**Robust Evidence for the Simple View of Second Language Reading:**

**Secondary Meta-Analysis of Jeon and Yamashita (2022)**

**Supplementary Material 3: Statistical Outputs**

## R Packages

library(meta)

library(metafor)

library(effectsize)

library(metaSEM)

library(openxlsx)  
library(lavaan)

library(psych)

options(digits = 6)

# Replication

## Data Frame

dataset <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 1) # read sheet No.1  
head(dataset)

## ES Calculation

dL2D <- na.omit(dataset[, c(1, 2, 3)]) # L2 Decoding  
L2D <- metacor(cor = L2R\_L2D,  
 n = N,  
 studlab = Study,  
 data = dL2D,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)

dL2V <- na.omit(dataset[, c(1, 2, 4)]) # L2 Vocabulary Knowledge  
L2V <- metacor(cor = L2R\_L2V,  
 n = N,  
 studlab = Study,  
 data = dL2V,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)  
  
dL2G <- na.omit(dataset[, c(1, 2, 5)]) # L2 Grammar Knowledge  
L2G <- metacor(cor = L2R\_L2G,  
 n = N,  
 studlab = Study,  
 data = dL2G,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)  
  
dL1R <- na.omit(dataset[, c(1, 2, 6)]) # L1 Reading Comprehension  
L1R <- metacor(cor = L2R\_L1R,  
 n = N,  
 studlab = Study,  
 data = dL1R,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)

dL2P <- na.omit(dataset[, c(1, 2, 7)]) # L2 Phonological Awareness  
L2P <- metacor(cor = L2R\_L2P,  
 n = N,  
 studlab = Study,  
 data = dL2P,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)  
  
dL2O <- na.omit(dataset[, c(1, 2, 8)]) # L2 Orthographic Knowledge  
L2O <- metacor(cor = L2R\_L2O,  
 n = N,  
 studlab = Study,  
 data = dL2O,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)  
  
dL2M <- na.omit(dataset[, c(1, 2, 9)]) # L2 Morphological Knowledge  
L2M <- metacor(cor = L2R\_L2M,  
 n = N,  
 studlab = Study,  
 data = dL2M,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)

dL2L <- na.omit(dataset[, c(1, 2, 10)]) # L2 Listening Comprehension  
L2L <- metacor(cor = L2R\_L2L,  
 n = N,  
 studlab = Study,  
 data = dL2L,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)

dWM <- na.omit(dataset[, c(1, 2, 11)]) # Working Memory  
WM <- metacor(cor = L2R\_WM,  
 n = N,  
 studlab = Study,  
 data = dWM,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)  
  
dMet <- na.omit(dataset[, c(1, 2, 12)]) # Metacognition  
Met <- metacor(cor = L2R\_Meta,  
 n = N,  
 studlab = Study,  
 data = dMet,  
 sm = "COR",  
 fixed = FALSE,  
 random = TRUE,  
 method.tau = "REML",  
 hakn = TRUE)

# Table 1  
t1 <- data.frame(k = c(L2D$k.study, L2P$k.study, L2O$k.study, L2M$k.study, L2V$k.study,  
 L2G$k.study, L1R$k.study, L2L$k.study, WM$k.study, Met$k.study),  
 ES = c(L2D$TE.random, L2P$TE.random, L2O$TE.random, L2M$TE.random, L2V$TE.random,  
 L2G$TE.random, L1R$TE.random, L2L$TE.random, WM$TE.random, Met$TE.random),  
 CI\_Lower = c(L2D$lower.random, L2P$lower.random, L2O$lower.random, L2M$lower.random, L2V$lower.random,  
 L2G$lower.random, L1R$lower.random, L2L$lower.random, WM$lower.random, Met$lower.random),  
 CI\_upper = c(L2D$upper.random, L2P$upper.random, L2O$upper.random, L2M$upper.random, L2V$upper.random,  
 L2G$upper.random, L1R$upper.random, L2L$upper.random, WM$upper.random, Met$upper.random))  
rownames(t1) <- c("L2D", "L2P", "L2O", "L2M", "L2V", "L2G", "L1R", "L2L", "WM", "Meta")  
print(t1)

