> library(devtools)

> library(semPower)

> library(MVN)

> library(lavaan)

> library(lavaanPlot)

> library(semTools)

>

> #O = OBsessive Compulsive Drug Use Scale

> #C = Cravings

> #CAN = Cannabis/Creatine

> #HA = HADS Anxiety

> #HD = HADS Depression

> #P = Marijuana Problems

> #QT = Quality of Life Challenges

> #Full Sample Structural

> model <- 'HA ~ K\*O

+ HD ~ T\*O

+ QT ~ M\*HA

+ QT ~ N\*HD

+ CAN ~ A\*O

+ C ~ X\*O

+ QT ~ G\*CAN

+ QT ~ H\*C

+ HA ~ F\*C

+ HA ~ B\*CAN

+ HD ~ D\*C

+ HD ~ E\*CAN

+ HA ~~ HD

+ P ~ J\*O

+ P ~ R\*C

+ P ~ Q\*CAN

+ QT ~ S\*P

+ HD ~~ P

+ HA ~~ P

+ indirectO.HA.QT := K\*M

+ indirectO.HD.QT := T\*N

+ indirectO.P.QT := J\*S

+ indirectO.CAN.HA := A\*B

+ indirectO.CRAV.HD := X\*D

+ indirectO.CAN.HD := A\*E

+ indirectO.CRAV.HA := X\*F

+ indirectO.CAN.QT := A\*G

+ indirectO.CRAV.QT := X\*H

+ indirectCRAV.HA.QT := F\*M

+ indirectCRAV.HD.QT := D\*N

+ indirectCAN.HA.QT := B\*M

+ indirectCAN.HD.QT := E\*N

+ indirectO.CAN.P := A\*Q

+ indirectO.CRAV.P := X\*R

+ indirectCRAV.P.QT := R\*S

+ indirectCAN.P.QT := Q\*S'

> result <- sem(model, data = RData)

> summary(result, standardized = TRUE)

lavaan 0.6-11 ended normally after 46 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 25

Used Total

Number of observations 186 187

Model Test User Model:

Test statistic 1.870

Degrees of freedom 2

P-value (Chi-square) 0.392

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.079 0.033 2.392 0.017

HD ~

O (T) 0.044 0.029 1.529 0.126

QT ~

HA (M) 0.717 0.238 3.012 0.003

HD (N) 0.701 0.267 2.627 0.009

CAN ~

O (A) 0.080 0.089 0.899 0.369

C ~

O (X) 0.582 0.121 4.793 0.000

QT ~

CAN (G) -0.049 0.066 -0.741 0.459

C (H) 0.013 0.047 0.270 0.787

HA ~

C (F) 0.033 0.019 1.760 0.078

CAN (B) 0.044 0.026 1.691 0.091

HD ~

C (D) 0.032 0.016 1.926 0.054

CAN (E) 0.041 0.022 1.831 0.067

P ~

O (J) 0.077 0.029 2.672 0.008

C (R) 0.040 0.016 2.414 0.016

CAN (Q) 0.048 0.022 2.160 0.031

QT ~

P (S) -0.089 0.229 -0.387 0.699

Std.lv Std.all

0.079 0.178

0.044 0.115

0.717 0.267

0.701 0.225

0.080 0.066

0.582 0.332

-0.049 -0.050

0.013 0.019

0.033 0.131

0.044 0.119

0.032 0.145

0.041 0.130

0.077 0.195

0.040 0.176

0.048 0.149

-0.089 -0.029

Covariances:

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

.HA ~~

.HD 7.167 1.027 6.976 0.000

.HD ~~

.P 3.039 0.799 3.804 0.000

.HA ~~

.P 4.471 0.941 4.751 0.000

Std.lv Std.all

7.167 0.595

3.039 0.290

4.471 0.372

Variances:

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

.HA 13.845 1.436 9.644 0.000

.HD 10.471 1.086 9.644 0.000

.QT 88.648 9.192 9.644 0.000

.CAN 111.573 11.570 9.644 0.000

.C 208.743 21.646 9.644 0.000

.P 10.455 1.084 9.644 0.000

Std.lv Std.all

13.845 0.918

10.471 0.935

88.648 0.814

111.573 0.996

208.743 0.890

10.455 0.881

Defined Parameters:

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

indirctO.HA.QT 0.057 0.030 1.873 0.061

indirctO.HD.QT 0.031 0.023 1.322 0.186

indirectO.P.QT -0.007 0.018 -0.383 0.701

indrctO.CAN.HA 0.003 0.004 0.794 0.427

indrcO.CRAV.HD 0.018 0.010 1.787 0.074

indrctO.CAN.HD 0.003 0.004 0.807 0.420

indrcO.CRAV.HA 0.019 0.012 1.652 0.099

indrctO.CAN.QT -0.004 0.007 -0.572 0.567

indrcO.CRAV.QT 0.007 0.027 0.270 0.787

indrCRAV.HA.QT 0.024 0.016 1.519 0.129

indrCRAV.HD.QT 0.022 0.014 1.553 0.120

indrcCAN.HA.QT 0.031 0.021 1.474 0.140

indrcCAN.HD.QT 0.029 0.019 1.502 0.133

indirctO.CAN.P 0.004 0.005 0.830 0.407

indrctO.CRAV.P 0.023 0.011 2.156 0.031

indrcCRAV.P.QT -0.004 0.009 -0.382 0.702

indrctCAN.P.QT -0.004 0.011 -0.381 0.703

Std.lv Std.all

0.057 0.048

0.031 0.026

-0.007 -0.006

0.003 0.008

0.018 0.048

0.003 0.009

0.019 0.043

-0.004 -0.003

0.007 0.006

0.024 0.035

0.022 0.033

0.031 0.032

0.029 0.029

0.004 0.010

0.023 0.058

-0.004 -0.005

-0.004 -0.004

>

> fit1 <- sem(model, data=RData,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "MLM", se = "standard")

> summary(fit1, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 46 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 25

Used Total

Number of observations 186 187

Model Test User Model:

Standard Robust

Test Statistic 1.870 3.062

Degrees of freedom 2 2

P-value (Chi-square) 0.392 0.216

Scaling correction factor 0.611

Satorra-Bentler correction

Model Test Baseline Model:

Test statistic 225.990 177.562

Degrees of freedom 21 21

P-value 0.000 0.000

Scaling correction factor 1.273

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000 0.993

Tucker-Lewis Index (TLI) 1.007 0.929

Robust Comparative Fit Index (CFI) 0.997

Robust Tucker-Lewis Index (TLI) 0.966

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -3561.580 -3561.580

Loglikelihood unrestricted model (H1) -3560.645 -3560.645

Akaike (AIC) 7173.160 7173.160

Bayesian (BIC) 7253.804 7253.804

Sample-size adjusted Bayesian (BIC) 7174.620 7174.620

Root Mean Square Error of Approximation:

RMSEA 0.000 0.053

90 Percent confidence interval - lower 0.000 0.000

90 Percent confidence interval - upper 0.142 0.196

P-value RMSEA <= 0.05 0.543 0.331

Robust RMSEA 0.042

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.129

Standardized Root Mean Square Residual:

SRMR 0.016 0.016

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.079 0.033 2.392 0.017

HD ~

O (T) 0.044 0.029 1.529 0.126

QT ~

HA (M) 0.717 0.238 3.012 0.003

HD (N) 0.701 0.267 2.627 0.009

CAN ~

O (A) 0.080 0.089 0.899 0.369

C ~

O (X) 0.582 0.121 4.793 0.000

QT ~

CAN (G) -0.049 0.066 -0.741 0.459

C (H) 0.013 0.047 0.270 0.787

HA ~

C (F) 0.033 0.019 1.760 0.078

CAN (B) 0.044 0.026 1.691 0.091

HD ~

C (D) 0.032 0.016 1.926 0.054

CAN (E) 0.041 0.022 1.831 0.067

P ~

O (J) 0.077 0.029 2.672 0.008

C (R) 0.040 0.016 2.414 0.016

CAN (Q) 0.048 0.022 2.160 0.031

QT ~

P (S) -0.089 0.229 -0.387 0.699

Std.lv Std.all

0.079 0.178

0.044 0.115

0.717 0.267

0.701 0.225

0.080 0.066

0.582 0.332

-0.049 -0.050

0.013 0.019

0.033 0.131

0.044 0.119

0.032 0.145

0.041 0.130

0.077 0.195

0.040 0.176

0.048 0.149

-0.089 -0.029

Covariances:

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

.HA ~~

.HD 7.167 1.027 6.976 0.000

.HD ~~

.P 3.039 0.799 3.804 0.000

.HA ~~

.P 4.471 0.941 4.751 0.000

Std.lv Std.all

7.167 0.595

3.039 0.290

4.471 0.372

Variances:

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

.HA 13.845 1.436 9.644 0.000

.HD 10.471 1.086 9.644 0.000

.QT 88.648 9.192 9.644 0.000

.CAN 111.573 11.570 9.644 0.000

.C 208.743 21.646 9.644 0.000

.P 10.455 1.084 9.644 0.000

Std.lv Std.all

13.845 0.918

10.471 0.935

88.648 0.814

111.573 0.996

208.743 0.890

10.455 0.881

R-Square:

Estimate

HA 0.082

HD 0.065

QT 0.186

CAN 0.004

C 0.110

P 0.119

Defined Parameters:

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

indirctO.HA.QT 0.057 0.030 1.873 0.061

indirctO.HD.QT 0.031 0.023 1.322 0.186

indirectO.P.QT -0.007 0.018 -0.383 0.701

indrctO.CAN.HA 0.003 0.004 0.794 0.427

indrcO.CRAV.HD 0.018 0.010 1.787 0.074

indrctO.CAN.HD 0.003 0.004 0.807 0.420

indrcO.CRAV.HA 0.019 0.012 1.652 0.099

indrctO.CAN.QT -0.004 0.007 -0.572 0.567

indrcO.CRAV.QT 0.007 0.027 0.270 0.787

indrCRAV.HA.QT 0.024 0.016 1.519 0.129

indrCRAV.HD.QT 0.022 0.014 1.553 0.120

indrcCAN.HA.QT 0.031 0.021 1.474 0.140

indrcCAN.HD.QT 0.029 0.019 1.502 0.133

indirctO.CAN.P 0.004 0.005 0.830 0.407

indrctO.CRAV.P 0.023 0.011 2.156 0.031

indrcCRAV.P.QT -0.004 0.009 -0.382 0.702

indrctCAN.P.QT -0.004 0.011 -0.381 0.703

Std.lv Std.all

0.057 0.048

0.031 0.026

-0.007 -0.006

0.003 0.008

0.018 0.048

0.003 0.009

0.019 0.043

-0.004 -0.003

0.007 0.006

0.024 0.035

0.022 0.033

0.031 0.032

0.029 0.029

0.004 0.010

0.023 0.058

-0.004 -0.005

-0.004 -0.004

> resid(fit1, type="standardized")

$type

[1] "standardized"

$cov

HA HD QT CAN C P O

HA 0.505

HD 0.505 0.505

QT 0.505 0.505 0.505

CAN 0.505 0.505 0.505 0.000

C 0.505 0.505 0.505 0.505 0.000

P 0.505 0.505 0.505 0.505 0.505 0.505

O 0.000 0.000 1.270 0.000 0.000 0.000 0.000

> resid(fit1, type="cor")

$type

[1] "cor.bollen"

$cov

HA HD QT CAN C P O

HA 0.000

HD 0.000 0.000

QT 0.000 0.000 0.000

CAN 0.004 0.005 0.003 0.000

C 0.004 0.004 0.000 0.035 0.000

P 0.001 0.001 0.000 0.006 0.005 0.000

O 0.000 0.000 0.077 0.000 0.000 0.000 0.000

>

> fitmeasures(fit1, fit.measures = "all")

npar fmin

25.000 0.005

chisq df

1.870 2.000

pvalue chisq.scaled

0.392 3.062

df.scaled pvalue.scaled

2.000 0.216

chisq.scaling.factor baseline.chisq

0.611 225.990

baseline.df baseline.pvalue

21.000 0.000

baseline.chisq.scaled baseline.df.scaled

177.562 21.000

baseline.pvalue.scaled baseline.chisq.scaling.factor

0.000 1.273

cfi tli

1.000 1.007

nnfi rfi

1.007 0.913

nfi pnfi

0.992 0.094

ifi rni

1.001 1.001

cfi.scaled tli.scaled

0.993 0.929

cfi.robust tli.robust

0.997 0.966

nnfi.scaled nnfi.robust

0.929 0.966

rfi.scaled nfi.scaled

0.819 0.983

ifi.scaled rni.scaled

0.994 0.993

rni.robust logl

0.997 -3561.580

unrestricted.logl aic

-3560.645 7173.160

bic ntotal

7253.804 186.000

bic2 rmsea

7174.620 0.000

rmsea.ci.lower rmsea.ci.upper

0.000 0.142

rmsea.pvalue rmsea.scaled

0.543 0.053

rmsea.ci.lower.scaled rmsea.ci.upper.scaled

0.000 0.196

rmsea.pvalue.scaled rmsea.robust

0.331 0.042

rmsea.ci.lower.robust rmsea.ci.upper.robust

0.000 0.129

rmsea.pvalue.robust rmr

NA 1.708

rmr\_nomean srmr

1.708 0.016

srmr\_bentler srmr\_bentler\_nomean

0.016 0.016

crmr crmr\_nomean

0.019 0.019

srmr\_mplus srmr\_mplus\_nomean

0.016 0.016

cn\_05 cn\_01

596.790 916.875

gfi agfi

0.997 0.954

pgfi mfi

0.071 1.000

ecvi

0.279

>

> standardizedSolution(fit1)

lhs op rhs label est.std se

1 HA ~ O K 0.178 0.073

2 HD ~ O T 0.115 0.075

3 QT ~ HA M 0.267 0.087

4 QT ~ HD N 0.225 0.084

5 CAN ~ O A 0.066 0.073

6 C ~ O X 0.332 0.063

7 QT ~ CAN G -0.050 0.067

8 QT ~ C H 0.019 0.069

9 HA ~ C F 0.131 0.074

10 HA ~ CAN B 0.119 0.070

11 HD ~ C D 0.145 0.074

12 HD ~ CAN E 0.130 0.070

13 HA ~~ HD 0.595 0.047

14 P ~ O J 0.195 0.071

15 P ~ C R 0.176 0.072

16 P ~ CAN Q 0.149 0.068

17 QT ~ P S -0.029 0.076

18 HD ~~ P 0.290 0.067

19 HA ~~ P 0.372 0.063

20 HA ~~ HA 0.918 0.038

21 HD ~~ HD 0.935 0.035

22 QT ~~ QT 0.814 0.051

23 CAN ~~ CAN 0.996 0.010

24 C ~~ C 0.890 0.042

25 P ~~ P 0.881 0.044

26 O ~~ O 1.000 0.000

27 indirectO.HA.QT := K\*M indirectO.HA.QT 0.048 0.025

28 indirectO.HD.QT := T\*N indirectO.HD.QT 0.026 0.019

29 indirectO.P.QT := J\*S indirectO.P.QT -0.006 0.015

30 indirectO.CAN.HA := A\*B indirectO.CAN.HA 0.008 0.010

31 indirectO.CRAV.HD := X\*D indirectO.CRAV.HD 0.048 0.027

32 indirectO.CAN.HD := A\*E indirectO.CAN.HD 0.009 0.011

33 indirectO.CRAV.HA := X\*F indirectO.CRAV.HA 0.043 0.026

34 indirectO.CAN.QT := A\*G indirectO.CAN.QT -0.003 0.006

35 indirectO.CRAV.QT := X\*H indirectO.CRAV.QT 0.006 0.023

36 indirectCRAV.HA.QT := F\*M indirectCRAV.HA.QT 0.035 0.023

37 indirectCRAV.HD.QT := D\*N indirectCRAV.HD.QT 0.033 0.021

38 indirectCAN.HA.QT := B\*M indirectCAN.HA.QT 0.032 0.021

39 indirectCAN.HD.QT := E\*N indirectCAN.HD.QT 0.029 0.019

40 indirectO.CAN.P := A\*Q indirectO.CAN.P 0.010 0.012

41 indirectO.CRAV.P := X\*R indirectO.CRAV.P 0.058 0.027

42 indirectCRAV.P.QT := R\*S indirectCRAV.P.QT -0.005 0.013

43 indirectCAN.P.QT := Q\*S indirectCAN.P.QT -0.004 0.011

z pvalue ci.lower ci.upper

1 2.443 0.015 0.035 0.322

2 1.542 0.123 -0.031 0.261

3 3.072 0.002 0.097 0.437

4 2.666 0.008 0.059 0.390

5 0.902 0.367 -0.077 0.209

6 5.226 0.000 0.207 0.456

7 -0.742 0.458 -0.182 0.082

8 0.270 0.787 -0.116 0.153

9 1.773 0.076 -0.014 0.276

10 1.702 0.089 -0.018 0.256

11 1.944 0.052 -0.001 0.291

12 1.846 0.065 -0.008 0.268

13 12.573 0.000 0.502 0.688

14 2.739 0.006 0.056 0.335

15 2.445 0.014 0.035 0.317

16 2.182 0.029 0.015 0.283

17 -0.387 0.698 -0.177 0.119

18 4.326 0.000 0.159 0.422

19 5.881 0.000 0.248 0.496

20 24.026 0.000 0.843 0.993

21 26.909 0.000 0.867 1.003

22 15.826 0.000 0.713 0.915

23 103.780 0.000 0.977 1.014

24 21.155 0.000 0.808 0.973

25 20.015 0.000 0.795 0.967

26 NA NA 1.000 1.000

27 1.898 0.058 -0.002 0.097

28 1.331 0.183 -0.012 0.064

29 -0.383 0.701 -0.035 0.023

30 0.797 0.426 -0.011 0.027

31 1.811 0.070 -0.004 0.100

32 0.810 0.418 -0.012 0.029

33 1.670 0.095 -0.008 0.094

34 -0.572 0.567 -0.015 0.008

35 0.270 0.787 -0.039 0.051

36 1.530 0.126 -0.010 0.080

37 1.564 0.118 -0.008 0.073

38 1.480 0.139 -0.010 0.074

39 1.508 0.132 -0.009 0.067

40 0.834 0.404 -0.013 0.033

41 2.198 0.028 0.006 0.110

42 -0.383 0.702 -0.032 0.021

43 -0.381 0.703 -0.027 0.018

>

> lavaanPlot(model = fit1, node\_options = list(shape = "box", fontname = "Helvetica"), covs = F, edge\_options = list(color = "grey"), coefs = F, sig = .05)

