## LOA[1,1]      NA  0.0518511329      NA
## LFA[1,1]      NA -0.0171789602      NA
## LPA[1,1]      NA -0.0008710835      NA
## LCA[1,1]      NA  0.0264786233      NA
## LEA[1,1]      NA  0.0033659446      NA
## LIA[1,1]      NA  0.0615099171      NA
## LMA[1,1]      NA  0.0331832440      NA
##
## Goodness-of-fit indices:
##                                     Value
## Sample size                        852.0000
## Chi-square of target model          79.8199
## DF of target model                   7.0000
## p value of target model              0.0000
## Number of constraints imposed on "Smatrix"  9.0000
## DF manually adjusted                 0.0000
## Chi-square of independence model     2283.2090
## DF of independence model             45.0000
## RMSEA                               0.1106
## RMSEA lower 95% CI                   0.0895
## RMSEA upper 95% CI                   0.1330
## SRMR                                 0.0388
## TLI                                  0.7908
## CFI                                  0.9675
## AIC                                  65.8199
## BIC                                  32.5868
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.
## Other values indicate problems.)

```