## k ES CI\_Lower CI\_upper  
## L2D 37 0.571699 0.502751 0.640648  
## L2P 18 0.475642 0.373064 0.578220  
## L2O 6 0.566343 0.326957 0.805728  
## L2M 10 0.527974 0.408676 0.647273  
## L2V 58 0.574154 0.525308 0.623000  
## L2G 33 0.596792 0.512247 0.681337  
## L1R 38 0.388494 0.314981 0.462006  
## L2L 20 0.619393 0.526499 0.712288  
## WM 20 0.310927 0.201837 0.420018  
## Meta 10 0.314751 0.101326 0.528176

## ES Comparisons

esL2D <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(1, 2))  
esL2V <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(3, 4))  
esL2G <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(5, 6))  
esL1R <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(7, 8))  
esL2P <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(9, 10))  
esL2O <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(11, 12))  
esL2M <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(13, 14))  
esL2L <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(15, 16))  
esWM <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(17, 18))  
esMeta <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 2, cols = c(19, 20))

esL2D.r <- t.test(ES ~ L2D, data = esL2D, paired = F)  
esL2V.r <- t.test(ES ~ L2V, data = esL2V, paired = F)  
esL2G.r <- t.test(ES ~ L2G, data = esL2G, paired = F)  
esL1R.r <- t.test(ES ~ L1R, data = esL1R, paired = F)  
esL2P.r <- t.test(ES ~ L2P, data = esL2P, paired = F)  
esL2O.r <- t.test(ES ~ L2O, data = esL2O, paired = F)  
esL2M.r <- t.test(ES ~ L2M, data = esL2M, paired = F)  
esL2L.r <- t.test(ES ~ L2L, data = esL2L, paired = F)  
esWM.r <- t.test(ES ~ WM, data = esWM, paired = F)  
esMeta.r <- t.test(ES ~ Meta, data = esMeta, paired = F)  
  
# Table 1 (Continue)  
t1 <- data.frame(t = c(esL2D.r$statistic, esL2P.r$statistic, esL2O.r$statistic, esL2M.r$statistic, esL2V.r$statistic,  
 esL2G.r$statistic, esL1R.r$statistic, esL2L.r$statistic, esWM.r$statistic, esMeta.r$statistic),  
 df = c(esL2D.r$parameter, esL2P.r$parameter, esL2O.r$parameter, esL2M.r$parameter, esL2V.r$parameter,  
 esL2G.r$parameter, esL1R.r$parameter, esL2L.r$parameter, esWM.r$parameter, esMeta.r$parameter),  
 p = c(esL2D.r$p.value, esL2P.r$p.value, esL2O.r$p.value, esL2M.r$p.value, esL2V.r$p.value,  
 esL2G.r$p.value, esL1R.r$p.value, esL2L.r$p.value, esWM.r$p.value, esMeta.r$p.value),  
 d = c(cohens\_d(ES ~ L2D, data = esL2D)$Cohens\_d, cohens\_d(ES ~ L2P, data = esL2P)$Cohens\_d,

cohens\_d(ES ~ L2O, data = esL2O)$Cohens\_d, cohens\_d(ES ~ L2M, data = esL2M)$Cohens\_d,

cohens\_d(ES ~ L2V, data = esL2V)$Cohens\_d, cohens\_d(ES ~ L2G, data = esL2G)$Cohens\_d,

cohens\_d(ES ~ L1R, data = esL1R)$Cohens\_d, cohens\_d(ES ~ L2L, data = esL2L)$Cohens\_d,

cohens\_d(ES ~ WM, data = esWM)$Cohens\_d, cohens\_d(ES ~ Meta, data = esMeta)$Cohens\_d))  
rownames(t1) <- c("L2D", "L2P", "L2O", "L2M", "L2V", "L2G", "L1R", "L2L", "WM", "Meta")  
print(t1, digits = 2)

