> #Extra Model

>

> Figure1E <- 'DEP ~ SCR

+ PW ~ SCR

+ PW ~~ DEP

+ SRP ~ SCR

+ SSE ~ SCR

+ PW ~ SSE

+ DEP ~ SSE

+ DEP ~ SRP

+ SRP ~~ SSE

+ SCR ~~ SCR'

>

> fit <- sem(Figure1E,

+ sample.cov = data.cov,

+ sample.nobs = 133)

> summary(fit, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 26 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 14

Number of observations 133

Model Test User Model:

Test statistic 0.357

Degrees of freedom 1

P-value (Chi-square) 0.550

Model Test Baseline Model:

Test statistic 371.293

Degrees of freedom 10

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.018

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -534.545

Loglikelihood unrestricted model (H1) -534.366

Akaike (AIC) 1097.090

Bayesian (BIC) 1137.555

Sample-size adjusted Bayesian (SABIC) 1093.271

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.192

P-value H\_0: RMSEA <= 0.050 0.612

P-value H\_0: RMSEA >= 0.080 0.308

Standardized Root Mean Square Residual:

SRMR 0.008

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

DEP ~

SCR -0.004 0.061 -0.070 0.944 -0.004 -0.007

PW ~

SCR -0.077 0.086 -0.892 0.372 -0.077 -0.083

SRP ~

SCR -0.326 0.053 -6.089 0.000 -0.326 -0.467

SSE ~

SCR -0.758 0.055 -13.784 0.000 -0.758 -0.767

PW ~

SSE 0.622 0.087 7.123 0.000 0.622 0.661

DEP ~

SSE -0.367 0.066 -5.523 0.000 -0.367 -0.578

SRP -0.160 0.065 -2.453 0.014 -0.160 -0.178

Covariances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

.DEP ~~

.PW -0.068 0.019 -3.526 0.000 -0.068 -0.321

.SRP ~~

.SSE 0.106 0.027 4.008 0.000 0.106 0.371

Variances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

SCR 0.734 0.090 8.155 0.000 0.734 1.000

.DEP 0.152 0.019 8.155 0.000 0.152 0.525

.PW 0.300 0.037 8.155 0.000 0.300 0.472

.SRP 0.279 0.034 8.155 0.000 0.279 0.782

.SSE 0.295 0.036 8.155 0.000 0.295 0.412

R-Square:

Estimate

DEP 0.475

PW 0.528

SRP 0.218

SSE 0.588

> resid(fit, type="standardized")

$type

[1] "standardized"

$cov

DEP PW SRP SSE SCR

DEP 0.596

PW -0.596 0.000

SRP -0.596 0.596 0.000

SSE 0.000 0.000 0.000 0.000

SCR 0.000 0.000 0.000 0.000 0.000

> resid(fit, type="cor")

$type

[1] "cor.bollen"

$cov

DEP PW SRP SSE SCR

DEP 0.000

PW -0.004 0.000

SRP -0.009 0.029 0.000

SSE 0.001 0.000 0.000 0.000

SCR -0.001 0.000 0.000 0.000 0.000

>

> #Switching the direction of PW on to SSE

> #Result: one area of local misfit

>

> Figure1E <- 'DEP ~ SCR

+ PW ~ SCR

+ PW ~~ DEP

+ SRP ~ SCR

+ SSE ~ SCR

+ SSE ~ PW

+ DEP ~ SSE

+ DEP ~ SRP

+ SRP ~~ SSE

+ SCR ~~ SCR'

>

> fit <- sem(Figure1E,

+ sample.cov = data.cov,

+ sample.nobs = 133)

> summary(fit, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 28 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 14

Number of observations 133

Model Test User Model:

Test statistic 7.601

Degrees of freedom 1

P-value (Chi-square) 0.006

Model Test Baseline Model:

Test statistic 371.293

Degrees of freedom 10

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 0.982

Tucker-Lewis Index (TLI) 0.817

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -538.167

Loglikelihood unrestricted model (H1) -534.366

Akaike (AIC) 1104.334

Bayesian (BIC) 1144.799

Sample-size adjusted Bayesian (SABIC) 1100.515

Root Mean Square Error of Approximation:

RMSEA 0.223

90 Percent confidence interval - lower 0.096

90 Percent confidence interval - upper 0.382

P-value H\_0: RMSEA <= 0.050 0.015

P-value H\_0: RMSEA >= 0.080 0.967

Standardized Root Mean Square Residual:

SRMR 0.054

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

DEP ~

SCR 0.103 0.066 1.566 0.117 0.103 0.168

PW ~

SCR -0.549 0.065 -8.426 0.000 -0.549 -0.590

SRP ~

SCR -0.326 0.053 -6.089 0.000 -0.326 -0.467

SSE ~

SCR -0.543 0.057 -9.504 0.000 -0.543 -0.556

PW 0.392 0.059 6.589 0.000 0.392 0.373

DEP ~

SSE -0.225 0.072 -3.101 0.002 -0.225 -0.356

SRP -0.160 0.064 -2.514 0.012 -0.160 -0.181

Covariances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

.DEP ~~

.PW -0.095 0.026 -3.585 0.000 -0.095 -0.370

.SRP ~~

.SSE 0.075 0.022 3.378 0.001 0.075 0.306

Variances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

SCR 0.734 0.090 8.155 0.000 0.734 1.000

.DEP 0.158 0.020 7.857 0.000 0.158 0.565

.PW 0.414 0.051 8.155 0.000 0.414 0.652

.SRP 0.279 0.034 8.155 0.000 0.279 0.782

.SSE 0.215 0.026 8.155 0.000 0.215 0.307

R-Square:

Estimate

DEP 0.435

PW 0.348

SRP 0.218

SSE 0.693

> resid(fit, type="standardized")

$type

[1] "standardized"

$cov

DEP PW SRP SSE SCR

DEP 2.646

PW -2.646 0.000

SRP -2.646 2.646 0.000

SSE -2.646 2.646 2.646 2.646

SCR 0.000 0.000 0.000 0.000 0.000

> resid(fit, type="cor")

$type

[1] "cor.bollen"

$cov

DEP PW SRP SSE SCR

DEP 0.000

PW -0.029 0.000

SRP -0.070 0.168 0.000

SSE -0.010 0.024 0.056 0.000

SCR -0.010 0.000 0.000 0.009 0.000

>

> #Reciprocal PW and SEE

> #Result: one area of local misfit

>

> Figure1E <- 'DEP ~ SCR

+ PW ~ SCR

+ PW ~~ DEP

+ SRP ~ SCR

+ SSE ~ SCR

+ PW ~~ SSE

+ DEP ~ SSE

+ DEP ~ SRP

+ SRP ~~ SSE

+ SCR ~~ SCR'

>

> fit <- sem(Figure1E,

+ sample.cov = data.cov,

+ sample.nobs = 133)

> summary(fit, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 26 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 14

Number of observations 133

Model Test User Model:

Test statistic 7.601

Degrees of freedom 1

P-value (Chi-square) 0.006

Model Test Baseline Model:

Test statistic 371.293

Degrees of freedom 10

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 0.982

Tucker-Lewis Index (TLI) 0.817

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -538.167

Loglikelihood unrestricted model (H1) -534.366

Akaike (AIC) 1104.334

Bayesian (BIC) 1144.799

Sample-size adjusted Bayesian (SABIC) 1100.515

Root Mean Square Error of Approximation:

RMSEA 0.223

90 Percent confidence interval - lower 0.096

90 Percent confidence interval - upper 0.382

P-value H\_0: RMSEA <= 0.050 0.015

P-value H\_0: RMSEA >= 0.080 0.967

Standardized Root Mean Square Residual:

SRMR 0.054

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

DEP ~

SCR 0.007 0.063 0.115 0.909 0.007 0.012

PW ~

SCR -0.549 0.065 -8.426 0.000 -0.549 -0.590

SRP ~

SCR -0.326 0.053 -6.089 0.000 -0.326 -0.467

SSE ~

SCR -0.758 0.053 -14.196 0.000 -0.758 -0.776

DEP ~

SSE -0.368 0.067 -5.530 0.000 -0.368 -0.584

SRP -0.121 0.064 -1.896 0.058 -0.121 -0.137

Covariances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

.DEP ~~

.PW -0.071 0.020 -3.585 0.000 -0.071 -0.284

.PW ~~

.SSE 0.162 0.032 5.125 0.000 0.162 0.478

.SRP ~~

.SSE 0.075 0.022 3.378 0.001 0.075 0.269

Variances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

SCR 0.734 0.090 8.155 0.000 0.734 1.000

.DEP 0.152 0.019 8.155 0.000 0.152 0.546

.PW 0.414 0.051 8.155 0.000 0.414 0.652

.SRP 0.279 0.034 8.155 0.000 0.279 0.782

.SSE 0.279 0.034 8.293 0.000 0.279 0.398

R-Square:

Estimate

DEP 0.454

PW 0.348

SRP 0.218

SSE 0.602

> resid(fit, type="standardized")

$type

[1] "standardized"

$cov

DEP PW SRP SSE SCR

DEP 2.646

PW -2.646 0.000

SRP -2.646 2.646 0.000

SSE -2.646 2.646 2.646 2.646

SCR 0.000 0.000 0.000 0.000 0.000

> resid(fit, type="cor")

$type

[1] "cor.bollen"

$cov

DEP PW SRP SSE SCR

DEP 0.000

PW -0.029 0.000

SRP -0.070 0.168 0.000

SSE -0.010 0.024 0.056 0.000

SCR -0.010 0.000 0.000 0.009 0.000

>

> #Switching the direction of DEP on to SSE

> #Result: No local misfit, but worse fit

>

> Figure1E <- 'DEP ~ SCR

+ PW ~ SCR

+ PW ~~ DEP

+ SRP ~ SCR

+ SSE ~ SCR

+ PW ~ SSE

+ SSE ~ DEP

+ DEP ~ SRP

+ SRP ~~ SSE

+ SCR ~~ SCR'

>

> fit <- sem(Figure1E,

+ sample.cov = data.cov,

+ sample.nobs = 133)

> summary(fit, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 28 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 14

Number of observations 133

Model Test User Model:

Test statistic 1.500

Degrees of freedom 1

P-value (Chi-square) 0.221

Model Test Baseline Model:

Test statistic 371.293

Degrees of freedom 10

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 0.999

Tucker-Lewis Index (TLI) 0.986

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -535.116

Loglikelihood unrestricted model (H1) -534.366

Akaike (AIC) 1098.233

Bayesian (BIC) 1138.698

Sample-size adjusted Bayesian (SABIC) 1094.414

Root Mean Square Error of Approximation:

RMSEA 0.061

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.249

P-value H\_0: RMSEA <= 0.050 0.294

P-value H\_0: RMSEA >= 0.080 0.603

Standardized Root Mean Square Residual:

SRMR 0.019

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

DEP ~

SCR 0.233 0.049 4.788 0.000 0.233 0.374

PW ~

SCR -0.182 0.089 -2.045 0.041 -0.182 -0.196

SRP ~

SCR -0.326 0.053 -6.089 0.000 -0.326 -0.467

SSE ~

SCR -0.596 0.056 -10.556 0.000 -0.596 -0.604

PW ~

SSE 0.483 0.092 5.270 0.000 0.483 0.513

SSE ~

DEP -0.499 0.092 -5.416 0.000 -0.499 -0.315

DEP ~

SRP -0.284 0.067 -4.235 0.000 -0.284 -0.318

Covariances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

.DEP ~~

.PW -0.080 0.023 -3.425 0.001 -0.080 -0.336

.SRP ~~

.SSE 0.063 0.023 2.688 0.007 0.063 0.253

Variances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

SCR 0.734 0.090 8.155 0.000 0.734 1.000

.DEP 0.185 0.023 8.155 0.000 0.185 0.648

.PW 0.305 0.038 8.004 0.000 0.305 0.482

.SRP 0.279 0.034 8.155 0.000 0.279 0.782

.SSE 0.223 0.028 8.096 0.000 0.223 0.312

R-Square:

Estimate

DEP 0.352

PW 0.518

SRP 0.218

SSE 0.688

> resid(fit, type="standardized")

$type

[1] "standardized"

$cov

DEP PW SRP SSE SCR

DEP 1.215

PW -1.215 1.215

SRP -1.215 1.215 0.000

SSE -1.215 1.215 1.215 1.215

SCR 0.000 0.000 0.000 0.000 0.000

> resid(fit, type="cor")

$type

[1] "cor.bollen"

$cov

DEP PW SRP SSE SCR

DEP 0.000

PW -0.018 0.000

SRP -0.020 0.064 0.000

SSE -0.002 0.001 0.006 0.000

SCR -0.004 0.001 0.000 0.001 0.000

>

> #Reciprocal DEP on to SSE

> #Result: Mathmatically equivalent, must rely on temporal precedence

>

> Figure1E <- 'DEP ~ SCR

+ PW ~ SCR

+ PW ~~ DEP

+ SRP ~ SCR

+ SSE ~ SCR

+ PW ~ SSE

+ DEP ~~ SSE

+ DEP ~ SRP

+ SRP ~~ SSE

+ SCR ~~ SCR'

>

> fit <- sem(Figure1E,

+ sample.cov = data.cov,

+ sample.nobs = 133)

> summary(fit, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 29 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 14

Number of observations 133

Model Test User Model:

Test statistic 0.357

Degrees of freedom 1

P-value (Chi-square) 0.550

Model Test Baseline Model:

Test statistic 371.293

Degrees of freedom 10

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.018

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -534.545

Loglikelihood unrestricted model (H1) -534.366

Akaike (AIC) 1097.090

Bayesian (BIC) 1137.555

Sample-size adjusted Bayesian (SABIC) 1093.271

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.192

P-value H\_0: RMSEA <= 0.050 0.612

P-value H\_0: RMSEA >= 0.080 0.308

Standardized Root Mean Square Residual:

SRMR 0.008

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

DEP ~

SCR 0.228 0.049 4.662 0.000 0.228 0.364

PW ~

SCR -0.077 0.086 -0.892 0.372 -0.077 -0.083

SRP ~

SCR -0.326 0.053 -6.089 0.000 -0.326 -0.467

SSE ~

SCR -0.758 0.055 -13.784 0.000 -0.758 -0.767

PW ~

SSE 0.622 0.087 7.123 0.000 0.622 0.661

DEP ~

SRP -0.299 0.068 -4.398 0.000 -0.299 -0.333

Covariances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

.DEP ~~

.PW -0.068 0.019 -3.526 0.000 -0.068 -0.290

.SSE -0.093 0.020 -4.573 0.000 -0.093 -0.399

.SRP ~~

.SSE 0.106 0.027 4.008 0.000 0.106 0.371

Variances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

SCR 0.734 0.090 8.155 0.000 0.734 1.000

.DEP 0.186 0.023 8.172 0.000 0.186 0.643

.PW 0.300 0.037 8.155 0.000 0.300 0.472

.SRP 0.279 0.034 8.155 0.000 0.279 0.782

.SSE 0.295 0.036 8.155 0.000 0.295 0.412

R-Square:

Estimate

DEP 0.357

PW 0.528

SRP 0.218

SSE 0.588

> resid(fit, type="standardized")