>

> #Full Sample Measurment

> model <- 'O ~~ CAN

+ O ~~ C

+ O ~~ HA

+ O ~~ HD

+ O ~~ P

+ O ~~ QT

+ CAN ~~ C

+ CAN ~~ HA

+ CAN ~~ HD

+ CAN ~~ P

+ CAN ~~ QT

+ HA ~~ HD

+ HA ~~ C

+ HA ~~ P

+ HA ~~ QT

+ HD ~~ P

+ HD ~~ QT

+ HD ~~ C

+ P ~~ QT

+ P ~~ C

+ C ~~ QT'

> result <- sem(model, data = RData)

> summary(result, standardized = TRUE)

lavaan 0.6-11 ended normally after 249 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 186 187

Model Test User Model:

Test statistic 0.000

Degrees of freedom 0

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Covariances:

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

O ~~

CAN 6.075 6.787 0.895 0.371

C 44.305 10.322 4.292 0.000

HA 7.785 2.551 3.052 0.002

HD 5.013 2.174 2.306 0.021

P 7.919 2.281 3.472 0.001

QT 15.675 6.773 2.314 0.021

CAN ~~

C 9.188 11.906 0.772 0.440

HA 5.682 3.045 1.866 0.062

HD 5.167 2.627 1.967 0.049

P 6.265 2.716 2.307 0.021

QT 1.737 8.100 0.215 0.830

HA ~~

HD 8.115 1.124 7.217 0.000

C 11.714 4.447 2.634 0.008

P 5.811 1.071 5.426 0.000

QT 15.865 3.192 4.970 0.000

HD ~~

P 4.062 0.898 4.526 0.000

QT 13.182 2.738 4.814 0.000

C 9.752 3.828 2.548 0.011

P ~~

QT 5.816 2.672 2.177 0.030

C 13.150 3.990 3.296 0.001

C ~~

QT 16.582 11.779 1.408 0.159

Std.lv Std.all

6.075 0.066

44.305 0.332

7.785 0.230

5.013 0.172

7.919 0.263

15.675 0.172

9.188 0.057

5.682 0.138

5.167 0.146

6.265 0.172

1.737 0.016

8.115 0.624

11.714 0.197

5.811 0.434

15.865 0.391

4.062 0.352

13.182 0.377

9.752 0.190

5.816 0.162

13.150 0.249

16.582 0.104

Variances:

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

O 76.125 7.894 9.644 0.000

CAN 112.057 11.620 9.644 0.000

HA 15.101 1.566 9.644 0.000

HD 11.213 1.163 9.644 0.000

P 11.890 1.233 9.644 0.000

C 234.528 24.319 9.644 0.000

QT 108.866 11.289 9.644 0.000

Std.lv Std.all

76.125 1.000

112.057 1.000

15.101 1.000

11.213 1.000

11.890 1.000

234.528 1.000

108.866 1.000

>

> fit2 <- lavaan(model, data=RData,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "MLM", se = "standard")

> summary(fit2, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 249 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 186 187

Model Test User Model:

Standard Robust

Test Statistic 0.000 0.000

Degrees of freedom 0 0

Model Test Baseline Model:

Test statistic 225.990 172.790

Degrees of freedom 21 21

P-value 0.000 0.000

Scaling correction factor 1.308

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000 1.000

Tucker-Lewis Index (TLI) 1.000 1.000

Robust Comparative Fit Index (CFI) NA

Robust Tucker-Lewis Index (TLI) NA

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -4227.479 -4227.479

Loglikelihood unrestricted model (H1) -4227.479 -4227.479

Akaike (AIC) 8510.957 8510.957

Bayesian (BIC) 8601.278 8601.278

Sample-size adjusted Bayesian (BIC) 8512.592 8512.592

Root Mean Square Error of Approximation:

RMSEA 0.000 0.000

90 Percent confidence interval - lower 0.000 0.000

90 Percent confidence interval - upper 0.000 0.000

P-value RMSEA <= 0.05 NA NA

Robust RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.000

Standardized Root Mean Square Residual:

SRMR 0.000 0.000

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Covariances:

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

O ~~

CAN 6.075 6.787 0.895 0.371

C 44.305 10.322 4.292 0.000

HA 7.785 2.551 3.052 0.002

HD 5.013 2.174 2.306 0.021

P 7.919 2.281 3.472 0.001

QT 15.675 6.773 2.314 0.021

CAN ~~

C 9.188 11.906 0.772 0.440

HA 5.682 3.045 1.866 0.062

HD 5.167 2.627 1.967 0.049

P 6.265 2.716 2.307 0.021

QT 1.737 8.100 0.215 0.830

HA ~~

HD 8.115 1.124 7.217 0.000

C 11.714 4.447 2.634 0.008

P 5.811 1.071 5.426 0.000

QT 15.865 3.192 4.970 0.000

HD ~~

P 4.062 0.898 4.526 0.000

QT 13.182 2.738 4.814 0.000

C 9.752 3.828 2.548 0.011

P ~~

QT 5.816 2.672 2.177 0.030

C 13.150 3.990 3.296 0.001

C ~~

QT 16.582 11.779 1.408 0.159

Std.lv Std.all

6.075 0.066

44.305 0.332

7.785 0.230

5.013 0.172

7.919 0.263

15.675 0.172

9.188 0.057

5.682 0.138

5.167 0.146

6.265 0.172

1.737 0.016

8.115 0.624

11.714 0.197

5.811 0.434

15.865 0.391

4.062 0.352

13.182 0.377

9.752 0.190

5.816 0.162

13.150 0.249

16.582 0.104

Variances:

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

O 76.125 7.894 9.644 0.000

CAN 112.057 11.620 9.644 0.000

HA 15.101 1.566 9.644 0.000

HD 11.213 1.163 9.644 0.000

P 11.890 1.233 9.644 0.000

C 234.528 24.319 9.644 0.000

QT 108.866 11.289 9.644 0.000

Std.lv Std.all

76.125 1.000

112.057 1.000

15.101 1.000

11.213 1.000

11.890 1.000

234.528 1.000

108.866 1.000

> resid(fit2, type="standardized")

$type

[1] "standardized"

$cov

O CAN HA HD P C QT

O 0

CAN 0 0

HA 0 0 0

HD 0 0 0 0

P 0 0 0 0 0

C 0 0 0 0 0 0

QT 0 0 0 0 0 0 0

> resid(fit2, type="cor")

$type

[1] "cor.bollen"

$cov

O CAN HA HD P C QT

O 0

CAN 0 0

HA 0 0 0

HD 0 0 0 0

P 0 0 0 0 0

C 0 0 0 0 0 0

QT 0 0 0 0 0 0 0

>

> fitmeasures(fit2, fit.measures = "all")

npar fmin

28.000 0.000

chisq df

0.000 0.000

pvalue chisq.scaled

NA 0.000

df.scaled pvalue.scaled

0.000 NA

chisq.scaling.factor baseline.chisq

NA 225.990

baseline.df baseline.pvalue

21.000 0.000

baseline.chisq.scaled baseline.df.scaled

172.790 21.000

baseline.pvalue.scaled baseline.chisq.scaling.factor

0.000 1.308

cfi tli

1.000 1.000

nnfi rfi

1.000 1.000

nfi pnfi

1.000 0.000

ifi rni

1.000 1.000

cfi.scaled tli.scaled

1.000 1.000

cfi.robust tli.robust

NA NA

nnfi.scaled nnfi.robust

1.000 NA

rfi.scaled nfi.scaled

1.000 1.000

ifi.scaled rni.scaled

1.000 1.000

rni.robust logl

NA -4227.479

unrestricted.logl aic

-4227.479 8510.957

bic ntotal

8601.278 186.000

bic2 rmsea

8512.592 0.000

rmsea.ci.lower rmsea.ci.upper

0.000 0.000

rmsea.pvalue rmsea.scaled

NA 0.000

rmsea.ci.lower.scaled rmsea.ci.upper.scaled

0.000 0.000

rmsea.pvalue.scaled rmsea.robust

NA 0.000

rmsea.ci.lower.robust rmsea.ci.upper.robust

0.000 0.000

rmsea.pvalue.robust rmr

NA 0.000

rmr\_nomean srmr

0.000 0.000

srmr\_bentler srmr\_bentler\_nomean

0.000 0.000

crmr crmr\_nomean

0.000 0.000

srmr\_mplus srmr\_mplus\_nomean

0.000 0.000

cn\_05 cn\_01

1.000 1.000

gfi agfi

1.000 1.000

pgfi mfi

0.000 1.000

ecvi

0.301

>

> standardizedSolution(fit2)

lhs op rhs est.std se z pvalue ci.lower ci.upper

1 O ~~ CAN 0.066 0.073 0.901 0.368 -0.077 0.209

2 O ~~ C 0.332 0.065 5.081 0.000 0.204 0.459

3 O ~~ HA 0.230 0.069 3.306 0.001 0.093 0.366

4 O ~~ HD 0.172 0.071 2.411 0.016 0.032 0.311

5 O ~~ P 0.263 0.068 3.857 0.000 0.129 0.397

6 O ~~ QT 0.172 0.071 2.420 0.016 0.033 0.312

7 CAN ~~ C 0.057 0.073 0.775 0.438 -0.087 0.200

8 CAN ~~ HA 0.138 0.072 1.920 0.055 -0.003 0.279

9 CAN ~~ HD 0.146 0.072 2.031 0.042 0.005 0.286

10 CAN ~~ P 0.172 0.071 2.412 0.016 0.032 0.311

11 CAN ~~ QT 0.016 0.073 0.215 0.830 -0.128 0.159

12 HA ~~ HD 0.624 0.045 13.917 0.000 0.536 0.711

13 HA ~~ C 0.197 0.070 2.793 0.005 0.059 0.335

14 HA ~~ P 0.434 0.060 7.285 0.000 0.317 0.550

15 HA ~~ QT 0.391 0.062 6.301 0.000 0.270 0.513

16 HD ~~ P 0.352 0.064 5.476 0.000 0.226 0.478

17 HD ~~ QT 0.377 0.063 6.000 0.000 0.254 0.501

18 HD ~~ C 0.190 0.071 2.691 0.007 0.052 0.329

19 P ~~ QT 0.162 0.071 2.264 0.024 0.022 0.302

20 P ~~ C 0.249 0.069 3.621 0.000 0.114 0.384

21 C ~~ QT 0.104 0.073 1.431 0.153 -0.038 0.246

22 O ~~ O 1.000 0.000 NA NA 1.000 1.000

23 CAN ~~ CAN 1.000 0.000 NA NA 1.000 1.000

24 HA ~~ HA 1.000 0.000 NA NA 1.000 1.000

25 HD ~~ HD 1.000 0.000 NA NA 1.000 1.000

26 P ~~ P 1.000 0.000 NA NA 1.000 1.000

27 C ~~ C 1.000 0.000 NA NA 1.000 1.000

28 QT ~~ QT 1.000 0.000 NA NA 1.000 1.000

>

> lavaanPlot(model = fit2, node\_options = list(shape = "box", fontname = "Helvetica"), covs = TRUE, edge\_options = list(color = "grey"), coefs = F, sig = .05)

> #Men Sample Structural

> model <- 'HA ~ K\*O

+ HD ~ T\*O

+ QT ~ M\*HA

+ QT ~ N\*HD

+ CAN ~ A\*O

+ C ~ X\*O

+ QT ~ G\*CAN

+ QT ~ H\*C

+ HA ~ F\*C

+ HA ~ B\*CAN

+ HD ~ D\*C

+ HD ~ E\*CAN

+ HA ~~ HD

+ P ~ J\*O

+ P ~ R\*C

+ P ~ Q\*CAN

+ QT ~ S\*P

+ HD ~~ P

+ HA ~~ P

+ O ~~ O

+ indirectO.HA.QT := K\*M

+ indirectO.HD.QT := T\*N

+ indirectO.P.QT := J\*S

+ indirectO.CAN.HA := A\*B

+ indirectO.CRAV.HD := X\*D

+ indirectO.CAN.HD := A\*E

+ indirectO.CRAV.HA := X\*F

+ indirectO.CAN.QT := A\*G

+ indirectO.CRAV.QT := X\*H

+ indirectCRAV.HA.QT := F\*M

+ indirectCRAV.HD.QT := D\*N

+ indirectCAN.HA.QT := B\*M

+ indirectCAN.HD.QT := E\*N

+ indirectO.CAN.P := A\*Q

+ indirectO.CRAV.P := X\*R

+ indirectCRAV.P.QT := R\*S

+ indirectCAN.P.QT := Q\*S'

> result <- sem(model, data = Men)

> summary(result, standardized = TRUE)

lavaan 0.6-11 ended normally after 50 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 26

Used Total

Number of observations 131 216

Model Test User Model:

Test statistic 1.717

Degrees of freedom 2

P-value (Chi-square) 0.424

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.050 0.036 1.368 0.171 0.050 0.125

HD ~

O (T) 0.009 0.033 0.257 0.797 0.009 0.024

QT ~

HA (M) 0.451 0.310 1.453 0.146 0.451 0.158

HD (N) 0.581 0.329 1.763 0.078 0.581 0.185

CAN ~

O (A) 0.093 0.111 0.841 0.401 0.093 0.073

C ~

O (X) 0.604 0.139 4.332 0.000 0.604 0.354

QT ~

CAN (G) -0.074 0.076 -0.982 0.326 -0.074 -0.083

C (H) 0.024 0.058 0.417 0.677 0.024 0.036

HA ~

C (F) 0.030 0.021 1.418 0.156 0.030 0.129

CAN (B) 0.029 0.027 1.083 0.279 0.029 0.092

HD ~

C (D) 0.040 0.020 2.024 0.043 0.040 0.185

CAN (E) 0.020 0.025 0.808 0.419 0.020 0.069

P ~

O (J) 0.063 0.034 1.835 0.067 0.063 0.163

C (R) 0.043 0.020 2.140 0.032 0.043 0.189

CAN (Q) 0.039 0.025 1.545 0.122 0.039 0.128

QT ~

P (S) -0.209 0.276 -0.757 0.449 -0.209 -0.071

Covariances:

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

.HA ~~

.HD 6.455 1.118 5.773 0.000 6.455 0.584

.HD ~~

.P 2.908 0.947 3.071 0.002 2.908 0.279

.HA ~~

.P 4.027 1.054 3.822 0.000 4.027 0.354

Variances:

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

O 79.773 9.857 8.093 0.000 79.773 1.000

.HA 12.029 1.486 8.093 0.000 12.029 0.946

.HD 10.152 1.254 8.093 0.000 10.152 0.956

.QT 94.622 11.692 8.093 0.000 94.622 0.910

.CAN 128.585 15.888 8.093 0.000 128.585 0.995

.C 203.189 25.106 8.093 0.000 203.189 0.875

.P 10.739 1.327 8.093 0.000 10.739 0.895

Defined Parameters:

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

indirctO.HA.QT 0.022 0.023 0.996 0.319 0.022 0.020

indirctO.HD.QT 0.005 0.020 0.254 0.799 0.005 0.004

indirectO.P.QT -0.013 0.019 -0.700 0.484 -0.013 -0.012

indrctO.CAN.HA 0.003 0.004 0.664 0.507 0.003 0.007

indrcO.CRAV.HD 0.024 0.013 1.834 0.067 0.024 0.065

indrctO.CAN.HD 0.002 0.003 0.583 0.560 0.002 0.005

indrcO.CRAV.HA 0.018 0.014 1.347 0.178 0.018 0.046

indrctO.CAN.QT -0.007 0.011 -0.639 0.523 -0.007 -0.006

indrcO.CRAV.QT 0.015 0.035 0.415 0.678 0.015 0.013

indrCRAV.HA.QT 0.014 0.013 1.015 0.310 0.014 0.020

indrCRAV.HD.QT 0.023 0.017 1.329 0.184 0.023 0.034

indrcCAN.HA.QT 0.013 0.015 0.868 0.385 0.013 0.015

indrcCAN.HD.QT 0.012 0.016 0.735 0.463 0.012 0.013

indirctO.CAN.P 0.004 0.005 0.738 0.460 0.004 0.009

indrctO.CRAV.P 0.026 0.014 1.919 0.055 0.026 0.067

indrcCRAV.P.QT -0.009 0.013 -0.714 0.475 -0.009 -0.013

indrctCAN.P.QT -0.008 0.012 -0.680 0.496 -0.008 -0.009

>

> fit3 <- lavaan(model, data=Men,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "ML")

> summary(fit3, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 50 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 26

Used Total

Number of observations 131 216

Model Test User Model:

Test statistic 1.717

Degrees of freedom 2

P-value (Chi-square) 0.424

Model Test Baseline Model:

Test statistic 133.526

Degrees of freedom 21

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.026

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -2985.715

Loglikelihood unrestricted model (H1) -2984.857

Akaike (AIC) 6023.430

Bayesian (BIC) 6098.185

Sample-size adjusted Bayesian (BIC) 6015.950

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.165

P-value RMSEA <= 0.05 0.532

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

HA ~

O (K) 0.050 0.036 1.368 0.171 0.050 0.125

HD ~

O (T) 0.009 0.033 0.257 0.797 0.009 0.024

QT ~

HA (M) 0.451 0.310 1.453 0.146 0.451 0.158

HD (N) 0.581 0.329 1.763 0.078 0.581 0.185

CAN ~

O (A) 0.093 0.111 0.841 0.401 0.093 0.073

C ~

O (X) 0.604 0.139 4.332 0.000 0.604 0.354

QT ~

CAN (G) -0.074 0.076 -0.982 0.326 -0.074 -0.083

C (H) 0.024 0.058 0.417 0.677 0.024 0.036

HA ~

C (F) 0.030 0.021 1.418 0.156 0.030 0.129

CAN (B) 0.029 0.027 1.083 0.279 0.029 0.092

HD ~

C (D) 0.040 0.020 2.024 0.043 0.040 0.185

CAN (E) 0.020 0.025 0.808 0.419 0.020 0.069

P ~

O (J) 0.063 0.034 1.835 0.067 0.063 0.163

C (R) 0.043 0.020 2.140 0.032 0.043 0.189

CAN (Q) 0.039 0.025 1.545 0.122 0.039 0.128

QT ~

P (S) -0.209 0.276 -0.757 0.449 -0.209 -0.071

Covariances:

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

.HA ~~

.HD 6.455 1.118 5.773 0.000 6.455 0.584

.HD ~~

.P 2.908 0.947 3.071 0.002 2.908 0.279

.HA ~~

.P 4.027 1.054 3.822 0.000 4.027 0.354

Variances:

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

O 79.773 9.857 8.093 0.000 79.773 1.000

.HA 12.029 1.486 8.093 0.000 12.029 0.946

.HD 10.152 1.254 8.093 0.000 10.152 0.956

.QT 94.622 11.692 8.093 0.000 94.622 0.910

.CAN 128.585 15.888 8.093 0.000 128.585 0.995

.C 203.189 25.106 8.093 0.000 203.189 0.875

.P 10.739 1.327 8.093 0.000 10.739 0.895

R-Square:

Estimate

HA 0.054

HD 0.044

QT 0.090

CAN 0.005

C 0.125

P 0.105

Defined Parameters:

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

indirctO.HA.QT 0.022 0.023 0.996 0.319 0.022 0.020

indirctO.HD.QT 0.005 0.020 0.254 0.799 0.005 0.004

indirectO.P.QT -0.013 0.019 -0.700 0.484 -0.013 -0.012

indrctO.CAN.HA 0.003 0.004 0.664 0.507 0.003 0.007

indrcO.CRAV.HD 0.024 0.013 1.834 0.067 0.024 0.065

indrctO.CAN.HD 0.002 0.003 0.583 0.560 0.002 0.005

indrcO.CRAV.HA 0.018 0.014 1.347 0.178 0.018 0.046

indrctO.CAN.QT -0.007 0.011 -0.639 0.523 -0.007 -0.006

indrcO.CRAV.QT 0.015 0.035 0.415 0.678 0.015 0.013

indrCRAV.HA.QT 0.014 0.013 1.015 0.310 0.014 0.020

indrCRAV.HD.QT 0.023 0.017 1.329 0.184 0.023 0.034

indrcCAN.HA.QT 0.013 0.015 0.868 0.385 0.013 0.015

indrcCAN.HD.QT 0.012 0.016 0.735 0.463 0.012 0.013

indirctO.CAN.P 0.004 0.005 0.738 0.460 0.004 0.009

indrctO.CRAV.P 0.026 0.014 1.919 0.055 0.026 0.067

indrcCRAV.P.QT -0.009 0.013 -0.714 0.475 -0.009 -0.013

indrctCAN.P.QT -0.008 0.012 -0.680 0.496 -0.008 -0.009

> resid(fit3, type="standardized")

$type

[1] "standardized"

$cov

HA HD QT CAN C P O

HA 0.192

HD 0.192 0.192

QT -0.192 -0.192 -0.192

CAN 0.192 0.192 0.192 0.000

C 0.192 0.192 -0.192 0.192 0.000

P 0.192 0.192 -0.192 0.192 0.192 0.192

O 0.000 0.000 1.284 0.000 0.000 0.000 0.000

> resid(fit3, type="cor")

$type

[1] "cor.bollen"

$cov

HA HD QT CAN C P O

HA 0.000

HD 0.000 0.000

QT 0.000 0.000 0.000

CAN 0.002 0.003 0.001 0.000

C 0.001 0.001 -0.001 0.016 0.000

P 0.000 0.000 0.000 0.003 0.002 0.000

O 0.000 0.000 0.099 0.000 0.000 0.000 0.000

>

> fitmeasures(fit3, fit.measures = "all")

npar fmin chisq df pvalue baseline.chisq

26.000 0.007 1.717 2.000 0.424 133.526

baseline.df baseline.pvalue cfi tli nnfi rfi

21.000 0.000 1.000 1.026 1.026 0.865

nfi pnfi ifi rni logl unrestricted.logl

0.987 0.094 1.002 1.003 -2985.715 -2984.857

aic bic ntotal bic2 rmsea rmsea.ci.lower

6023.430 6098.185 131.000 6015.950 0.000 0.000

rmsea.ci.upper rmsea.pvalue rmr rmr\_nomean srmr srmr\_bentler

0.165 0.532 1.777 1.777 0.019 0.019

srmr\_bentler\_nomean crmr crmr\_nomean srmr\_mplus srmr\_mplus\_nomean cn\_05

0.019 0.022 0.022 0.019 0.019 458.233

cn\_01 gfi agfi pgfi mfi ecvi

703.879 0.996 0.948 0.071 1.001 0.410

>

> standardizedSolution(fit3)

lhs op rhs label est.std se z pvalue ci.lower ci.upper

1 HA ~ O K 0.125 0.090 1.378 0.168 -0.053 0.302

2 HD ~ O T 0.024 0.092 0.257 0.797 -0.156 0.203

3 QT ~ HA M 0.158 0.108 1.463 0.143 -0.054 0.369

4 QT ~ HD N 0.185 0.104 1.782 0.075 -0.019 0.390

5 CAN ~ O A 0.073 0.087 0.843 0.399 -0.097 0.244

6 C ~ O X 0.354 0.076 4.632 0.000 0.204 0.504

7 QT ~ CAN G -0.083 0.084 -0.985 0.325 -0.248 0.082

8 QT ~ C H 0.036 0.087 0.417 0.677 -0.134 0.206

9 HA ~ C F 0.129 0.090 1.428 0.153 -0.048 0.306

10 HA ~ CAN B 0.092 0.085 1.087 0.277 -0.074 0.259

11 HD ~ C D 0.185 0.090 2.055 0.040 0.009 0.361

12 HD ~ CAN E 0.069 0.085 0.810 0.418 -0.098 0.237

13 HA ~~ HD 0.584 0.058 10.148 0.000 0.471 0.697

14 P ~ O J 0.163 0.088 1.855 0.064 -0.009 0.334

15 P ~ C R 0.189 0.087 2.173 0.030 0.019 0.360

16 P ~ CAN Q 0.128 0.082 1.557 0.119 -0.033 0.289

17 QT ~ P S -0.071 0.094 -0.759 0.448 -0.255 0.112

18 HD ~~ P 0.279 0.081 3.456 0.001 0.121 0.437

19 HA ~~ P 0.354 0.076 4.637 0.000 0.205 0.504

20 O ~~ O 1.000 0.000 NA NA 1.000 1.000

21 HA ~~ HA 0.946 0.038 24.589 0.000 0.870 1.021

22 HD ~~ HD 0.956 0.035 27.476 0.000 0.888 1.025

23 QT ~~ QT 0.910 0.048 19.089 0.000 0.817 1.004

24 CAN ~~ CAN 0.995 0.013 78.128 0.000 0.970 1.020

25 C ~~ C 0.875 0.054 16.165 0.000 0.769 0.981

26 P ~~ P 0.895 0.050 17.730 0.000 0.796 0.994

27 indirectO.HA.QT := K\*M indirectO.HA.QT 0.020 0.020 0.999 0.318 -0.019 0.058

28 indirectO.HD.QT := T\*N indirectO.HD.QT 0.004 0.017 0.254 0.799 -0.029 0.038

29 indirectO.P.QT := J\*S indirectO.P.QT -0.012 0.016 -0.701 0.483 -0.044 0.021

30 indirectO.CAN.HA := A\*B indirectO.CAN.HA 0.007 0.010 0.665 0.506 -0.013 0.027

31 indirectO.CRAV.HD := X\*D indirectO.CRAV.HD 0.065 0.035 1.858 0.063 -0.004 0.135

32 indirectO.CAN.HD := A\*E indirectO.CAN.HD 0.005 0.009 0.583 0.560 -0.012 0.022

33 indirectO.CRAV.HA := X\*F indirectO.CRAV.HA 0.046 0.034 1.357 0.175 -0.020 0.111

34 indirectO.CAN.QT := A\*G indirectO.CAN.QT -0.006 0.009 -0.639 0.523 -0.025 0.013

35 indirectO.CRAV.QT := X\*H indirectO.CRAV.QT 0.013 0.031 0.415 0.678 -0.048 0.073

36 indirectCRAV.HA.QT := F\*M indirectCRAV.HA.QT 0.020 0.020 1.019 0.308 -0.019 0.059

37 indirectCRAV.HD.QT := D\*N indirectCRAV.HD.QT 0.034 0.026 1.339 0.181 -0.016 0.085

38 indirectCAN.HA.QT := B\*M indirectCAN.HA.QT 0.015 0.017 0.869 0.385 -0.018 0.047

39 indirectCAN.HD.QT := E\*N indirectCAN.HD.QT 0.013 0.017 0.735 0.462 -0.021 0.047

40 indirectO.CAN.P := A\*Q indirectO.CAN.P 0.009 0.013 0.741 0.459 -0.015 0.034

41 indirectO.CRAV.P := X\*R indirectO.CRAV.P 0.067 0.034 1.948 0.051 0.000 0.134

42 indirectCRAV.P.QT := R\*S indirectCRAV.P.QT -0.013 0.019 -0.715 0.474 -0.050 0.023

43 indirectCAN.P.QT := Q\*S indirectCAN.P.QT -0.009 0.013 -0.681 0.496 -0.035 0.017

>

> lavaanPlot(model = fit3, node\_options = list(shape = "box", fontname = "Helvetica"), covs = F, edge\_options = list(color = "grey"), coefs = F, sig = .05)

>

> #Men Sample Measurment

> model <- 'O ~~ CAN

+ O ~~ C

+ O ~~ HA

+ O ~~ HD

+ O ~~ P

+ O ~~ QT

+ CAN ~~ C

+ CAN ~~ HA

+ CAN ~~ HD

+ CAN ~~ P

+ CAN ~~ QT

+ HA ~~ HD

+ HA ~~ C

+ HA ~~ P

+ HA ~~ QT

+ HD ~~ P

+ HD ~~ QT

+ HD ~~ C

+ P ~~ QT

+ P ~~ C

+ C ~~ QT'

> result <- sem(model, data = Men)

> summary(result, standardized = TRUE)

lavaan 0.6-11 ended normally after 250 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 131 216

Model Test User Model:

Test statistic 0.000

Degrees of freedom 0

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Covariances:

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

O ~~

CAN 7.439 8.896 0.836 0.403 7.439 0.073

C 48.192 12.617 3.820 0.000 48.192 0.354

HA 5.637 2.827 1.994 0.046 5.637 0.177

HD 2.737 2.554 1.071 0.284 2.737 0.094

P 7.390 2.780 2.659 0.008 7.390 0.239

QT 12.192 8.027 1.519 0.129 12.192 0.134

CAN ~~

C 7.211 15.154 0.476 0.634 7.211 0.042

HA 4.327 3.564 1.214 0.225 4.327 0.107

HD 2.914 3.247 0.897 0.369 2.914 0.079

P 5.823 3.479 1.674 0.094 5.823 0.148

QT -7.009 10.147 -0.691 0.490 -7.009 -0.060

HA ~~

HD 6.969 1.184 5.885 0.000 6.969 0.600

C 9.608 4.824 1.992 0.046 9.608 0.177

P 4.964 1.164 4.266 0.000 4.964 0.402

QT 8.650 3.266 2.648 0.008 8.650 0.238

HD ~~

P 3.613 1.036 3.489 0.000 3.613 0.320

QT 8.566 2.998 2.858 0.004 8.566 0.258

C 9.738 4.422 2.202 0.028 9.738 0.196

P ~~

QT 1.712 3.090 0.554 0.580 1.712 0.048

C 13.304 4.758 2.796 0.005 13.304 0.252

C ~~

QT 12.285 13.619 0.902 0.367 12.285 0.079

Variances:

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

O 79.773 9.857 8.093 0.000 79.773 1.000

CAN 129.279 15.974 8.093 0.000 129.279 1.000

HA 12.725 1.572 8.093 0.000 12.725 1.000

HD 10.618 1.312 8.093 0.000 10.618 1.000

P 12.004 1.483 8.093 0.000 12.004 1.000

C 232.303 28.703 8.093 0.000 232.303 1.000

QT 103.952 12.844 8.093 0.000 103.952 1.000

>

> fit4 <- lavaan(model, data=Men,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "ML", se = "standard")

> summary(fit4, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 250 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 131 216

Model Test User Model:

Test statistic 0.000

Degrees of freedom 0

Model Test Baseline Model:

Test statistic 133.526

Degrees of freedom 21

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.000

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -2984.857

Loglikelihood unrestricted model (H1) -2984.857

Akaike (AIC) 6025.713

Bayesian (BIC) 6106.219

Sample-size adjusted Bayesian (BIC) 6017.658

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.000

P-value RMSEA <= 0.05 NA

Standardized Root Mean Square Residual:

SRMR 0.000

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Covariances:

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

O ~~

CAN 7.439 8.896 0.836 0.403 7.439 0.073

C 48.192 12.617 3.820 0.000 48.192 0.354

HA 5.637 2.827 1.994 0.046 5.637 0.177

HD 2.737 2.554 1.071 0.284 2.737 0.094

P 7.390 2.780 2.659 0.008 7.390 0.239

QT 12.192 8.027 1.519 0.129 12.192 0.134

CAN ~~

C 7.211 15.154 0.476 0.634 7.211 0.042

HA 4.327 3.564 1.214 0.225 4.327 0.107

HD 2.914 3.247 0.897 0.369 2.914 0.079

P 5.823 3.479 1.674 0.094 5.823 0.148

QT -7.009 10.147 -0.691 0.490 -7.009 -0.060

HA ~~

HD 6.969 1.184 5.885 0.000 6.969 0.600

C 9.608 4.824 1.992 0.046 9.608 0.177

P 4.964 1.164 4.266 0.000 4.964 0.402

QT 8.650 3.266 2.648 0.008 8.650 0.238

HD ~~

P 3.613 1.036 3.489 0.000 3.613 0.320

QT 8.566 2.998 2.858 0.004 8.566 0.258

C 9.738 4.422 2.202 0.028 9.738 0.196

P ~~

QT 1.712 3.090 0.554 0.580 1.712 0.048

C 13.304 4.758 2.796 0.005 13.304 0.252

C ~~

QT 12.285 13.619 0.902 0.367 12.285 0.079

Variances:

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

O 79.773 9.857 8.093 0.000 79.773 1.000

CAN 129.279 15.974 8.093 0.000 129.279 1.000

HA 12.725 1.572 8.093 0.000 12.725 1.000

HD 10.618 1.312 8.093 0.000 10.618 1.000

P 12.004 1.483 8.093 0.000 12.004 1.000

C 232.303 28.703 8.093 0.000 232.303 1.000

QT 103.952 12.844 8.093 0.000 103.952 1.000

> resid(fit4, type="standardized")

$type

[1] "standardized"

$cov

O CAN HA HD P C QT

O 0

CAN 0 0

HA 0 0 0

HD 0 0 0 0

P 0 0 0 0 0

C 0 0 0 0 0 0

QT 0 0 0 0 0 0 0

> resid(fit4, type="cor")

$type

[1] "cor.bollen"

$cov

O CAN HA HD P C QT

O 0

CAN 0 0

HA 0 0 0

HD 0 0 0 0

P 0 0 0 0 0

C 0 0 0 0 0 0

QT 0 0 0 0 0 0 0

>

> fitmeasures(fit4, fit.measures = "all")

npar fmin chisq df pvalue baseline.chisq

28.000 0.000 0.000 0.000 NA 133.526

baseline.df baseline.pvalue cfi tli nnfi rfi

21.000 0.000 1.000 1.000 1.000 1.000

nfi pnfi ifi rni logl unrestricted.logl

1.000 0.000 1.000 1.000 -2984.857 -2984.857

aic bic ntotal bic2 rmsea rmsea.ci.lower

6025.713 6106.219 131.000 6017.658 0.000 0.000

rmsea.ci.upper rmsea.pvalue rmr rmr\_nomean srmr srmr\_bentler

0.000 NA 0.000 0.000 0.000 0.000

srmr\_bentler\_nomean crmr crmr\_nomean srmr\_mplus srmr\_mplus\_nomean cn\_05

0.000 0.000 0.000 0.000 0.000 NA

cn\_01 gfi agfi pgfi mfi ecvi

NA 1.000 1.000 0.000 1.000 0.427

>

> standardizedSolution(fit4)

lhs op rhs est.std se z pvalue ci.lower ci.upper

1 O ~~ CAN 0.073 0.087 0.843 0.399 -0.097 0.244

2 O ~~ C 0.354 0.076 4.632 0.000 0.204 0.504

3 O ~~ HA 0.177 0.085 2.091 0.037 0.011 0.343

4 O ~~ HD 0.094 0.087 1.086 0.278 -0.076 0.264

5 O ~~ P 0.239 0.082 2.899 0.004 0.077 0.400

6 O ~~ QT 0.134 0.086 1.560 0.119 -0.034 0.302

7 CAN ~~ C 0.042 0.087 0.477 0.633 -0.129 0.213

8 CAN ~~ HA 0.107 0.086 1.235 0.217 -0.063 0.276

9 CAN ~~ HD 0.079 0.087 0.906 0.365 -0.092 0.249

10 CAN ~~ P 0.148 0.085 1.730 0.084 -0.020 0.315

11 CAN ~~ QT -0.060 0.087 -0.695 0.487 -0.231 0.110

12 HA ~~ HD 0.600 0.056 10.713 0.000 0.490 0.709

13 HA ~~ C 0.177 0.085 2.088 0.037 0.011 0.343

14 HA ~~ P 0.402 0.073 5.482 0.000 0.258 0.545

15 HA ~~ QT 0.238 0.082 2.886 0.004 0.076 0.399

16 HD ~~ P 0.320 0.078 4.081 0.000 0.166 0.474

17 HD ~~ QT 0.258 0.082 3.161 0.002 0.098 0.418

18 HD ~~ C 0.196 0.084 2.334 0.020 0.031 0.361

19 P ~~ QT 0.048 0.087 0.556 0.578 -0.122 0.219

20 P ~~ C 0.252 0.082 3.079 0.002 0.092 0.412

21 C ~~ QT 0.079 0.087 0.910 0.363 -0.091 0.249

22 O ~~ O 1.000 0.000 NA NA 1.000 1.000

23 CAN ~~ CAN 1.000 0.000 NA NA 1.000 1.000

24 HA ~~ HA 1.000 0.000 NA NA 1.000 1.000

25 HD ~~ HD 1.000 0.000 NA NA 1.000 1.000

26 P ~~ P 1.000 0.000 NA NA 1.000 1.000

27 C ~~ C 1.000 0.000 NA NA 1.000 1.000

28 QT ~~ QT 1.000 0.000 NA NA 1.000 1.000

>

> lavaanPlot(model = fit4, node\_options = list(shape = "box", fontname = "Helvetica"), covs = TRUE, edge\_options = list(color = "grey"), coefs = F, sig = .05)