## t df p d  
## L2D -0.289 59 0.7738 -0.0717  
## L2P -2.241 37 0.0311 -0.7168  
## L2O -0.380 10 0.7116 -0.2196  
## L2M -2.277 20 0.0341 -0.9422  
## L2V -3.319 95 0.0013 -0.6450  
## L2G -1.025 48 0.3104 -0.2752  
## L1R -2.104 68 0.0391 -0.4985  
## L2L -1.742 34 0.0905 -0.5509  
## WM -0.964 37 0.3411 -0.3087  
## Meta 0.011 19 0.9914 0.0047

## Forest Plots (see Supplemental Material 5)

# L2 Decoding  
pL2D <- forest(L2D,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L2D$TE)

# L2 Phonological Awareness  
pL2P <- forest(L2P,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L2P$cor)

# L2 Orthographic Knowledge  
pL2O <- forest(L2O,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L2O$cor)

# L2 Morphological Knowledge  
pL2M <- forest(L2M,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L2M$cor)

# L2 Vocabulary Knowledge  
pL2V <- forest(L2V,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L2V$cor)

# L2 Grammar Knowledge  
pL2G <- forest(L2G,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L2G$cor)

# L1 Reading Comprehension  
pL1R <- forest(L1R,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L1R$cor)

# L2 Listening Comprehension  
pL2L <- forest(L2L,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = L2L$cor)

# Working Memory  
pWM <- forest(WM,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = WM$cor)

# Metacognition  
pMet <- forest(Met,  
 slab = paste(dataset$Study),  
 xlab = "Effect size [r]",  
 mlab = "",  
 pch = 18,  
 cex = 0.5,  
 sortvar = Met$cor)

# Secondary Analysis

## MASEM

dataset2 <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 3) # read sheet No.3  
head(dataset2)

# make list of correlation matrices (cordat), NA on diagonal  
nvar2 <- 28  
varnames2 <- c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L")  
labels2 <- list(varnames2, varnames2)  
cordat2 <- list()  
for (i in 1:nrow(dataset2)){   
 cordat2[[i]] <- vec2symMat(as.matrix(dataset2[i, 3:30]), diag = FALSE)  
 dimnames(cordat2[[i]]) <- labels2  
}  
head(cordat2)

# Table 3  
pattern.na(cordat2, show.na = FALSE)

## L2R L2DA L2DF L2V L2G L2P L2M L2L  
## L2R 78 30 19 60 33 20 11 21  
## L2DA 30 78 9 23 6 16 9 8  
## L2DF 19 9 78 12 6 5 3 4  
## L2V 60 23 12 78 29 12 9 16  
## L2G 33 6 6 29 78 3 3 12  
## L2P 20 16 5 12 3 78 5 3  
## L2M 11 9 3 9 3 5 78 3  
## L2L 21 8 4 16 12 3 3 78

### MASEM Stage 1

# Create Pooled Correlations  
S1 <- tssem1(Cov = cordat2, n = dataset2$N, method = "REM", RE.type = "Diag", acov = "weighted")  
S1 <- rerun(S1, autofixtau2 = TRUE)

# Extract the fixed coefficients (correlations)  
REs1 <- coef(S1, "fixed")  
REs1.mat <- vec2symMat(REs1, diag = FALSE)  
  
# Table 3  
dimnames(REs1.mat)[[1]] <- c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L")  
dimnames(REs1.mat)[[2]] <- c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L")  
round(REs1.mat, 2)

## L2R L2DA L2DF L2V L2G L2P L2M L2L  
## L2R 1.00 0.56 0.46 0.51 0.52 0.46 0.49 0.56  
## L2DA 0.56 1.00 0.63 0.49 0.56 0.53 0.56 0.42  
## L2DF 0.46 0.63 1.00 0.36 0.35 0.42 0.34 0.30  
## L2V 0.51 0.49 0.36 1.00 0.53 0.43 0.53 0.52  
## L2G 0.52 0.56 0.35 0.53 1.00 0.39 0.58 0.48  
## L2P 0.46 0.53 0.42 0.43 0.39 1.00 0.46 0.37  
## L2M 0.49 0.56 0.34 0.53 0.58 0.46 1.00 0.52  
## L2L 0.56 0.42 0.30 0.52 0.48 0.37 0.52 1.00