$type

[1] "standardized"

$cov

DEP PW SRP SSE SCR

DEP 0.596

PW -0.596 0.000

SRP -0.596 0.596 0.000

SSE 0.000 0.000 0.000 0.000

SCR 0.000 0.000 0.000 0.000 0.000

> resid(fit, type="cor")

$type

[1] "cor.bollen"

$cov

DEP PW SRP SSE SCR

DEP 0.000

PW -0.004 0.000

SRP -0.009 0.029 0.000

SSE 0.001 0.000 0.000 0.000

SCR -0.001 0.000 0.000 0.000 0.000

>

> #Reciprocal DEP on to SSE

> #Result: Mathmatically equivalent, must rely on temporal precedence

>

> Figure1E <- 'DEP ~ SCR

+ PW ~ SCR

+ PW ~~ DEP

+ SRP ~ SCR

+ SSE ~ SCR

+ PW ~ SSE

+ DEP ~ SSE

+ DEP ~ SRP

+ SRP ~~ SSE

+ SCR ~~ SCR'

>

> fit <- sem(Figure1E,

+ sample.cov = data.cov,

+ sample.nobs = 133)

> summary(fit, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 26 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 14

Number of observations 133

Model Test User Model:

Test statistic 0.357

Degrees of freedom 1

P-value (Chi-square) 0.550

Model Test Baseline Model:

Test statistic 371.293

Degrees of freedom 10

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.018

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -534.545

Loglikelihood unrestricted model (H1) -534.366

Akaike (AIC) 1097.090

Bayesian (BIC) 1137.555

Sample-size adjusted Bayesian (SABIC) 1093.271

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.192

P-value H\_0: RMSEA <= 0.050 0.612

P-value H\_0: RMSEA >= 0.080 0.308

Standardized Root Mean Square Residual:

SRMR 0.008

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

DEP ~

SCR -0.004 0.061 -0.070 0.944 -0.004 -0.007

PW ~

SCR -0.077 0.086 -0.892 0.372 -0.077 -0.083

SRP ~

SCR -0.326 0.053 -6.089 0.000 -0.326 -0.467

SSE ~

SCR -0.758 0.055 -13.784 0.000 -0.758 -0.767

PW ~

SSE 0.622 0.087 7.123 0.000 0.622 0.661

DEP ~

SSE -0.367 0.066 -5.523 0.000 -0.367 -0.578

SRP -0.160 0.065 -2.453 0.014 -0.160 -0.178

Covariances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

.DEP ~~

.PW -0.068 0.019 -3.526 0.000 -0.068 -0.321

.SRP ~~

.SSE 0.106 0.027 4.008 0.000 0.106 0.371

Variances:

Estimate Std.Err z-value P(>|z|) Std.lv Std.all

SCR 0.734 0.090 8.155 0.000 0.734 1.000

.DEP 0.152 0.019 8.155 0.000 0.152 0.525

.PW 0.300 0.037 8.155 0.000 0.300 0.472

.SRP 0.279 0.034 8.155 0.000 0.279 0.782

.SSE 0.295 0.036 8.155 0.000 0.295 0.412

R-Square:

Estimate

DEP 0.475

PW 0.528

SRP 0.218

SSE 0.588

> resid(fit, type="standardized")

$type

[1] "standardized"

$cov

DEP PW SRP SSE SCR

DEP 0.596

PW -0.596 0.000

SRP -0.596 0.596 0.000

SSE 0.000 0.000 0.000 0.000

SCR 0.000 0.000 0.000 0.000 0.000

> resid(fit, type="cor")

$type

[1] "cor.bollen"

$cov

DEP PW SRP SSE SCR

DEP 0.000

PW -0.004 0.000

SRP -0.009 0.029 0.000

SSE 0.001 0.000 0.000 0.000

SCR -0.001 0.000 0.000 0.000 0.000