> #Women Sample Structural

> model <- 'HA ~ K\*O

+ HD ~ T\*O

+ QT ~ M\*HA

+ QT ~ N\*HD

+ CAN ~ A\*O

+ C ~ X\*O

+ QT ~ G\*CAN

+ QT ~ H\*C

+ HA ~ F\*C

+ HA ~ B\*CAN

+ HD ~ D\*C

+ HD ~ E\*CAN

+ HA ~~ HD

+ P ~ J\*O

+ P ~ R\*C

+ P ~ Q\*CAN

+ QT ~ S\*P

+ HD ~~ P

+ HA ~~ P

+ indirectO.HA.QT := K\*M

+ indirectO.HD.QT := T\*N

+ indirectO.P.QT := J\*S

+ indirectO.CAN.HA := A\*B

+ indirectO.CRAV.HD := X\*D

+ indirectO.CAN.HD := A\*E

+ indirectO.CRAV.HA := X\*F

+ indirectO.CAN.QT := A\*G

+ indirectO.CRAV.QT := X\*H

+ indirectCRAV.HA.QT := F\*M

+ indirectCRAV.HD.QT := D\*N

+ indirectCAN.HA.QT := B\*M

+ indirectCAN.HD.QT := E\*N

+ indirectO.CAN.P := A\*Q

+ indirectO.CRAV.P := X\*R

+ indirectCRAV.P.QT := R\*S

+ indirectCAN.P.QT := Q\*S'

> result <- sem(model, data = Women)

> summary(result, standardized = TRUE)

lavaan 0.6-11 ended normally after 47 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 25

Used Total

Number of observations 55 86

Model Test User Model:

Test statistic 0.618

Degrees of freedom 2

P-value (Chi-square) 0.734

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.147 0.071 2.070 0.038 0.147 0.265

HD ~

O (T) 0.148 0.054 2.737 0.006 0.148 0.335

QT ~

HA (M) 0.894 0.345 2.590 0.010 0.894 0.368

HD (N) 1.001 0.416 2.407 0.016 1.001 0.328

CAN ~

O (A) 0.066 0.140 0.469 0.639 0.066 0.063

C ~

O (X) 0.534 0.249 2.140 0.032 0.534 0.277

QT ~

CAN (G) 0.042 0.133 0.313 0.754 0.042 0.032

C (H) -0.012 0.069 -0.170 0.865 -0.012 -0.017

HA ~

C (F) 0.040 0.037 1.097 0.273 0.040 0.140

CAN (B) 0.121 0.065 1.848 0.065 0.121 0.227

HD ~

C (D) 0.011 0.028 0.411 0.681 0.011 0.050

CAN (E) 0.138 0.050 2.774 0.006 0.138 0.326

P ~

O (J) 0.126 0.053 2.363 0.018 0.126 0.299

C (R) 0.030 0.028 1.094 0.274 0.030 0.138

CAN (Q) 0.087 0.049 1.775 0.076 0.087 0.216

QT ~

P (S) 0.309 0.368 0.839 0.402 0.309 0.097

Covariances:

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

.HA ~~

.HD 7.690 1.980 3.884 0.000 7.690 0.615

.HD ~~

.P 2.575 1.318 1.954 0.051 2.575 0.273

.HA ~~

.P 5.264 1.815 2.900 0.004 5.264 0.425

Variances:

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

.HA 16.440 3.135 5.244 0.000 16.440 0.829

.HD 9.515 1.815 5.244 0.000 9.515 0.756

.QT 59.315 11.311 5.244 0.000 59.315 0.507

.CAN 70.025 13.353 5.244 0.000 70.025 0.996

.C 221.305 42.201 5.244 0.000 221.305 0.923

.P 9.338 1.781 5.244 0.000 9.338 0.812

Defined Parameters:

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

indirctO.HA.QT 0.131 0.081 1.617 0.106 0.131 0.097

indirctO.HD.QT 0.148 0.082 1.807 0.071 0.148 0.110

indirectO.P.QT 0.039 0.049 0.790 0.429 0.039 0.029

indrctO.CAN.HA 0.008 0.017 0.455 0.649 0.008 0.014

indrcO.CRAV.HD 0.006 0.015 0.403 0.687 0.006 0.014

indrctO.CAN.HD 0.009 0.020 0.463 0.644 0.009 0.021

indrcO.CRAV.HA 0.022 0.022 0.976 0.329 0.022 0.039

indrctO.CAN.QT 0.003 0.011 0.261 0.794 0.003 0.002

indrcO.CRAV.QT -0.006 0.037 -0.169 0.866 -0.006 -0.005

indrCRAV.HA.QT 0.036 0.036 1.010 0.312 0.036 0.052

indrCRAV.HD.QT 0.011 0.028 0.405 0.686 0.011 0.016

indrcCAN.HA.QT 0.108 0.072 1.504 0.133 0.108 0.084

indrcCAN.HD.QT 0.138 0.076 1.818 0.069 0.138 0.107

indirctO.CAN.P 0.006 0.013 0.454 0.650 0.006 0.014

indrctO.CRAV.P 0.016 0.017 0.974 0.330 0.016 0.038

indrcCRAV.P.QT 0.009 0.014 0.666 0.506 0.009 0.013

indrctCAN.P.QT 0.027 0.036 0.758 0.448 0.027 0.021

>

> fit5 <- sem(model, data=Women,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "ML",)

> summary(fit5, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 47 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 25

Used Total

Number of observations 55 86

Model Test User Model:

Test statistic 0.618

Degrees of freedom 2

P-value (Chi-square) 0.734

Model Test Baseline Model:

Test statistic 117.764

Degrees of freedom 21

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.150

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -1027.704

Loglikelihood unrestricted model (H1) -1027.395

Akaike (AIC) 2105.408

Bayesian (BIC) 2155.591

Sample-size adjusted Bayesian (BIC) 2077.033

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.188

P-value RMSEA <= 0.05 0.764

Standardized Root Mean Square Residual:

SRMR 0.021

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.147 0.071 2.070 0.038 0.147 0.265

HD ~

O (T) 0.148 0.054 2.737 0.006 0.148 0.335

QT ~

HA (M) 0.894 0.345 2.590 0.010 0.894 0.368

HD (N) 1.001 0.416 2.407 0.016 1.001 0.328

CAN ~

O (A) 0.066 0.140 0.469 0.639 0.066 0.063

C ~

O (X) 0.534 0.249 2.140 0.032 0.534 0.277

QT ~

CAN (G) 0.042 0.133 0.313 0.754 0.042 0.032

C (H) -0.012 0.069 -0.170 0.865 -0.012 -0.017

HA ~

C (F) 0.040 0.037 1.097 0.273 0.040 0.140

CAN (B) 0.121 0.065 1.848 0.065 0.121 0.227

HD ~

C (D) 0.011 0.028 0.411 0.681 0.011 0.050

CAN (E) 0.138 0.050 2.774 0.006 0.138 0.326

P ~

O (J) 0.126 0.053 2.363 0.018 0.126 0.299

C (R) 0.030 0.028 1.094 0.274 0.030 0.138

CAN (Q) 0.087 0.049 1.775 0.076 0.087 0.216

QT ~

P (S) 0.309 0.368 0.839 0.402 0.309 0.097

Covariances:

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

.HA ~~

.HD 7.690 1.980 3.884 0.000 7.690 0.615

.HD ~~

.P 2.575 1.318 1.954 0.051 2.575 0.273

.HA ~~

.P 5.264 1.815 2.900 0.004 5.264 0.425

Variances:

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

.HA 16.440 3.135 5.244 0.000 16.440 0.829

.HD 9.515 1.815 5.244 0.000 9.515 0.756

.QT 59.315 11.311 5.244 0.000 59.315 0.507

.CAN 70.025 13.353 5.244 0.000 70.025 0.996

.C 221.305 42.201 5.244 0.000 221.305 0.923

.P 9.338 1.781 5.244 0.000 9.338 0.812

R-Square:

Estimate

HA 0.171

HD 0.244

QT 0.493

CAN 0.004

C 0.077

P 0.188

Defined Parameters:

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

indirctO.HA.QT 0.131 0.081 1.617 0.106 0.131 0.097

indirctO.HD.QT 0.148 0.082 1.807 0.071 0.148 0.110

indirectO.P.QT 0.039 0.049 0.790 0.429 0.039 0.029

indrctO.CAN.HA 0.008 0.017 0.455 0.649 0.008 0.014

indrcO.CRAV.HD 0.006 0.015 0.403 0.687 0.006 0.014

indrctO.CAN.HD 0.009 0.020 0.463 0.644 0.009 0.021

indrcO.CRAV.HA 0.022 0.022 0.976 0.329 0.022 0.039

indrctO.CAN.QT 0.003 0.011 0.261 0.794 0.003 0.002

indrcO.CRAV.QT -0.006 0.037 -0.169 0.866 -0.006 -0.005

indrCRAV.HA.QT 0.036 0.036 1.010 0.312 0.036 0.052

indrCRAV.HD.QT 0.011 0.028 0.405 0.686 0.011 0.016

indrcCAN.HA.QT 0.108 0.072 1.504 0.133 0.108 0.084

indrcCAN.HD.QT 0.138 0.076 1.818 0.069 0.138 0.107

indirctO.CAN.P 0.006 0.013 0.454 0.650 0.006 0.014

indrctO.CRAV.P 0.016 0.017 0.974 0.330 0.016 0.038

indrcCRAV.P.QT 0.009 0.014 0.666 0.506 0.009 0.013

indrctCAN.P.QT 0.027 0.036 0.758 0.448 0.027 0.021

> resid(fit5, type="standardized")

$type

[1] "standardized"

$cov

HA HD QT CAN C P O

HA 0.706

HD 0.706 0.706

QT 0.706 0.706 0.706

CAN 0.706 0.706 0.706 0.000

C 0.706 0.706 0.706 0.706 0.000

P 0.706 0.706 0.706 0.706 0.706 0.706

O 0.000 0.000 -0.336 0.000 0.000 0.000 0.000

> resid(fit5, type="cor")

$type

[1] "cor.bollen"

$cov

HA HD QT CAN C P O

HA 0.000

HD 0.002 0.000

QT 0.002 0.001 0.000

CAN 0.012 0.004 0.006 0.000

C 0.020 0.030 0.022 0.092 0.000

P 0.003 0.003 0.003 0.012 0.019 0.000

O -0.001 -0.001 -0.029 0.000 0.000 -0.001 0.000

>

> fitmeasures(fit5, fit.measures = "all")

npar fmin chisq df pvalue baseline.chisq

25.000 0.006 0.618 2.000 0.734 117.764

baseline.df baseline.pvalue cfi tli nnfi rfi

21.000 0.000 1.000 1.150 1.150 0.945

nfi pnfi ifi rni logl unrestricted.logl

0.995 0.095 1.012 1.014 -1027.704 -1027.395

aic bic ntotal bic2 rmsea rmsea.ci.lower

2105.408 2155.591 55.000 2077.033 0.000 0.000

rmsea.ci.upper rmsea.pvalue rmr rmr\_nomean srmr srmr\_bentler

0.188 0.764 2.453 2.453 0.021 0.021

srmr\_bentler\_nomean crmr crmr\_nomean srmr\_mplus srmr\_mplus\_nomean cn\_05

0.021 0.024 0.024 0.021 0.021 534.371

cn\_01 gfi agfi pgfi mfi ecvi

820.921 0.996 0.949 0.071 1.013 0.920

>

> standardizedSolution(fit5)

lhs op rhs label est.std se z pvalue ci.lower ci.upper

1 HA ~ O K 0.265 0.122 2.170 0.030 0.026 0.504

2 HD ~ O T 0.335 0.113 2.950 0.003 0.112 0.557

3 QT ~ HA M 0.368 0.138 2.662 0.008 0.097 0.639

4 QT ~ HD N 0.328 0.133 2.461 0.014 0.067 0.590

5 CAN ~ O A 0.063 0.134 0.471 0.638 -0.200 0.326

6 C ~ O X 0.277 0.122 2.271 0.023 0.038 0.516

7 QT ~ CAN G 0.032 0.103 0.313 0.754 -0.170 0.235

8 QT ~ C H -0.017 0.099 -0.170 0.865 -0.212 0.178

9 HA ~ C F 0.140 0.127 1.106 0.269 -0.108 0.389

10 HA ~ CAN B 0.227 0.120 1.891 0.059 -0.008 0.463

11 HD ~ C D 0.050 0.122 0.411 0.681 -0.189 0.289

12 HD ~ CAN E 0.326 0.112 2.907 0.004 0.106 0.545

13 HA ~~ HD 0.615 0.084 7.332 0.000 0.451 0.779

14 P ~ O J 0.299 0.119 2.511 0.012 0.066 0.533

15 P ~ C R 0.138 0.126 1.102 0.270 -0.108 0.384

16 P ~ CAN Q 0.216 0.119 1.811 0.070 -0.018 0.450

17 QT ~ P S 0.097 0.115 0.840 0.401 -0.129 0.322

18 HD ~~ P 0.273 0.125 2.189 0.029 0.029 0.518

19 HA ~~ P 0.425 0.111 3.844 0.000 0.208 0.641

20 HA ~~ HA 0.829 0.091 9.135 0.000 0.651 1.007

21 HD ~~ HD 0.756 0.099 7.654 0.000 0.562 0.949

22 QT ~~ QT 0.507 0.096 5.296 0.000 0.319 0.695

23 CAN ~~ CAN 0.996 0.017 58.796 0.000 0.963 1.029

24 C ~~ C 0.923 0.068 13.641 0.000 0.791 1.056

25 P ~~ P 0.812 0.093 8.759 0.000 0.631 0.994

26 O ~~ O 1.000 0.000 NA NA 1.000 1.000

27 indirectO.HA.QT := K\*M indirectO.HA.QT 0.097 0.058 1.674 0.094 -0.017 0.212

28 indirectO.HD.QT := T\*N indirectO.HD.QT 0.110 0.059 1.872 0.061 -0.005 0.225

29 indirectO.P.QT := J\*S indirectO.P.QT 0.029 0.036 0.795 0.427 -0.042 0.100

30 indirectO.CAN.HA := A\*B indirectO.CAN.HA 0.014 0.031 0.458 0.647 -0.047 0.076

31 indirectO.CRAV.HD := X\*D indirectO.CRAV.HD 0.014 0.034 0.404 0.686 -0.053 0.081

32 indirectO.CAN.HD := A\*E indirectO.CAN.HD 0.021 0.044 0.467 0.641 -0.066 0.107

33 indirectO.CRAV.HA := X\*F indirectO.CRAV.HA 0.039 0.039 0.989 0.323 -0.038 0.116

34 indirectO.CAN.QT := A\*G indirectO.CAN.QT 0.002 0.008 0.261 0.794 -0.013 0.017

35 indirectO.CRAV.QT := X\*H indirectO.CRAV.QT -0.005 0.028 -0.169 0.866 -0.059 0.049

36 indirectCRAV.HA.QT := F\*M indirectCRAV.HA.QT 0.052 0.051 1.015 0.310 -0.048 0.151

37 indirectCRAV.HD.QT := D\*N indirectCRAV.HD.QT 0.016 0.041 0.406 0.685 -0.063 0.096

38 indirectCAN.HA.QT := B\*M indirectCAN.HA.QT 0.084 0.054 1.541 0.123 -0.023 0.190

39 indirectCAN.HD.QT := E\*N indirectCAN.HD.QT 0.107 0.057 1.860 0.063 -0.006 0.220

40 indirectO.CAN.P := A\*Q indirectO.CAN.P 0.014 0.030 0.457 0.648 -0.045 0.072

41 indirectO.CRAV.P := X\*R indirectO.CRAV.P 0.038 0.039 0.987 0.324 -0.038 0.115

42 indirectCRAV.P.QT := R\*S indirectCRAV.P.QT 0.013 0.020 0.666 0.505 -0.026 0.053

43 indirectCAN.P.QT := Q\*S indirectCAN.P.QT 0.021 0.027 0.761 0.447 -0.033 0.075

>

> lavaanPlot(model = fit5, node\_options = list(shape = "box", fontname = "Helvetica"), covs = F, edge\_options = list(color = "grey"), coefs = F, sig = .05)

>

> #Women Sample Measurment

> model <- 'O ~~ CAN

+ O ~~ C

+ O ~~ HA

+ O ~~ HD

+ O ~~ P

+ O ~~ QT

+ CAN ~~ C

+ CAN ~~ HA

+ CAN ~~ HD

+ CAN ~~ P

+ CAN ~~ QT

+ HA ~~ HD

+ HA ~~ C

+ HA ~~ P

+ HA ~~ QT

+ HD ~~ P

+ HD ~~ QT

+ HD ~~ C

+ P ~~ QT

+ P ~~ C

+ C ~~ QT'

> result <- sem(model, data = Women)

> summary(result, standardized = TRUE)

lavaan 0.6-11 ended normally after 246 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 55 86

Model Test User Model:

Test statistic 0.000

Degrees of freedom 0

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Covariances:

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

O ~~

CAN 4.256 9.109 0.467 0.640 4.256 0.063

C 34.512 17.421 1.981 0.048 34.512 0.277

HA 11.392 5.080 2.243 0.025 11.392 0.317

HD 10.529 4.106 2.564 0.010 10.529 0.368

P 9.580 3.906 2.453 0.014 9.580 0.350

QT 20.977 12.081 1.736 0.083 20.977 0.241

CAN ~~

C 14.171 17.609 0.805 0.421 14.171 0.109

HA 9.682 5.215 1.857 0.063 9.682 0.259

HD 10.485 4.259 2.462 0.014 10.485 0.352

P 7.111 3.962 1.795 0.073 7.111 0.249

QT 24.108 12.672 1.903 0.057 24.108 0.265

HA ~~

HD 10.896 2.596 4.198 0.000 10.896 0.687

C 16.439 9.583 1.715 0.086 16.439 0.238

P 8.046 2.317 3.473 0.001 8.046 0.530

QT 31.425 7.778 4.040 0.000 31.425 0.650

HD ~~

P 5.117 1.769 2.892 0.004 5.117 0.424

QT 24.279 6.137 3.956 0.000 24.279 0.631

C 9.802 7.536 1.301 0.193 9.802 0.178

P ~~

QT 16.026 5.416 2.959 0.003 16.026 0.435

C 12.860 7.307 1.760 0.078 12.860 0.244

C ~~

QT 26.242 22.891 1.146 0.252 26.242 0.156

Variances:

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

O 64.658 12.330 5.244 0.000 64.658 1.000

CAN 70.305 13.407 5.244 0.000 70.305 1.000

HA 19.942 3.803 5.244 0.000 19.942 1.000

HD 12.628 2.408 5.244 0.000 12.628 1.000

P 11.559 2.204 5.244 0.000 11.559 1.000

C 239.727 45.714 5.244 0.000 239.727 1.000

QT 117.347 22.377 5.244 0.000 117.347 1.000

>

> fit6 <- lavaan(model, data=Women,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "ML")

> summary(fit6, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 246 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 55 86

Model Test User Model:

Test statistic 0.000

Degrees of freedom 0

Model Test Baseline Model:

Test statistic 117.764

Degrees of freedom 21

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.000

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -1220.087

Loglikelihood unrestricted model (H1) -1220.087

Akaike (AIC) 2496.174

Bayesian (BIC) 2552.380

Sample-size adjusted Bayesian (BIC) 2464.394

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.000

P-value RMSEA <= 0.05 NA

Standardized Root Mean Square Residual:

SRMR 0.000

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Covariances:

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

O ~~

CAN 4.256 9.109 0.467 0.640 4.256 0.063

C 34.512 17.421 1.981 0.048 34.512 0.277

HA 11.392 5.080 2.243 0.025 11.392 0.317

HD 10.529 4.106 2.564 0.010 10.529 0.368

P 9.580 3.906 2.453 0.014 9.580 0.350

QT 20.977 12.081 1.736 0.083 20.977 0.241

CAN ~~

C 14.171 17.609 0.805 0.421 14.171 0.109

HA 9.682 5.215 1.857 0.063 9.682 0.259

HD 10.485 4.259 2.462 0.014 10.485 0.352

P 7.111 3.962 1.795 0.073 7.111 0.249

QT 24.108 12.672 1.903 0.057 24.108 0.265

HA ~~

HD 10.896 2.596 4.198 0.000 10.896 0.687

C 16.439 9.583 1.715 0.086 16.439 0.238

P 8.046 2.317 3.473 0.001 8.046 0.530

QT 31.425 7.778 4.040 0.000 31.425 0.650

HD ~~

P 5.117 1.769 2.892 0.004 5.117 0.424

QT 24.279 6.137 3.956 0.000 24.279 0.631

C 9.802 7.536 1.301 0.193 9.802 0.178

P ~~

QT 16.026 5.416 2.959 0.003 16.026 0.435

C 12.860 7.307 1.760 0.078 12.860 0.244

C ~~

QT 26.242 22.891 1.146 0.252 26.242 0.156

Variances:

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

O 64.658 12.330 5.244 0.000 64.658 1.000

CAN 70.305 13.407 5.244 0.000 70.305 1.000

HA 19.942 3.803 5.244 0.000 19.942 1.000

HD 12.628 2.408 5.244 0.000 12.628 1.000

P 11.559 2.204 5.244 0.000 11.559 1.000

C 239.727 45.714 5.244 0.000 239.727 1.000

QT 117.347 22.377 5.244 0.000 117.347 1.000

> resid(fit6, type="standardized")

$type

[1] "standardized"

$cov

O CAN HA HD P C QT

O 0

CAN 0 0

HA 0 0 0

HD 0 0 0 0

P 0 0 0 0 0

C 0 0 0 0 0 0

QT 0 0 0 0 0 0 0

> resid(fit6, type="cor")

$type

[1] "cor.bollen"

$cov

O CAN HA HD P C QT

O 0

CAN 0 0

HA 0 0 0

HD 0 0 0 0

P 0 0 0 0 0

C 0 0 0 0 0 0

QT 0 0 0 0 0 0 0

>

> fitmeasures(fit6, fit.measures = "all")

npar fmin chisq df pvalue baseline.chisq

28.000 0.000 0.000 0.000 NA 117.764

baseline.df baseline.pvalue cfi tli nnfi rfi

21.000 0.000 1.000 1.000 1.000 1.000

nfi pnfi ifi rni logl unrestricted.logl

1.000 0.000 1.000 1.000 -1220.087 -1220.087

aic bic ntotal bic2 rmsea rmsea.ci.lower

2496.174 2552.380 55.000 2464.394 0.000 0.000

rmsea.ci.upper rmsea.pvalue rmr rmr\_nomean srmr srmr\_bentler

0.000 NA 0.000 0.000 0.000 0.000

srmr\_bentler\_nomean crmr crmr\_nomean srmr\_mplus srmr\_mplus\_nomean cn\_05

0.000 0.000 0.000 0.000 0.000 1.000

cn\_01 gfi agfi pgfi mfi ecvi

1.000 1.000 1.000 0.000 1.000 1.018

>

> standardizedSolution(fit6)

lhs op rhs est.std se z pvalue ci.lower ci.upper

1 O ~~ CAN 0.063 0.134 0.470 0.638 -0.200 0.326

2 O ~~ C 0.277 0.124 2.227 0.026 0.033 0.521

3 O ~~ HA 0.317 0.121 2.616 0.009 0.080 0.555

4 O ~~ HD 0.368 0.117 3.162 0.002 0.140 0.597

5 O ~~ P 0.350 0.118 2.963 0.003 0.119 0.582

6 O ~~ QT 0.241 0.127 1.896 0.058 -0.008 0.490

7 CAN ~~ C 0.109 0.133 0.819 0.413 -0.152 0.370

8 CAN ~~ HA 0.259 0.126 2.055 0.040 0.012 0.505

9 CAN ~~ HD 0.352 0.118 2.978 0.003 0.120 0.583

10 CAN ~~ P 0.249 0.126 1.973 0.049 0.002 0.497

11 CAN ~~ QT 0.265 0.125 2.118 0.034 0.020 0.511

12 HA ~~ HD 0.687 0.071 9.633 0.000 0.547 0.826

13 HA ~~ C 0.238 0.127 1.869 0.062 -0.012 0.487

14 HA ~~ P 0.530 0.097 5.465 0.000 0.340 0.720

15 HA ~~ QT 0.650 0.078 8.335 0.000 0.497 0.802

16 HD ~~ P 0.424 0.111 3.828 0.000 0.207 0.640

17 HD ~~ QT 0.631 0.081 7.767 0.000 0.472 0.790

18 HD ~~ C 0.178 0.131 1.364 0.172 -0.078 0.434

19 P ~~ QT 0.435 0.109 3.981 0.000 0.221 0.649

20 P ~~ C 0.244 0.127 1.927 0.054 -0.004 0.493

21 C ~~ QT 0.156 0.132 1.189 0.234 -0.101 0.414

22 O ~~ O 1.000 0.000 NA NA 1.000 1.000

23 CAN ~~ CAN 1.000 0.000 NA NA 1.000 1.000

24 HA ~~ HA 1.000 0.000 NA NA 1.000 1.000

25 HD ~~ HD 1.000 0.000 NA NA 1.000 1.000

26 P ~~ P 1.000 0.000 NA NA 1.000 1.000

27 C ~~ C 1.000 0.000 NA NA 1.000 1.000

28 QT ~~ QT 1.000 0.000 NA NA 1.000 1.000

>

> lavaanPlot(model = fit6, node\_options = list(shape = "box", fontname = "Helvetica"), covs = TRUE, edge\_options = list(color = "grey"), coefs = F, sig = .05)

> #Multivariate Normality Full Sample

>

> mvn(FullMVN, mvnTest = "mardia", multivariatePlot = "qq")

$multivariateNormality

Test Statistic p value Result

1 Mardia Skewness 873.800202224302 1.0730489730838e-131 NO

2 Mardia Kurtosis 21.3416789306096 0 NO

3 MVN <NA> <NA> NO

$univariateNormality

Test Variable Statistic p value Normality

1 Anderson-Darling O 0.2638 0.695 YES

2 Anderson-Darling CAN 18.1622 <0.001 NO

3 Anderson-Darling P 14.1219 <0.001 NO

4 Anderson-Darling HA 2.3963 <0.001 NO

5 Anderson-Darling HD 9.7122 <0.001 NO

6 Anderson-Darling C 6.3857 <0.001 NO

7 Anderson-Darling QT 22.2413 <0.001 NO

$Descriptives

n Mean Std.Dev Median Min Max 25th 75th Skew Kurtosis

O 186 21.419355 8.748526 22.000000 0 42.00000 15.2500000 27.000000 0.05616542 -0.344675083

CAN 186 6.712474 10.614286 1.978237 0 83.25691 0.2606707 9.886634 3.18968606 15.381520453

P 186 2.693548 3.457489 1.000000 0 15.00000 0.0000000 4.000000 1.48933575 1.702175428

HA 186 5.295699 3.896455 5.000000 0 19.00000 2.0000000 8.000000 0.75637224 0.453351490

HD 186 2.956989 3.357650 2.000000 0 19.00000 0.0000000 4.750000 1.50454447 2.615020350

C 186 27.349462 15.355655 23.000000 11 77.00000 14.0000000 37.000000 0.93001386 -0.002699707

QT 186 6.365591 10.462065 3.000000 0 60.00000 0.0000000 7.000000 2.52417833 6.759391180

>

> #Multivariate Normality Men Sample

>

> mvn(MenMVN, mvnTest = "mardia", multivariatePlot = "qq")

$multivariateNormality

Test Statistic p value Result

1 Mardia Skewness 717.452498588767 3.02388220386664e-101 NO

2 Mardia Kurtosis 17.5387653822957 0 NO

3 MVN <NA> <NA> NO

$univariateNormality

Test Variable Statistic p value Normality

1 Anderson-Darling O 0.1972 0.8866 YES

2 Anderson-Darling CAN 13.7181 <0.001 NO

3 Anderson-Darling P 8.9170 <0.001 NO

4 Anderson-Darling HA 1.6297 3e-04 NO

5 Anderson-Darling HD 6.3151 <0.001 NO

6 Anderson-Darling C 4.4785 <0.001 NO

7 Anderson-Darling QT 17.3106 <0.001 NO

$Descriptives

n Mean Std.Dev Median Min Max 25th 75th Skew Kurtosis

O 131 20.832061 8.965878 21.000000 0 42.00000 15.0000000 27.000000 0.03621873 -0.36455690

CAN 131 7.014394 11.413728 2.281234 0 83.25691 0.1450872 9.674973 3.30258767 15.40513536

P 131 2.778626 3.478041 1.000000 0 15.00000 0.0000000 4.000000 1.55179087 2.12699352

HA 131 4.977099 3.580859 4.000000 0 17.00000 2.0000000 8.000000 0.54822027 -0.15044332

HD 131 2.977099 3.271005 2.000000 0 19.00000 0.0000000 4.000000 1.60108544 3.48429227

C 131 27.236641 15.299991 22.000000 11 77.00000 14.0000000 37.500000 0.90564366 -0.03912072

QT 131 5.732824 10.234801 2.000000 0 60.00000 0.0000000 7.000000 2.85430931 8.97207399

>

> #Multivariate Normality Women Sample

>

> mvn(WomenMVN, mvnTest = "mardia", multivariatePlot = "qq")

$multivariateNormality

Test Statistic p value Result

1 Mardia Skewness 214.890306747206 1.97825221127957e-13 NO

2 Mardia Kurtosis 4.86755704343973 1.12986224709566e-06 NO

3 MVN <NA> <NA> NO

$univariateNormality

Test Variable Statistic p value Normality

1 Anderson-Darling O 0.2752 0.6471 YES

2 Anderson-Darling CAN 5.1836 <0.001 NO

3 Anderson-Darling P 5.7180 <0.001 NO

4 Anderson-Darling HA 1.0121 0.0106 NO

5 Anderson-Darling HD 3.7824 <0.001 NO

6 Anderson-Darling C 2.0168 <0.001 NO

7 Anderson-Darling QT 5.3627 <0.001 NO

$Descriptives

n Mean Std.Dev Median Min Max 25th 75th Skew Kurtosis

O 55 22.818182 8.115123 22.000000 8 41.00000 18.0000000 28.00000 0.2361107 -0.61975515

CAN 55 5.993353 8.462084 1.321918 0 41.18825 0.2723997 10.04152 1.7762237 3.56110216

P 55 2.490909 3.431190 1.000000 0 12.00000 0.0000000 4.50000 1.2972665 0.39787341

HA 55 6.054545 4.506860 6.000000 0 19.00000 2.5000000 8.00000 0.8146271 0.24400252

HD 55 2.909091 3.586356 1.000000 0 14.00000 0.0000000 5.00000 1.2883103 0.90399940

C 55 27.618182 15.625823 23.000000 11 71.00000 16.0000000 36.50000 0.9582989 -0.03881433

QT 55 7.872727 10.932545 4.000000 0 48.00000 0.0000000 10.50000 1.8544024 2.89097322

> #Full Sample Post-Hoc Power

>

> ph <- semPower(type = 'post-hoc', effect = .93, effect.measure = 'GFI', alpha = .05, N = 186, df = 2, p = 7)

>

> summary(ph)

semPower: Post-hoc power analysis

F0 0.263441

RMSEA 0.362933

Mc 0.876586

GFI 0.930000

AGFI 0.020000

df 2

Num Observations 186

NCP 48.73655

Critical Chi-Square 5.991465

Alpha 0.050000

Beta 1.657488e-06

Power (1-beta) > 0.9999

Implied Alpha/Beta Ratio 30166.136152

>

> #Men Sample Post-Hoc Power

>

> ph <- semPower(type = 'post-hoc', effect = .93, effect.measure = 'GFI', alpha = .05, N = 131, df = 2, p = 7)

>

> summary(ph)

semPower: Post-hoc power analysis

F0 0.263441

RMSEA 0.362933

Mc 0.876586

GFI 0.930000

AGFI 0.020000

df 2

Num Observations 131

NCP 34.24731

Critical Chi-Square 5.991465

Alpha 0.050000

Beta 0.000205

Power (1-beta) 0.999795

Implied Alpha/Beta Ratio 244.368432

>

> #Women Sample Post-Hoc Power

>

> ph <- semPower(type = 'post-hoc', effect = .90, effect.measure = 'GFI', alpha = .05, N = 55, df = 2, p = 7)

>

> summary(ph)

semPower: Post-hoc power analysis

F0 0.388889

RMSEA 0.440959

Mc 0.823292

GFI 0.900000

AGFI -0.400000

df 2

Num Observations 55

NCP 21.00000

Critical Chi-Square 5.991465

Alpha 0.050000

Beta 0.011181

Power (1-beta) 0.988819

Implied Alpha/Beta Ratio 4.471704

> #Multigroup Path Analysis

> model <- 'HA ~ O

+ HD ~ O

+ QT ~ HA

+ QT ~ HD

+ CAN ~ O

+ C ~ O

+ QT ~ CAN

+ QT ~ C

+ HA ~ C

+ HA ~ CAN

+ HD ~ C

+ HD ~ CAN

+ HA ~~ HD

+ P ~ O

+ P ~ C

+ P ~ CAN

+ QT ~ P

+ HD ~~ P

+ HA ~~ P'

> result <- sem(model, data = MultigroupData)

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

lavaan 0.6-11 ended normally after 46 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 25

Number of observations 186

Model Test User Model:

Test statistic 1.870

Degrees of freedom 2

P-value (Chi-square) 0.392

Model Test Baseline Model:

Test statistic 225.990

Degrees of freedom 21

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.007

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -3561.580

Loglikelihood unrestricted model (H1) -3560.645

Akaike (AIC) 7173.160

Bayesian (BIC) 7253.804

Sample-size adjusted Bayesian (BIC) 7174.620

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.142

P-value RMSEA <= 0.05 0.543

Standardized Root Mean Square Residual:

SRMR 0.016

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O 0.079 0.033 2.392 0.017 0.079 0.178

HD ~

O 0.044 0.029 1.529 0.126 0.044 0.115

QT ~

HA 0.717 0.238 3.012 0.003 0.717 0.267

HD 0.701 0.267 2.627 0.009 0.701 0.225

CAN ~

O 0.080 0.089 0.899 0.369 0.080 0.066

C ~

O 0.582 0.121 4.793 0.000 0.582 0.332

QT ~

CAN -0.049 0.066 -0.741 0.459 -0.049 -0.050

C 0.013 0.047 0.270 0.787 0.013 0.019

HA ~

C 0.033 0.019 1.760 0.078 0.033 0.131

CAN 0.044 0.026 1.691 0.091 0.044 0.119

HD ~

C 0.032 0.016 1.926 0.054 0.032 0.145

CAN 0.041 0.022 1.831 0.067 0.041 0.130

P ~

O 0.077 0.029 2.672 0.008 0.077 0.195

C 0.040 0.016 2.414 0.016 0.040 0.176

CAN 0.048 0.022 2.160 0.031 0.048 0.149

QT ~

P -0.089 0.229 -0.387 0.699 -0.089 -0.029

Covariances:

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

.HA ~~

.HD 7.167 1.027 6.976 0.000 7.167 0.595

.HD ~~

.P 3.039 0.799 3.804 0.000 3.039 0.290

.HA ~~

.P 4.471 0.941 4.751 0.000 4.471 0.372

Variances:

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

.HA 13.845 1.436 9.644 0.000 13.845 0.918

.HD 10.471 1.086 9.644 0.000 10.471 0.935

.QT 88.648 9.192 9.644 0.000 88.648 0.814

.CAN 111.573 11.570 9.644 0.000 111.573 0.996

.C 208.743 21.646 9.644 0.000 208.743 0.890

.P 10.455 1.084 9.644 0.000 10.455 0.881

R-Square:

Estimate

HA 0.082

HD 0.065

QT 0.186

CAN 0.004

C 0.110

P 0.119

>

> #Configural

>

> fit8 <- cfa(model, data = MultigroupData, group = "MG")

> summary(fit8, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 181 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 62

Number of observations per group:

2 55

1 131

Model Test User Model:

Test statistic 2.334

Degrees of freedom 4

P-value (Chi-square) 0.675

Test statistic for each group:

2 0.618

1 1.717

Model Test Baseline Model:

Test statistic 251.290

Degrees of freedom 42

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 1.000

Tucker-Lewis Index (TLI) 1.084

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -3540.701

Loglikelihood unrestricted model (H1) -3539.534

Akaike (AIC) 7205.402

Bayesian (BIC) 7405.398

Sample-size adjusted Bayesian (BIC) 7209.022

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.122

P-value RMSEA <= 0.05 0.760

Standardized Root Mean Square Residual:

SRMR 0.017

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Group 1 [2]:

Regressions:

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

HA ~

O 0.147 0.071 2.070 0.038 0.147 0.265

HD ~

O 0.148 0.054 2.737 0.006 0.148 0.335

QT ~

HA 0.894 0.345 2.590 0.010 0.894 0.368

HD 1.001 0.416 2.407 0.016 1.001 0.328

CAN ~

O 0.066 0.140 0.469 0.639 0.066 0.063

C ~

O 0.534 0.249 2.140 0.032 0.534 0.277

QT ~

CAN 0.042 0.133 0.313 0.754 0.042 0.032

C -0.012 0.069 -0.170 0.865 -0.012 -0.017

HA ~

C 0.040 0.037 1.097 0.273 0.040 0.140

CAN 0.121 0.065 1.848 0.065 0.121 0.227

HD ~

C 0.011 0.028 0.411 0.681 0.011 0.050

CAN 0.138 0.050 2.774 0.006 0.138 0.326

P ~

O 0.126 0.053 2.363 0.018 0.126 0.299

C 0.030 0.028 1.094 0.274 0.030 0.138

CAN 0.087 0.049 1.775 0.076 0.087 0.216

QT ~

P 0.309 0.368 0.839 0.402 0.309 0.097

Covariances:

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

.HA ~~

.HD 7.690 1.980 3.884 0.000 7.690 0.615

.HD ~~

.P 2.575 1.318 1.954 0.051 2.575 0.273

.HA ~~

.P 5.264 1.815 2.900 0.004 5.264 0.425

Intercepts:

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

.HA 0.870 1.765 0.493 0.622 0.870 0.195

.HD -1.603 1.343 -1.194 0.232 -1.603 -0.452

.QT -1.145 2.436 -0.470 0.638 -1.145 -0.106

.CAN 4.491 3.395 1.323 0.186 4.491 0.536

.C 15.439 6.035 2.558 0.011 15.439 0.997

.P -1.750 1.330 -1.316 0.188 -1.750 -0.516

Variances:

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

.HA 16.440 3.135 5.244 0.000 16.440 0.829

.HD 9.515 1.815 5.244 0.000 9.515 0.756

.QT 59.315 11.311 5.244 0.000 59.315 0.507

.CAN 70.025 13.353 5.244 0.000 70.025 0.996

.C 221.305 42.201 5.244 0.000 221.305 0.923

.P 9.338 1.781 5.244 0.000 9.338 0.812

R-Square:

Estimate

HA 0.171

HD 0.244

QT 0.493

CAN 0.004

C 0.077

P 0.188

Group 2 [1]:

Regressions:

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

HA ~

O 0.050 0.036 1.368 0.171 0.050 0.125

HD ~

O 0.009 0.033 0.257 0.797 0.009 0.024

QT ~

HA 0.451 0.310 1.453 0.146 0.451 0.158

HD 0.581 0.329 1.763 0.078 0.581 0.185

CAN ~

O 0.093 0.111 0.841 0.401 0.093 0.073

C ~

O 0.604 0.139 4.332 0.000 0.604 0.354

QT ~

CAN -0.074 0.076 -0.982 0.326 -0.074 -0.083

C 0.024 0.058 0.417 0.677 0.024 0.036

HA ~

C 0.030 0.021 1.418 0.156 0.030 0.129

CAN 0.029 0.027 1.083 0.279 0.029 0.092

HD ~

C 0.040 0.020 2.024 0.043 0.040 0.185

CAN 0.020 0.025 0.808 0.419 0.020 0.069

P ~

O 0.063 0.034 1.835 0.067 0.063 0.163

C 0.043 0.020 2.140 0.032 0.043 0.189

CAN 0.039 0.025 1.545 0.122 0.039 0.128

QT ~

P -0.209 0.276 -0.757 0.449 -0.209 -0.071

Covariances:

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

.HA ~~

.HD 6.455 1.118 5.773 0.000 6.455 0.584

.HD ~~

.P 2.908 0.947 3.071 0.002 2.908 0.279

.HA ~~

.P 4.027 1.054 3.822 0.000 4.027 0.354

Intercepts:

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

.HA 2.917 0.841 3.469 0.001 2.917 0.818

.HD 1.583 0.772 2.049 0.040 1.583 0.486

.QT 2.206 2.017 1.094 0.274 2.206 0.216

.CAN 5.072 2.514 2.017 0.044 5.072 0.446

.C 14.652 3.161 4.636 0.000 14.652 0.961

.P 0.021 0.794 0.026 0.979 0.021 0.006

Variances:

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

.HA 12.029 1.486 8.093 0.000 12.029 0.946

.HD 10.152 1.254 8.093 0.000 10.152 0.956

.QT 94.622 11.692 8.093 0.000 94.622 0.910

.CAN 128.585 15.888 8.093 0.000 128.585 0.995

.C 203.189 25.106 8.093 0.000 203.189 0.875

.P 10.739 1.327 8.093 0.000 10.739 0.895

R-Square:

Estimate

HA 0.054

HD 0.044

QT 0.090

CAN 0.005

C 0.125

P 0.105

> fitmeasures(fit8, fit.measures = "all")

npar fmin chisq df pvalue baseline.chisq

62.000 0.006 2.334 4.000 0.675 251.290

baseline.df baseline.pvalue cfi tli nnfi rfi

42.000 0.000 1.000 1.084 1.084 0.902

nfi pnfi ifi rni logl unrestricted.logl

0.991 0.094 1.007 1.008 -3540.701 -3539.534

aic bic ntotal bic2 rmsea rmsea.ci.lower

7205.402 7405.398 186.000 7209.022 0.000 0.000

rmsea.ci.upper rmsea.pvalue rmr rmr\_nomean srmr srmr\_bentler

0.122 0.760 1.768 1.977 0.017 0.017

srmr\_bentler\_nomean crmr crmr\_nomean srmr\_mplus srmr\_mplus\_nomean cn\_05

0.019 0.019 0.022 0.017 0.019 756.957

cn\_01 gfi agfi pgfi mfi

1058.852 0.999 0.974 0.057 1.004

> resid(fit8, type="standardized")

$`2`

$`2`$type

[1] "standardized"

$`2`$cov

HA HD QT CAN C P O

HA 0.706

HD 0.706 0.706

QT 0.706 0.706 0.706

CAN 0.706 0.706 0.706 14015795.963

C 0.706 0.706 0.706 0.706 0.000

P 0.706 0.706 0.706 0.706 0.706 0.706

O 0.000 0.000 -0.336 0.000 0.000 0.000 0.000

$`2`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

$`1`

$`1`$type

[1] "standardized"

$`1`$cov

HA HD QT CAN C P O

HA 1.920000e-01

HD 1.920000e-01 1.920000e-01

QT -1.940000e-01 -1.920000e-01 -1.920000e-01

CAN 1.920000e-01 1.920000e-01 1.920000e-01 -5.900760e+06

C 1.920000e-01 1.920000e-01 -1.920000e-01 1.920000e-01 0.000000e+00

P 1.920000e-01 1.920000e-01 -1.920000e-01 1.920000e-01 1.920000e-01 1.920000e-01

O 0.000000e+00 0.000000e+00 1.295000e+00 -1.879584e+08 0.000000e+00 0.000000e+00 0.000000e+00

$`1`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

> resid(fit8, type="cor")

$`2`

$`2`$type

[1] "cor.bollen"

$`2`$cov

HA HD QT CAN C P O

HA 0.000

HD 0.002 0.000

QT 0.002 0.001 0.000

CAN 0.012 0.004 0.006 0.000

C 0.020 0.030 0.022 0.092 0.000

P 0.003 0.003 0.003 0.012 0.019 0.000

O -0.001 -0.001 -0.029 0.000 0.000 -0.001 0.000

$`2`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

$`1`

$`1`$type

[1] "cor.bollen"

$`1`$cov

HA HD QT CAN C P O

HA 0.000

HD 0.000 0.000

QT 0.000 0.000 0.000

CAN 0.002 0.003 0.001 0.000

C 0.001 0.001 -0.001 0.016 0.000

P 0.000 0.000 0.000 0.003 0.002 0.000

O 0.000 0.000 0.099 0.000 0.000 0.000 0.000

$`1`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

>

> #Metric

>

> fit9 <- cfa(model, data = MultigroupData, group = "MG", group.equal = c("regressions"))

> summary(fit9, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6-11 ended normally after 146 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 62

Number of equality constraints 16

Number of observations per group:

2 55

1 131

Model Test User Model:

Test statistic 23.058

Degrees of freedom 20

P-value (Chi-square) 0.286

Test statistic for each group:

2 14.453

1 8.605

Model Test Baseline Model:

Test statistic 251.290

Degrees of freedom 42

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 0.985

Tucker-Lewis Index (TLI) 0.969

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -3551.063

Loglikelihood unrestricted model (H1) -3539.534

Akaike (AIC) 7194.126

Bayesian (BIC) 7342.510

Sample-size adjusted Bayesian (BIC) 7196.812

Root Mean Square Error of Approximation:

RMSEA 0.041

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.102

P-value RMSEA <= 0.05 0.544

Standardized Root Mean Square Residual:

SRMR 0.079

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Group 1 [2]:

Regressions:

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

HA ~

O (.p1.) 0.069 0.033 2.123 0.034 0.069 0.130

HD ~

O (.p2.) 0.044 0.029 1.532 0.126 0.044 0.105

QT ~

HA (.p3.) 0.724 0.236 3.070 0.002 0.724 0.323

HD (.p4.) 0.766 0.264 2.905 0.004 0.766 0.270

CAN ~

O (.p5.) 0.083 0.087 0.950 0.342 0.083 0.079

C ~

O (.p6.) 0.587 0.122 4.825 0.000 0.587 0.302

QT ~

CAN (.p7.) -0.038 0.067 -0.566 0.571 -0.038 -0.033

C (.p8.) 0.009 0.046 0.190 0.849 0.009 0.014

HA ~

C (.p9.) 0.033 0.019 1.752 0.080 0.033 0.119

CAN (.10.) 0.042 0.025 1.693 0.091 0.042 0.083

HD ~

C (.11.) 0.030 0.016 1.857 0.063 0.030 0.140

CAN (.12.) 0.040 0.022 1.790 0.073 0.040 0.099

P ~

O (.14.) 0.081 0.029 2.791 0.005 0.081 0.197

C (.15.) 0.038 0.016 2.319 0.020 0.038 0.179

CAN (.16.) 0.048 0.022 2.122 0.034 0.048 0.122

QT ~

P (.17.) -0.026 0.227 -0.116 0.907 -0.026 -0.009

Covariances:

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

.HA ~~

.HD 8.748 2.197 3.982 0.000 8.748 0.636

.HD ~~

.P 3.146 1.440 2.185 0.029 3.146 0.308

.HA ~~

.P 5.715 1.903 3.002 0.003 5.715 0.443

Intercepts:

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

.HA 3.328 0.940 3.542 0.000 3.328 0.778

.HD 0.819 0.804 1.019 0.308 0.819 0.242

.QT 1.313 1.883 0.697 0.486 1.313 0.137

.CAN 4.106 2.284 1.798 0.072 4.106 0.489

.C 14.215 3.427 4.148 0.000 14.215 0.910

.P -0.677 0.788 -0.858 0.391 -0.677 -0.206

Variances:

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

.HA 17.389 3.316 5.244 0.000 17.389 0.951

.HD 10.864 2.072 5.244 0.000 10.864 0.948

.QT 65.620 12.513 5.244 0.000 65.620 0.713

.CAN 70.043 13.357 5.244 0.000 70.043 0.994

.C 221.491 42.237 5.244 0.000 221.491 0.908

.P 9.581 1.827 5.244 0.000 9.581 0.888

R-Square:

Estimate

HA 0.049

HD 0.052

QT 0.287

CAN 0.006

C 0.092

P 0.112

Group 2 [1]:

Regressions:

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

HA ~

O (.p1.) 0.069 0.033 2.123 0.034 0.069 0.170

HD ~

O (.p2.) 0.044 0.029 1.532 0.126 0.044 0.119

QT ~

HA (.p3.) 0.724 0.236 3.070 0.002 0.724 0.241

HD (.p4.) 0.766 0.264 2.905 0.004 0.766 0.233

CAN ~

O (.p5.) 0.083 0.087 0.950 0.342 0.083 0.065

C ~

O (.p6.) 0.587 0.122 4.825 0.000 0.587 0.345

QT ~

CAN (.p7.) -0.038 0.067 -0.566 0.571 -0.038 -0.039

C (.p8.) 0.009 0.046 0.190 0.849 0.009 0.012

HA ~

C (.p9.) 0.033 0.019 1.752 0.080 0.033 0.136

CAN (.10.) 0.042 0.025 1.693 0.091 0.042 0.132

HD ~

C (.11.) 0.030 0.016 1.857 0.063 0.030 0.139

CAN (.12.) 0.040 0.022 1.790 0.073 0.040 0.137

P ~

O (.14.) 0.081 0.029 2.791 0.005 0.081 0.206

C (.15.) 0.038 0.016 2.319 0.020 0.038 0.164

CAN (.16.) 0.048 0.022 2.122 0.034 0.048 0.155

QT ~

P (.17.) -0.026 0.227 -0.116 0.907 -0.026 -0.008

Covariances:

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

.HA ~~

.HD 6.541 1.130 5.787 0.000 6.541 0.586

.HD ~~

.P 2.979 0.957 3.115 0.002 2.979 0.283

.HA ~~

.P 4.066 1.059 3.841 0.000 4.066 0.356

Intercepts:

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

.HA 2.357 0.770 3.061 0.002 2.357 0.649

.HD 0.946 0.689 1.373 0.170 0.946 0.285

.QT -0.049 1.661 -0.030 0.976 -0.049 -0.005

.CAN 5.292 2.066 2.561 0.010 5.292 0.466

.C 15.000 2.825 5.309 0.000 15.000 0.988

.P -0.263 0.691 -0.381 0.703 -0.263 -0.075

Variances:

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

.HA 12.092 1.494 8.093 0.000 12.092 0.916

.HD 10.302 1.273 8.093 0.000 10.302 0.933

.QT 97.999 12.109 8.093 0.000 97.999 0.823

.CAN 128.594 15.889 8.093 0.000 128.594 0.996

.C 203.211 25.109 8.093 0.000 203.211 0.881

.P 10.773 1.331 8.093 0.000 10.773 0.878

R-Square:

Estimate

HA 0.084

HD 0.067

QT 0.177

CAN 0.004

C 0.119

P 0.122

> fitmeasures(fit9, fit.measures = "all")

npar fmin chisq df pvalue baseline.chisq

46.000 0.062 23.058 20.000 0.286 251.290

baseline.df baseline.pvalue cfi tli nnfi rfi

42.000 0.000 0.985 0.969 0.969 0.807

nfi pnfi ifi rni logl unrestricted.logl

0.908 0.432 0.987 0.985 -3551.063 -3539.534

aic bic ntotal bic2 rmsea rmsea.ci.lower

7194.126 7342.510 186.000 7196.812 0.041 0.000

rmsea.ci.upper rmsea.pvalue rmr rmr\_nomean srmr srmr\_bentler

0.102 0.544 4.917 5.497 0.079 0.079

srmr\_bentler\_nomean crmr crmr\_nomean srmr\_mplus srmr\_mplus\_nomean cn\_05

0.089 0.072 0.081 0.072 0.079 254.372

cn\_01 gfi agfi pgfi mfi

304.028 0.986 0.949 0.282 0.992

> resid(fit9, type="standardized")

$`2`

$`2`$type

[1] "standardized"

$`2`$cov

HA HD QT CAN C P O

HA 1.851

HD 2.227 2.154

QT 3.588 3.258 3.543

CAN 1.448 2.223 2.245 -0.195

C 0.804 0.109 0.660 0.644 -0.282

P 1.785 2.149 3.081 1.065 0.092 1.111

O 1.480 2.331 1.320 -0.195 -0.282 1.070 0.000

$`2`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

$`1`

$`1`$type

[1] "standardized"

$`1`$cov

HA HD QT CAN C P O

HA -3.642

HD -4.024 -3.331

QT -4.337 -4.455 -4.364

CAN -2.340 -3.482 -4.037 0.247

C -1.037 0.357 -0.805 0.233 0.505

P -2.849 -2.997 -4.423 -1.067 0.386 -1.228

O -3.101 -3.882 0.417 0.247 0.505 -1.494 0.000

$`1`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

> resid(fit9, type="cor")

$`2`

$`2`$type

[1] "cor.bollen"

$`2`$cov

HA HD QT CAN C P O

HA 0.000

HD 0.032 0.000

QT 0.155 0.154 0.000

CAN 0.163 0.241 0.239 0.000

C 0.078 0.004 0.047 0.085 0.000

P 0.049 0.065 0.193 0.108 0.002 0.000

O 0.145 0.213 0.144 -0.016 -0.025 0.089 0.000

$`2`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

$`1`

$`1`$type

[1] "cor.bollen"

$`1`$cov

HA HD QT CAN C P O

HA 0.000

HD -0.016 0.000

QT -0.140 -0.117 0.000

CAN -0.039 -0.069 -0.089 0.000

C -0.021 0.013 -0.020 0.019 0.000

P -0.019 -0.025 -0.121 -0.024 0.014 0.000

O -0.048 -0.082 0.039 0.008 0.009 -0.033 0.000

$`1`$mean

HA HD QT CAN C P O

0 0 0 0 0 0 0

> #Reductions in MOBC

>

> #Full Sample

> model <- 'HA ~ K\*O

+ HD ~ T\*O

+ QT ~ M\*HA

+ QT ~ N\*HD

+ CAN ~ A\*O

+ C ~ X\*O

+ QT ~ G\*CAN

+ QT ~ H\*C

+ HA ~ F\*C

+ HA ~ B\*CAN

+ HD ~ D\*C

+ HD ~ E\*CAN

+ HA ~~ HD

+ P ~ J\*O

+ P ~ R\*C

+ P ~ Q\*CAN

+ QT ~ S\*P

+ HD ~~ P

+ HA ~~ P

+ HA ~ C2

+ HD ~ C2

+ P ~ C2

+ indirectO.HA.QT := K\*M

+ indirectO.HD.QT := T\*N

+ indirectO.P.QT := J\*S

+ indirectO.CAN.HA := A\*B

+ indirectO.CRAV.HD := X\*D

+ indirectO.CAN.HD := A\*E

+ indirectO.CRAV.HA := X\*F

+ indirectO.CAN.QT := A\*G

+ indirectO.CRAV.QT := X\*H

+ indirectCRAV.HA.QT := F\*M

+ indirectCRAV.HD.QT := D\*N

+ indirectCAN.HA.QT := B\*M

+ indirectCAN.HD.QT := E\*N

+ indirectO.CAN.P := A\*Q

+ indirectO.CRAV.P := X\*R

+ indirectCRAV.P.QT := R\*S

+ indirectCAN.P.QT := Q\*S'

> result <- sem(model, data = FullReduct)

> summary(result, standardized = TRUE)

lavaan 0.6.15 ended normally after 53 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 186 187

Model Test User Model:

Test statistic 59.905

Degrees of freedom 5

P-value (Chi-square) 0.000

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.084 0.038 2.221 0.026 0.084 0.188