### MASEM Stage 2

## Specify the model  
# Model A  
ModelA <-   
 'Comprehension =~ L2L + L2V + L2G  
 Decoding =~ L2DA + L2DF  
 Meta =~ L2P + L2M  
 L2R ~ Comprehension + Decoding  
 Comprehension ~~ Meta  
 Decoding ~ Meta  
 Comprehension ~~ Decoding'  
RAM1 <- lavaan2RAM(ModelA, obs.variables = c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L"),  
 A.notation = "on", S.notation = "with")  
  
# Model B  
ModelB <-   
 'Comprehension =~ L2L + L2V + L2G  
 Decoding =~ L2DA + L2DF  
 Meta =~ L2P + L2M  
 L2R ~ Comprehension + Decoding + Meta  
 Comprehension ~~ Meta  
 Decoding ~ Meta  
 Comprehension ~~ Decoding'  
RAM2 <- lavaan2RAM(ModelB, obs.variables = c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L"),  
 A.notation = "on", S.notation = "with")  
  
# Model C  
ModelC <- # Lee et al.'s model  
 'Comprehension =~ L2L + L2V + L2G  
 Decoding =~ L2DA + L2DF  
 Meta =~ L2P + L2M  
 L2R ~ Comprehension + Decoding  
 Comprehension ~~ 0 \* Meta  
 Decoding ~ 0 \* Meta  
 Comprehension ~~ Decoding'  
RAM3 <- lavaan2RAM(ModelC, obs.variables = c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L"),  
 A.notation = "on", S.notation = "with")  
  
## Model fitting  
REA <- tssem2(S1,  
 RAM = RAM1,  
 intervals = "z",  
 diag.constraints = FALSE,  
 model.name = "Model A")

REA <- rerun(REA, autofixtau2 = TRUE)

REB <- tssem2(S1,  
 RAM = RAM2,  
 intervals = "z",  
 diag.constraints = FALSE,  
 model.name = "Model B")

REB <- rerun(REB, autofixtau2 = TRUE, extraTries = 100)

REC <- tssem2(S1,  
 RAM = RAM3,  
 intervals = "z",  
 diag.constraints = FALSE,  
 model.name = "Model C")  
REC <- rerun(REC, autofixtau2 = TRUE)

## Model Comparison  
anova(REB, REA)

## base comparison ep minus2LL df AIC diffLL diffdf p

## 1 Model B <NA> 13 19.6398 -13 45.6398 NA NA NA

## 2 Model B Model A 12 22.1492 -12 46.1492 2.5094 1 0.113169

anova(REB, REC)

## base comparison ep minus2LL df AIC diffLL diffdf p

## 1 Model B <NA> 13 19.6398 -13 45.6398 NA NA NA

## 2 Model B Model C 10 1185.9485 -10 1205.9485 1166.31 3 1.49625e-252

anova(REA, REC)

## base comparison ep minus2LL df AIC diffLL diffdf p  
## 1 Model A <NA> 12 22.1492 -12 46.1492 NA NA NA  
## 2 Model A Model C 10 1185.9485 -10 1205.9485 1163.8 2 1.92396e-253

## Model Statistics  
summary(REA)

##   
## Call:  
## wls(Cov = pooledS, aCov = aCov, n = tssem1.obj$total.n, RAM = RAM,   
## Amatrix = Amatrix, Smatrix = Smatrix, Fmatrix = Fmatrix,   
## diag.constraints = diag.constraints, cor.analysis = cor.analysis,   
## intervals.type = intervals.type, mx.algebras = mx.algebras,   
## mxModel.Args = mxModel.Args, subset.variables = subset.variables,   
## 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|)  
## DecodingonMeta 0.86447 0.05058 0.76534 0.96359 17.092 < 2e-16\*\*\*  
## L2DAonDecoding 0.92904 0.03032 0.86961 0.98848 30.637 < 2e-16\*\*\*  
## L2DFonDecoding 0.67669 0.02620 0.62534 0.72804 25.829 < 2e-16\*\*\*  
## L2GonComprehension 0.75659 0.02319 0.71113 0.80205 32.620 < 2e-16\*\*\*  
## L2LonComprehension 0.68908 0.02668 0.63680 0.74137 25.830 < 2e-16\*\*\*  
## L2MonMeta 0.73679 0.03384 0.67047 0.80310 21.776 < 2e-16\*\*\*  
## L2PonMeta 0.65714 0.03787 0.58292 0.73136 17.353 < 2e-16\*\*\*  
## L2RonComprehension 0.58290 0.07755 0.43090 0.73490 7.516 5.64e-14\*\*\*  
## L2RonDecoding 0.17810 0.08347 0.01450 0.34170 2.134 0.0329\*  
## L2VonComprehension 0.71598 0.02285 0.67120 0.76076 31.339 < 2e-16\*\*\*  
## ComprehensionwithDecoding -0.11084 0.07270 -0.25333 0.03165 -1.525 0.1274  
## ComprehensionwithMeta 0.98930 0.04703 0.89712 1.08148 21.035 < 2e-16\*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## Goodness-of-fit indices:  
## Value  
## Sample size 12062.000  
## Chi-square of target model 22.149  
## DF of target model 16.000  
## p value of target model 0.138  
## Number of constraints imposed on "Smatrix" 0.000  
## DF manually adjusted 0.000  
## Chi-square of independence model 3347.084  
## DF of independence model 28.000  
## RMSEA 0.006  
## RMSEA lower 95% CI 0.000  
## RMSEA upper 95% CI 0.011  
## SRMR 0.043  
## TLI 0.997  
## CFI 0.998  
## AIC -9.851  
## BIC -128.216  
## OpenMx status1: 0 ("0" or "1": The optimization is considered fine.  
## Other values indicate problems.)

## Figure 3  
plot(REA)

### Publication Bias (see Supplemental Material 4)

# Correlations  
cor <- data.frame(dataset$Datapoints, dataset$N, dataset$IF)  
colnames(cor) <- c("Datapoints", "N", "IF")  
cor.test(cor$Datapoints, cor$IF)

##

## Pearson's product-moment correlation  
##   
## data: cor$Datapoints and cor$IF  
## t = -0.8192, df = 77, p-value = 0.415  
## alternative hypothesis: true correlation is not equal to 0  
## 95 percent confidence interval:  
## -0.307743 0.130842  
## sample estimates:  
## cor   
## -0.0929574

cor.test(cor$N, cor$IF)

##   
## Pearson's product-moment correlation  
##   
## data: cor$N and cor$IF  
## t = 0.7837, df = 93, p-value = 0.435  
## alternative hypothesis: true correlation is not equal to 0  
## 95 percent confidence interval:  
## -0.122547 0.278001  
## sample estimates:  
## cor   
## 0.0809961

# Egger's Test  
x <- coef(S1)  
se <- sqrt(sqrt(diag(vcov(S1))))  
CSE <- data.frame(Correl = x, SE = se)

PB <- rma.uni(yi = CSE[1:28, 1], sei = CSE[1:28, 2], method = "REML")  
regtest(PB)

##   
## Regression Test for Funnel Plot Asymmetry  
##   
## Model: mixed-effects meta-regression model  
## Predictor: standard error  
##   
## Test for Funnel Plot Asymmetry: z = -0.8899, p = 0.3735  
## Limit Estimate (as sei -> 0): b = 0.6831 (CI: 0.2484, 1.1179)

funnel(PB)

# Moderator Analysis  
dataset2\_hi <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 4) # read sheet No.4  
dataset2\_li <- read.xlsx("SSLA\_MASEM\_L2\_Reading.xlsx", 5) # read sheet No.5  
  
describe(dataset2\_hi$IF)

## vars n mean sd median trimmed mad min max range skew kurtosis se  
## X1 1 39 4.79 0.47 4.9 4.75 0 4.1 6 1.9 0.73 1.14 0.08

describe(dataset2\_li$IF)

## vars n mean sd median trimmed mad min max range skew kurtosis se  
## X1 1 40 2.27 0.92 2.5 2.34 0.74 0.27 3.6 3.33 -0.57 -0.36 0.14

cordat\_hi <- list()  
for (i in 1:nrow(dataset2\_hi)){   
 cordat\_hi[[i]] <- vec2symMat(as.matrix(dataset2\_hi[i, 3:30]), diag = FALSE)  
 dimnames(cordat\_hi[[i]]) <- labels2  
}  
head(cordat\_hi)

cordat\_li <- list()  
for (i in 1:nrow(dataset2\_li)){   
 cordat\_li[[i]] <- vec2symMat(as.matrix(dataset2\_li[i, 3:30]), diag = FALSE)  
 dimnames(cordat\_li[[i]]) <- labels2  
}  
head(cordat\_li)

S1hi <- tssem1(Cov = cordat\_hi, n = dataset2\_hi$N, method = "REM", RE.type = "Diag", acov = "weighted")  
S1hi <- rerun(S1hi, autofixtau2 = TRUE)

S1li <- tssem1(Cov = cordat\_li, n = dataset2\_li$N, method = "REM", RE.type = "Diag", acov = "weighted")  
S1li <- rerun(S1li, autofixtau2 = TRUE)

REs\_hi <- coef(S1hi, "fixed")  
REs\_hi.mat <- vec2symMat(REs\_hi, diag = FALSE)  
dimnames(REs\_hi.mat)[[1]] <- c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L")  
dimnames(REs\_hi.mat)[[2]] <- c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L")  
round(REs\_hi.mat, 2)

## L2R L2DA L2DF L2V L2G L2P L2M L2L  
## L2R 1.00 0.51 0.57 0.63 0.37 0.56 0.59 0.56  
## L2DA 0.51 1.00 0.69 0.18 0.35 0.46 0.58 0.34  
## L2DF 0.57 0.69 1.00 0.53 0.54 0.50 0.38 0.41  
## L2V 0.63 0.18 0.53 1.00 0.25 0.59 0.12 0.49  
## L2G 0.37 0.35 0.54 0.25 1.00 0.56 0.65 0.59  
## L2P 0.56 0.46 0.50 0.59 0.56 1.00 0.29 0.28  
## L2M 0.59 0.58 0.38 0.12 0.65 0.29 1.00 0.28  
## L2L 0.56 0.34 0.41 0.49 0.59 0.28 0.28 1.00

REs\_li <- coef(S1li, "fixed")  
REs\_li.mat <- vec2symMat(REs\_li, diag = FALSE)  
dimnames(REs\_li.mat)[[1]] <- c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L")  
dimnames(REs\_li.mat)[[2]] <- c("L2R", "L2DA", "L2DF", "L2V", "L2G", "L2P", "L2M", "L2L")  
round(REs\_li.mat, 2)

## L2R L2DA L2DF L2V L2G L2P L2M L2L  
## L2R 1.00 0.59 0.54 0.49 0.36 0.42 0.48 0.50  
## L2DA 0.59 1.00 0.49 0.42 0.12 0.51 0.56 0.14  
## L2DF 0.54 0.49 1.00 0.54 0.43 0.54 0.46 0.33  
## L2V 0.49 0.42 0.54 1.00 0.18 0.59 0.22 0.41  
## L2G 0.36 0.12 0.43 0.18 1.00 0.50 0.54 0.53  
## L2P 0.42 0.51 0.54 0.59 0.50 1.00 0.31 0.00  
## L2M 0.48 0.56 0.46 0.22 0.54 0.31 1.00 0.17  
## L2L 0.50 0.14 0.33 0.41 0.53 0.00 0.17 1.00