HD ~

O (T) 0.045 0.033 1.373 0.170 0.045 0.118

QT ~

HA (M) 0.717 0.238 3.013 0.003 0.717 0.267

HD (N) 0.701 0.267 2.627 0.009 0.701 0.225

CAN ~

O (A) 0.080 0.089 0.899 0.369 0.080 0.066

C ~

O (X) 0.582 0.121 4.793 0.000 0.582 0.332

QT ~

CAN (G) -0.049 0.067 -0.739 0.460 -0.049 -0.050

C (H) 0.013 0.048 0.267 0.790 0.013 0.019

HA ~

C (F) 0.036 0.019 1.933 0.053 0.036 0.144

CAN (B) 0.045 0.026 1.754 0.080 0.045 0.123

HD ~

C (D) 0.032 0.016 1.968 0.049 0.032 0.148

CAN (E) 0.041 0.022 1.846 0.065 0.041 0.131

P ~

O (J) 0.097 0.033 2.988 0.003 0.097 0.243

C (R) 0.054 0.016 3.336 0.001 0.054 0.237

CAN (Q) 0.056 0.022 2.501 0.012 0.056 0.168

QT ~

P (S) -0.089 0.229 -0.387 0.699 -0.089 -0.030

HA ~

C2 -0.007 0.020 -0.362 0.717 -0.007 -0.029

HD ~

C2 -0.002 0.017 -0.089 0.929 -0.002 -0.007

P ~

C2 -0.032 0.017 -1.895 0.058 -0.032 -0.147

Covariances:

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

.HA ~~

.HD 7.165 1.027 6.976 0.000 7.165 0.595

.HD ~~

.P 3.032 0.794 3.821 0.000 3.032 0.292

.HA ~~

.P 4.439 0.934 4.751 0.000 4.439 0.372

Variances:

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

.HA 13.838 1.435 9.644 0.000 13.838 0.913

.HD 10.471 1.086 9.644 0.000 10.471 0.934

.QT 88.648 9.192 9.644 0.000 88.648 0.814

.CAN 111.573 11.570 9.644 0.000 111.573 0.996

.C 208.743 21.646 9.644 0.000 208.743 0.890

.P 10.308 1.069 9.644 0.000 10.308 0.838

Defined Parameters:

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

indirctO.HA.QT 0.060 0.034 1.788 0.074 0.060 0.050

indirctO.HD.QT 0.032 0.026 1.217 0.224 0.032 0.026

indirectO.P.QT -0.009 0.022 -0.384 0.701 -0.009 -0.007

indrctO.CAN.HA 0.004 0.005 0.800 0.424 0.004 0.008

indrcO.CRAV.HD 0.019 0.010 1.821 0.069 0.019 0.049

indrctO.CAN.HD 0.003 0.004 0.808 0.419 0.003 0.009

indrcO.CRAV.HA 0.021 0.012 1.793 0.073 0.021 0.048

indrctO.CAN.QT -0.004 0.007 -0.571 0.568 -0.004 -0.003

indrcO.CRAV.QT 0.007 0.028 0.266 0.790 0.007 0.006

indrCRAV.HA.QT 0.026 0.016 1.627 0.104 0.026 0.038

indrCRAV.HD.QT 0.023 0.014 1.575 0.115 0.023 0.033

indrcCAN.HA.QT 0.032 0.021 1.516 0.130 0.032 0.033

indrcCAN.HD.QT 0.029 0.019 1.510 0.131 0.029 0.029

indirctO.CAN.P 0.004 0.005 0.846 0.398 0.004 0.011

indrctO.CRAV.P 0.032 0.012 2.738 0.006 0.032 0.079

indrcCRAV.P.QT -0.005 0.013 -0.385 0.701 -0.005 -0.007

indrctCAN.P.QT -0.005 0.013 -0.383 0.702 -0.005 -0.005

>

> fit10 <- sem(model, data=FullReduct,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "MLM", se = "standard")

> summary(fit10, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 53 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 28

Used Total

Number of observations 186 187

Model Test User Model:

Standard Scaled

Test Statistic 59.905 79.137

Degrees of freedom 5 5

P-value (Chi-square) 0.000 0.000

Scaling correction factor 0.757

Satorra-Bentler correction

Model Test Baseline Model:

Test statistic 286.832 248.181

Degrees of freedom 27 27

P-value 0.000 0.000

Scaling correction factor 1.156

User Model versus Baseline Model:

Comparative Fit Index (CFI) 0.789 0.665

Tucker-Lewis Index (TLI) -0.141 -0.810

Robust Comparative Fit Index (CFI) 0.780

Robust Tucker-Lewis Index (TLI) -0.186

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -3560.176 -3560.176

Loglikelihood unrestricted model (H1) -3530.223 -3530.223

Akaike (AIC) 7176.352 7176.352

Bayesian (BIC) 7266.673 7266.673

Sample-size adjusted Bayesian (SABIC) 7177.987 7177.987

Root Mean Square Error of Approximation:

RMSEA 0.243 0.282

90 Percent confidence interval - lower 0.190 0.222

90 Percent confidence interval - upper 0.300 0.347

P-value H\_0: RMSEA <= 0.050 0.000 0.000

P-value H\_0: RMSEA >= 0.080 1.000 1.000

Robust RMSEA 0.246

90 Percent confidence interval - lower 0.200

90 Percent confidence interval - upper 0.295

P-value H\_0: Robust RMSEA <= 0.050 0.000

P-value H\_0: Robust RMSEA >= 0.080 1.000

Standardized Root Mean Square Residual:

SRMR 0.081 0.081

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.084 0.038 2.221 0.026 0.084 0.188

HD ~

O (T) 0.045 0.033 1.373 0.170 0.045 0.118

QT ~

HA (M) 0.717 0.238 3.013 0.003 0.717 0.267

HD (N) 0.701 0.267 2.627 0.009 0.701 0.225

CAN ~

O (A) 0.080 0.089 0.899 0.369 0.080 0.066

C ~

O (X) 0.582 0.121 4.793 0.000 0.582 0.332

QT ~

CAN (G) -0.049 0.067 -0.739 0.460 -0.049 -0.050

C (H) 0.013 0.048 0.267 0.790 0.013 0.019

HA ~

C (F) 0.036 0.019 1.933 0.053 0.036 0.144

CAN (B) 0.045 0.026 1.754 0.080 0.045 0.123

HD ~

C (D) 0.032 0.016 1.968 0.049 0.032 0.148

CAN (E) 0.041 0.022 1.846 0.065 0.041 0.131

P ~

O (J) 0.097 0.033 2.988 0.003 0.097 0.243

C (R) 0.054 0.016 3.336 0.001 0.054 0.237

CAN (Q) 0.056 0.022 2.501 0.012 0.056 0.168

QT ~

P (S) -0.089 0.229 -0.387 0.699 -0.089 -0.030

HA ~

C2 -0.007 0.020 -0.362 0.717 -0.007 -0.029

HD ~

C2 -0.002 0.017 -0.089 0.929 -0.002 -0.007

P ~

C2 -0.032 0.017 -1.895 0.058 -0.032 -0.147

Covariances:

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

.HA ~~

.HD 7.165 1.027 6.976 0.000 7.165 0.595

.HD ~~

.P 3.032 0.794 3.821 0.000 3.032 0.292

.HA ~~

.P 4.439 0.934 4.751 0.000 4.439 0.372

Variances:

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

.HA 13.838 1.435 9.644 0.000 13.838 0.913

.HD 10.471 1.086 9.644 0.000 10.471 0.934

.QT 88.648 9.192 9.644 0.000 88.648 0.814

.CAN 111.573 11.570 9.644 0.000 111.573 0.996

.C 208.743 21.646 9.644 0.000 208.743 0.890

.P 10.308 1.069 9.644 0.000 10.308 0.838

R-Square:

Estimate

HA 0.087

HD 0.066

QT 0.186

CAN 0.004

C 0.110

P 0.162

Defined Parameters:

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

indirctO.HA.QT 0.060 0.034 1.788 0.074 0.060 0.050

indirctO.HD.QT 0.032 0.026 1.217 0.224 0.032 0.026

indirectO.P.QT -0.009 0.022 -0.384 0.701 -0.009 -0.007

indrctO.CAN.HA 0.004 0.005 0.800 0.424 0.004 0.008

indrcO.CRAV.HD 0.019 0.010 1.821 0.069 0.019 0.049

indrctO.CAN.HD 0.003 0.004 0.808 0.419 0.003 0.009

indrcO.CRAV.HA 0.021 0.012 1.793 0.073 0.021 0.048

indrctO.CAN.QT -0.004 0.007 -0.571 0.568 -0.004 -0.003

indrcO.CRAV.QT 0.007 0.028 0.266 0.790 0.007 0.006

indrCRAV.HA.QT 0.026 0.016 1.627 0.104 0.026 0.038

indrCRAV.HD.QT 0.023 0.014 1.575 0.115 0.023 0.033

indrcCAN.HA.QT 0.032 0.021 1.516 0.130 0.032 0.033

indrcCAN.HD.QT 0.029 0.019 1.510 0.131 0.029 0.029

indirctO.CAN.P 0.004 0.005 0.846 0.398 0.004 0.011

indrctO.CRAV.P 0.032 0.012 2.738 0.006 0.032 0.079

indrcCRAV.P.QT -0.005 0.013 -0.385 0.701 -0.005 -0.007

indrctCAN.P.QT -0.005 0.013 -0.383 0.702 -0.005 -0.005

> resid(fit10, type="standardized")

$type

[1] "standardized"

$cov

HA HD QT CAN C P O C2

HA -1.478

HD -0.675 0.075

QT -1.339 -0.297 -3.457

CAN 0.023 0.400 0.372 0.000

C -0.874 0.191 -3.238 0.509 0.000

P -3.932 -3.110 -4.400 -1.092 -4.033 -5.997

O 0.000 0.000 1.271 0.000 0.000 0.000 0.000

C2 7.406 7.343 1.869 2.631 7.547 7.715 0.000 0.000

> resid(fit10, type="cor")

$type

[1] "cor.bollen"

$cov

HA HD QT CAN C P O C2

HA 0.000

HD -0.001 0.000

QT 0.000 0.000 0.000

CAN 0.000 0.004 0.002 0.000

C -0.007 0.002 -0.002 0.035 0.000

P -0.005 -0.005 -0.002 -0.013 -0.048 0.000

O 0.000 0.000 0.077 0.000 0.000 0.004 0.000

C2 0.077 0.080 0.112 0.164 0.396 0.124 0.000 0.000

>

> standardizedSolution(fit10)

lhs op rhs label est.std se z pvalue ci.lower ci.upper

1 HA ~ O K 0.188 0.083 2.262 0.024 0.025 0.351

2 HD ~ O T 0.118 0.085 1.382 0.167 -0.049 0.284

3 QT ~ HA M 0.267 0.087 3.072 0.002 0.097 0.438

4 QT ~ HD N 0.225 0.084 2.666 0.008 0.060 0.390

5 CAN ~ O A 0.066 0.073 0.902 0.367 -0.077 0.209

6 C ~ O X 0.332 0.063 5.226 0.000 0.207 0.456

7 QT ~ CAN G -0.050 0.068 -0.739 0.460 -0.182 0.082

8 QT ~ C H 0.019 0.070 0.267 0.790 -0.118 0.155

9 HA ~ C F 0.144 0.074 1.950 0.051 -0.001 0.288

10 HA ~ CAN B 0.123 0.070 1.766 0.077 -0.014 0.260

11 HD ~ C D 0.148 0.074 1.987 0.047 0.002 0.294

12 HD ~ CAN E 0.131 0.070 1.861 0.063 -0.007 0.269

13 HA ~~ HD 0.595 0.047 12.575 0.000 0.502 0.688

14 P ~ O J 0.243 0.079 3.077 0.002 0.088 0.397

15 P ~ C R 0.237 0.070 3.416 0.001 0.101 0.374

16 P ~ CAN Q 0.168 0.066 2.532 0.011 0.038 0.299

17 QT ~ P S -0.030 0.077 -0.387 0.699 -0.180 0.121

18 HD ~~ P 0.292 0.067 4.351 0.000 0.160 0.423

19 HA ~~ P 0.372 0.063 5.881 0.000 0.248 0.496

20 HA ~ C2 -0.029 0.081 -0.363 0.717 -0.188 0.129

21 HD ~ C2 -0.007 0.082 -0.089 0.929 -0.168 0.153

22 P ~ C2 -0.147 0.077 -1.917 0.055 -0.297 0.003

23 HA ~~ HA 0.913 0.039 23.399 0.000 0.837 0.990

24 HD ~~ HD 0.934 0.035 26.690 0.000 0.865 1.003

25 QT ~~ QT 0.814 0.051 15.815 0.000 0.713 0.915

26 CAN ~~ CAN 0.996 0.010 103.780 0.000 0.977 1.014

27 C ~~ C 0.890 0.042 21.155 0.000 0.808 0.973

28 P ~~ P 0.838 0.048 17.297 0.000 0.743 0.933

29 O ~~ O 1.000 0.000 NA NA 1.000 1.000

30 O ~~ C2 0.500 0.000 NA NA 0.500 0.500

31 C2 ~~ C2 1.000 0.000 NA NA 1.000 1.000

32 indirectO.HA.QT := K\*M indirectO.HA.QT 0.050 0.028 1.810 0.070 -0.004 0.105

33 indirectO.HD.QT := T\*N indirectO.HD.QT 0.026 0.022 1.224 0.221 -0.016 0.069

34 indirectO.P.QT := J\*S indirectO.P.QT -0.007 0.019 -0.384 0.701 -0.044 0.030

35 indirectO.CAN.HA := A\*B indirectO.CAN.HA 0.008 0.010 0.803 0.422 -0.012 0.028

36 indirectO.CRAV.HD := X\*D indirectO.CRAV.HD 0.049 0.027 1.846 0.065 -0.003 0.101

37 indirectO.CAN.HD := A\*E indirectO.CAN.HD 0.009 0.011 0.811 0.417 -0.012 0.029

38 indirectO.CRAV.HA := X\*F indirectO.CRAV.HA 0.048 0.026 1.817 0.069 -0.004 0.099

39 indirectO.CAN.QT := A\*G indirectO.CAN.QT -0.003 0.006 -0.571 0.568 -0.015 0.008

40 indirectO.CRAV.QT := X\*H indirectO.CRAV.QT 0.006 0.023 0.266 0.790 -0.039 0.052

41 indirectCRAV.HA.QT := F\*M indirectCRAV.HA.QT 0.038 0.023 1.640 0.101 -0.008 0.084

42 indirectCRAV.HD.QT := D\*N indirectCRAV.HD.QT 0.033 0.021 1.586 0.113 -0.008 0.074

43 indirectCAN.HA.QT := B\*M indirectCAN.HA.QT 0.033 0.022 1.522 0.128 -0.009 0.075

44 indirectCAN.HD.QT := E\*N indirectCAN.HD.QT 0.029 0.019 1.517 0.129 -0.009 0.068

45 indirectO.CAN.P := A\*Q indirectO.CAN.P 0.011 0.013 0.850 0.395 -0.014 0.037

46 indirectO.CRAV.P := X\*R indirectO.CRAV.P 0.079 0.028 2.826 0.005 0.024 0.133

47 indirectCRAV.P.QT := R\*S indirectCRAV.P.QT -0.007 0.018 -0.385 0.700 -0.043 0.029

48 indirectCAN.P.QT := Q\*S indirectCAN.P.QT -0.005 0.013 -0.383 0.702 -0.031 0.021

> #Men Sample

> model <- 'HA ~ K\*O

+ HD ~ T\*O

+ QT ~ M\*HA

+ QT ~ N\*HD

+ CAN ~ A\*O

+ C ~ X\*O

+ QT ~ G\*CAN

+ QT ~ H\*C

+ HA ~ F\*C

+ HA ~ B\*CAN

+ HD ~ D\*C

+ HD ~ E\*CAN

+ HA ~~ HD

+ P ~ J\*O

+ P ~ R\*C

+ P ~ Q\*CAN

+ QT ~ S\*P

+ HD ~~ P

+ HA ~~ P

+ HD ~ C2

+ P ~ C2

+ indirectO.HA.QT := K\*M

+ indirectO.HD.QT := T\*N

+ indirectO.P.QT := J\*S

+ indirectO.CAN.HA := A\*B

+ indirectO.CRAV.HD := X\*D

+ indirectO.CAN.HD := A\*E

+ indirectO.CRAV.HA := X\*F

+ indirectO.CAN.QT := A\*G

+ indirectO.CRAV.QT := X\*H

+ indirectCRAV.HA.QT := F\*M

+ indirectCRAV.HD.QT := D\*N

+ indirectCAN.HA.QT := B\*M

+ indirectCAN.HD.QT := E\*N

+ indirectO.CAN.P := A\*Q

+ indirectO.CRAV.P := X\*R

+ indirectCRAV.P.QT := R\*S

+ indirectCAN.P.QT := Q\*S'

> result <- sem(model, data = MenReduct)

> summary(result, standardized = TRUE)

lavaan 0.6.15 ended normally after 53 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 27

Number of observations 131

Model Test User Model:

Test statistic 46.422

Degrees of freedom 6

P-value (Chi-square) 0.000

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.050 0.036 1.368 0.171 0.050 0.125

HD ~

O (T) 0.006 0.037 0.171 0.864 0.006 0.017

QT ~

HA (M) 0.451 0.310 1.453 0.146 0.451 0.158

HD (N) 0.581 0.329 1.762 0.078 0.581 0.185

CAN ~

O (A) 0.093 0.111 0.841 0.401 0.093 0.073

C ~

O (X) 0.604 0.139 4.332 0.000 0.604 0.354

QT ~

CAN (G) -0.074 0.076 -0.981 0.326 -0.074 -0.083

C (H) 0.024 0.058 0.416 0.678 0.024 0.036

HA ~

C (F) 0.030 0.021 1.418 0.156 0.030 0.129

CAN (B) 0.029 0.027 1.083 0.279 0.029 0.092

HD ~

C (D) 0.038 0.020 1.935 0.053 0.038 0.177

CAN (E) 0.019 0.025 0.778 0.437 0.019 0.067

P ~

O (J) 0.068 0.039 1.753 0.080 0.068 0.176

C (R) 0.047 0.020 2.344 0.019 0.047 0.206

CAN (Q) 0.041 0.025 1.616 0.106 0.041 0.133

QT ~

P (S) -0.209 0.276 -0.757 0.449 -0.209 -0.071

HD ~

C2 0.003 0.016 0.216 0.829 0.003 0.018

P ~

C2 -0.008 0.019 -0.428 0.669 -0.008 -0.039

Covariances:

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

.HA ~~

.HD 6.463 1.119 5.777 0.000 6.463 0.585

.HD ~~

.P 2.905 0.946 3.070 0.002 2.905 0.278

.HA ~~

.P 4.008 1.052 3.809 0.000 4.008 0.353

Variances:

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

.HA 12.029 1.486 8.093 0.000 12.029 0.946

.HD 10.159 1.255 8.093 0.000 10.159 0.959

.QT 94.622 11.692 8.093 0.000 94.622 0.910

.CAN 128.585 15.888 8.093 0.000 128.585 0.995

.C 203.189 25.106 8.093 0.000 203.189 0.875

.P 10.717 1.324 8.093 0.000 10.717 0.887

Defined Parameters:

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

indirctO.HA.QT 0.022 0.023 0.996 0.319 0.022 0.020

indirctO.HD.QT 0.004 0.022 0.171 0.865 0.004 0.003

indirectO.P.QT -0.014 0.021 -0.695 0.487 -0.014 -0.013

indrctO.CAN.HA 0.003 0.004 0.664 0.507 0.003 0.007

indrcO.CRAV.HD 0.023 0.013 1.767 0.077 0.023 0.063

indrctO.CAN.HD 0.002 0.003 0.571 0.568 0.002 0.005

indrcO.CRAV.HA 0.018 0.014 1.347 0.178 0.018 0.046

indrctO.CAN.QT -0.007 0.011 -0.638 0.523 -0.007 -0.006

indrcO.CRAV.QT 0.015 0.035 0.414 0.679 0.015 0.013

indrCRAV.HA.QT 0.014 0.013 1.015 0.310 0.014 0.020

indrCRAV.HD.QT 0.022 0.017 1.303 0.193 0.022 0.033

indrcCAN.HA.QT 0.013 0.015 0.868 0.385 0.013 0.015

indrcCAN.HD.QT 0.011 0.016 0.712 0.477 0.011 0.012

indirctO.CAN.P 0.004 0.005 0.746 0.456 0.004 0.010

indrctO.CRAV.P 0.028 0.014 2.061 0.039 0.028 0.073

indrcCRAV.P.QT -0.010 0.014 -0.720 0.471 -0.010 -0.015

indrctCAN.P.QT -0.009 0.012 -0.685 0.493 -0.009 -0.010

>

> fit11 <- lavaan(model, data=MenReduct,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "ML")

> summary(fit11, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 53 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 27

Number of observations 131

Model Test User Model:

Test statistic 46.422

Degrees of freedom 6

P-value (Chi-square) 0.000

Model Test Baseline Model:

Test statistic 178.410

Degrees of freedom 27

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 0.733

Tucker-Lewis Index (TLI) -0.201

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -2512.908

Loglikelihood unrestricted model (H1) -2489.697

Akaike (AIC) 5079.817

Bayesian (BIC) 5157.447

Sample-size adjusted Bayesian (SABIC) 5072.049

Root Mean Square Error of Approximation:

RMSEA 0.227

90 Percent confidence interval - lower 0.169

90 Percent confidence interval - upper 0.290

P-value H\_0: RMSEA <= 0.050 0.000

P-value H\_0: RMSEA >= 0.080 1.000

Standardized Root Mean Square Residual:

SRMR 0.077

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.050 0.036 1.368 0.171 0.050 0.125

HD ~

O (T) 0.006 0.037 0.171 0.864 0.006 0.017

QT ~

HA (M) 0.451 0.310 1.453 0.146 0.451 0.158

HD (N) 0.581 0.329 1.762 0.078 0.581 0.185

CAN ~

O (A) 0.093 0.111 0.841 0.401 0.093 0.073

C ~

O (X) 0.604 0.139 4.332 0.000 0.604 0.354

QT ~

CAN (G) -0.074 0.076 -0.981 0.326 -0.074 -0.083

C (H) 0.024 0.058 0.416 0.678 0.024 0.036

HA ~

C (F) 0.030 0.021 1.418 0.156 0.030 0.129

CAN (B) 0.029 0.027 1.083 0.279 0.029 0.092

HD ~

C (D) 0.038 0.020 1.935 0.053 0.038 0.177

CAN (E) 0.019 0.025 0.778 0.437 0.019 0.067

P ~

O (J) 0.068 0.039 1.753 0.080 0.068 0.176

C (R) 0.047 0.020 2.344 0.019 0.047 0.206

CAN (Q) 0.041 0.025 1.616 0.106 0.041 0.133

QT ~

P (S) -0.209 0.276 -0.757 0.449 -0.209 -0.071

HD ~

C2 0.003 0.016 0.216 0.829 0.003 0.018

P ~

C2 -0.008 0.019 -0.428 0.669 -0.008 -0.039

Covariances:

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

.HA ~~

.HD 6.463 1.119 5.777 0.000 6.463 0.585

.HD ~~

.P 2.905 0.946 3.070 0.002 2.905 0.278

.HA ~~

.P 4.008 1.052 3.809 0.000 4.008 0.353

Variances:

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

.HA 12.029 1.486 8.093 0.000 12.029 0.946

.HD 10.159 1.255 8.093 0.000 10.159 0.959

.QT 94.622 11.692 8.093 0.000 94.622 0.910

.CAN 128.585 15.888 8.093 0.000 128.585 0.995

.C 203.189 25.106 8.093 0.000 203.189 0.875

.P 10.717 1.324 8.093 0.000 10.717 0.887

R-Square:

Estimate

HA 0.054

HD 0.041

QT 0.090

CAN 0.005

C 0.125

P 0.113

Defined Parameters:

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

indirctO.HA.QT 0.022 0.023 0.996 0.319 0.022 0.020

indirctO.HD.QT 0.004 0.022 0.171 0.865 0.004 0.003

indirectO.P.QT -0.014 0.021 -0.695 0.487 -0.014 -0.013

indrctO.CAN.HA 0.003 0.004 0.664 0.507 0.003 0.007

indrcO.CRAV.HD 0.023 0.013 1.767 0.077 0.023 0.063

indrctO.CAN.HD 0.002 0.003 0.571 0.568 0.002 0.005

indrcO.CRAV.HA 0.018 0.014 1.347 0.178 0.018 0.046

indrctO.CAN.QT -0.007 0.011 -0.638 0.523 -0.007 -0.006

indrcO.CRAV.QT 0.015 0.035 0.414 0.679 0.015 0.013

indrCRAV.HA.QT 0.014 0.013 1.015 0.310 0.014 0.020

indrCRAV.HD.QT 0.022 0.017 1.303 0.193 0.022 0.033

indrcCAN.HA.QT 0.013 0.015 0.868 0.385 0.013 0.015

indrcCAN.HD.QT 0.011 0.016 0.712 0.477 0.011 0.012

indirctO.CAN.P 0.004 0.005 0.746 0.456 0.004 0.010

indrctO.CRAV.P 0.028 0.014 2.061 0.039 0.028 0.073

indrcCRAV.P.QT -0.010 0.014 -0.720 0.471 -0.010 -0.015

indrctCAN.P.QT -0.009 0.012 -0.685 0.493 -0.009 -0.010

> resid(fit11, type="standardized")

$type

[1] "standardized"

$cov

HA HD QT CAN C P O C2

HA 0.194

HD 0.338 0.931

QT 0.282 0.525 -0.038

CAN 0.194 0.366 0.335 0.000

C 0.194 1.451 0.266 0.194 0.000

P -0.103 -0.019 0.153 -0.175 -1.254 -1.340

O 0.000 0.000 1.295 0.000 0.000 0.000 0.000

C2 0.343 1.295 0.941 2.104 6.712 3.056 0.000 0.000

> resid(fit11, type="cor")

$type

[1] "cor.bollen"

$cov

HA HD QT CAN C P O C2

HA 0.000

HD 0.000 0.000

QT 0.000 0.000 0.000

CAN 0.002 0.005 0.002 0.000

C 0.001 0.008 0.001 0.016 0.000

P 0.001 0.001 0.000 -0.002 -0.013 0.000

O 0.000 0.000 0.099 0.000 0.000 0.001 0.000

C2 0.025 0.057 0.072 0.154 0.403 0.090 0.000 0.000

>

> standardizedSolution(fit11)

lhs op rhs label est.std se z pvalue ci.lower ci.upper

1 HA ~ O K 0.125 0.090 1.382 0.167 -0.052 0.301

2 HD ~ O T 0.017 0.101 0.171 0.864 -0.181 0.216

3 QT ~ HA M 0.158 0.108 1.463 0.143 -0.054 0.369

4 QT ~ HD N 0.185 0.104 1.781 0.075 -0.019 0.389

5 CAN ~ O A 0.073 0.087 0.844 0.399 -0.097 0.243

6 C ~ O X 0.354 0.074 4.785 0.000 0.209 0.499

7 QT ~ CAN G -0.083 0.084 -0.984 0.325 -0.248 0.082

8 QT ~ C H 0.036 0.087 0.416 0.677 -0.134 0.207

9 HA ~ C F 0.129 0.090 1.428 0.153 -0.048 0.306

10 HA ~ CAN B 0.092 0.085 1.087 0.277 -0.074 0.259

11 HD ~ C D 0.177 0.090 1.962 0.050 0.000 0.354

12 HD ~ CAN E 0.067 0.086 0.779 0.436 -0.101 0.235

13 HA ~~ HD 0.585 0.058 10.168 0.000 0.472 0.697

14 P ~ O J 0.176 0.099 1.780 0.075 -0.018 0.369

15 P ~ C R 0.206 0.086 2.386 0.017 0.037 0.376

16 P ~ CAN Q 0.133 0.082 1.629 0.103 -0.027 0.294

17 QT ~ P S -0.071 0.094 -0.758 0.448 -0.256 0.113

18 HD ~~ P 0.278 0.081 3.454 0.001 0.120 0.436

19 HA ~~ P 0.353 0.076 4.615 0.000 0.203 0.503

20 HD ~ C2 0.018 0.082 0.216 0.829 -0.142 0.177

21 P ~ C2 -0.039 0.090 -0.428 0.668 -0.216 0.138

22 HA ~~ HA 0.946 0.038 24.701 0.000 0.871 1.021

23 HD ~~ HD 0.959 0.034 28.372 0.000 0.893 1.025

24 QT ~~ QT 0.910 0.048 19.102 0.000 0.817 1.004

25 CAN ~~ CAN 0.995 0.013 78.233 0.000 0.970 1.020

26 C ~~ C 0.875 0.052 16.697 0.000 0.772 0.977

27 P ~~ P 0.887 0.051 17.243 0.000 0.786 0.988

28 O ~~ O 1.000 0.000 NA NA 1.000 1.000

29 O ~~ C2 0.525 0.000 NA NA 0.525 0.525

30 C2 ~~ C2 1.000 0.000 NA NA 1.000 1.000

31 indirectO.HA.QT := K\*M indirectO.HA.QT 0.020 0.020 1.001 0.317 -0.019 0.058

32 indirectO.HD.QT := T\*N indirectO.HD.QT 0.003 0.019 0.171 0.865 -0.034 0.040

33 indirectO.P.QT := J\*S indirectO.P.QT -0.013 0.018 -0.697 0.486 -0.048 0.023

34 indirectO.CAN.HA := A\*B indirectO.CAN.HA 0.007 0.010 0.666 0.505 -0.013 0.027

35 indirectO.CRAV.HD := X\*D indirectO.CRAV.HD 0.063 0.035 1.799 0.072 -0.006 0.131

36 indirectO.CAN.HD := A\*E indirectO.CAN.HD 0.005 0.009 0.572 0.567 -0.012 0.022

37 indirectO.CRAV.HA := X\*F indirectO.CRAV.HA 0.046 0.033 1.362 0.173 -0.020 0.111

38 indirectO.CAN.QT := A\*G indirectO.CAN.QT -0.006 0.009 -0.640 0.522 -0.025 0.013

39 indirectO.CRAV.QT := X\*H indirectO.CRAV.QT 0.013 0.031 0.414 0.679 -0.048 0.073

40 indirectCRAV.HA.QT := F\*M indirectCRAV.HA.QT 0.020 0.020 1.019 0.308 -0.019 0.059

41 indirectCRAV.HD.QT := D\*N indirectCRAV.HD.QT 0.033 0.025 1.312 0.190 -0.016 0.082

42 indirectCAN.HA.QT := B\*M indirectCAN.HA.QT 0.015 0.017 0.869 0.385 -0.018 0.047

43 indirectCAN.HD.QT := E\*N indirectCAN.HD.QT 0.012 0.017 0.712 0.476 -0.022 0.046

44 indirectO.CAN.P := A\*Q indirectO.CAN.P 0.010 0.013 0.749 0.454 -0.016 0.035

45 indirectO.CRAV.P := X\*R indirectO.CRAV.P 0.073 0.035 2.114 0.035 0.005 0.141

46 indirectCRAV.P.QT := R\*S indirectCRAV.P.QT -0.015 0.020 -0.722 0.471 -0.055 0.025

47 indirectCAN.P.QT := Q\*S indirectCAN.P.QT -0.010 0.014 -0.686 0.492 -0.037 0.018

> #Women Sample

> model <- 'HA ~ K\*O

+ HD ~ T\*O

+ QT ~ M\*HA

+ QT ~ N\*HD

+ CAN ~ A\*O

+ C ~ X\*O

+ QT ~ G\*CAN

+ QT ~ H\*C

+ HA ~ F\*C

+ HA ~ B\*CAN

+ HD ~ D\*C

+ HD ~ E\*CAN

+ HA ~~ HD

+ P ~ J\*O

+ P ~ R\*C

+ P ~ Q\*CAN

+ QT ~ S\*P

+ HD ~~ P

+ HA ~~ P

+ QT ~ HD2

+ indirectO.HA.QT := K\*M

+ indirectO.HD.QT := T\*N

+ indirectO.P.QT := J\*S

+ indirectO.CAN.HA := A\*B

+ indirectO.CRAV.HD := X\*D

+ indirectO.CAN.HD := A\*E

+ indirectO.CRAV.HA := X\*F

+ indirectO.CAN.QT := A\*G

+ indirectO.CRAV.QT := X\*H

+ indirectCRAV.HA.QT := F\*M

+ indirectCRAV.HD.QT := D\*N

+ indirectCAN.HA.QT := B\*M

+ indirectCAN.HD.QT := E\*N

+ indirectO.CAN.P := A\*Q

+ indirectO.CRAV.P := X\*R

+ indirectCRAV.P.QT := R\*S

+ indirectCAN.P.QT := Q\*S'

> result <- sem(model, data = WomenReduct)

> summary(result, standardized = TRUE)

lavaan 0.6.15 ended normally after 51 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 26

Used Total

Number of observations 55 56

Model Test User Model:

Test statistic 24.831

Degrees of freedom 7

P-value (Chi-square) 0.001

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.147 0.071 2.070 0.038 0.147 0.265

HD ~

O (T) 0.148 0.054 2.737 0.006 0.148 0.335

QT ~

HA (M) 0.894 0.340 2.627 0.009 0.894 0.350

HD (N) 1.086 0.410 2.647 0.008 1.086 0.339

CAN ~

O (A) 0.066 0.140 0.469 0.639 0.066 0.063

C ~

O (X) 0.534 0.249 2.140 0.032 0.534 0.277

QT ~

CAN (G) 0.093 0.131 0.706 0.480 0.093 0.068

C (H) -0.003 0.068 -0.047 0.962 -0.003 -0.004

HA ~

C (F) 0.040 0.037 1.097 0.273 0.040 0.140

CAN (B) 0.121 0.065 1.848 0.065 0.121 0.227

HD ~

C (D) 0.011 0.028 0.411 0.681 0.011 0.050

CAN (E) 0.138 0.050 2.774 0.006 0.138 0.326

P ~

O (J) 0.126 0.053 2.363 0.018 0.126 0.299

C (R) 0.030 0.028 1.094 0.274 0.030 0.138

CAN (Q) 0.087 0.049 1.775 0.076 0.087 0.216

QT ~

P (S) 0.486 0.363 1.341 0.180 0.486 0.145

HD2 -0.492 0.302 -1.629 0.103 -0.492 -0.148

Covariances:

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

.HA ~~

.HD 7.690 1.980 3.884 0.000 7.690 0.615

.HD ~~

.P 2.575 1.318 1.954 0.051 2.575 0.273

.HA ~~

.P 5.264 1.815 2.900 0.004 5.264 0.425

Variances:

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

.HA 16.440 3.135 5.244 0.000 16.440 0.829

.HD 9.515 1.815 5.244 0.000 9.515 0.756

.QT 57.598 10.983 5.244 0.000 57.598 0.446

.CAN 70.025 13.353 5.244 0.000 70.025 0.996

.C 221.305 42.201 5.244 0.000 221.305 0.923

.P 9.338 1.781 5.244 0.000 9.338 0.812

Defined Parameters:

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

indirctO.HA.QT 0.131 0.081 1.626 0.104 0.131 0.093

indirctO.HD.QT 0.160 0.084 1.903 0.057 0.160 0.113

indirectO.P.QT 0.061 0.053 1.166 0.244 0.061 0.043

indrctO.CAN.HA 0.008 0.017 0.455 0.649 0.008 0.014

indrcO.CRAV.HD 0.006 0.015 0.403 0.687 0.006 0.014

indrctO.CAN.HD 0.009 0.020 0.463 0.644 0.009 0.021

indrcO.CRAV.HA 0.022 0.022 0.976 0.329 0.022 0.039

indrctO.CAN.QT 0.006 0.016 0.391 0.696 0.006 0.004

indrcO.CRAV.QT -0.002 0.037 -0.047 0.963 -0.002 -0.001

indrCRAV.HA.QT 0.036 0.036 1.012 0.311 0.036 0.049

indrCRAV.HD.QT 0.012 0.031 0.406 0.685 0.012 0.017

indrcCAN.HA.QT 0.108 0.071 1.511 0.131 0.108 0.080

indrcCAN.HD.QT 0.150 0.078 1.915 0.055 0.150 0.110

indirctO.CAN.P 0.006 0.013 0.454 0.650 0.006 0.014

indrctO.CRAV.P 0.016 0.017 0.974 0.330 0.016 0.038

indrcCRAV.P.QT 0.015 0.017 0.848 0.397 0.015 0.020

indrctCAN.P.QT 0.043 0.040 1.070 0.285 0.043 0.031

>

> fit12 <- lavaan(model, data=WomenReduct,

+ auto.var=TRUE, auto.fix.first=TRUE,

+ auto.cov.lv.x=TRUE, estimator = "ML")

> summary(fit12, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 51 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 26

Used Total

Number of observations 55 56

Model Test User Model:

Test statistic 24.831

Degrees of freedom 7

P-value (Chi-square) 0.001

Model Test Baseline Model:

Test statistic 143.593

Degrees of freedom 27

P-value 0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI) 0.847

Tucker-Lewis Index (TLI) 0.410

Loglikelihood and Information Criteria:

Loglikelihood user model (H0) -1026.896

Loglikelihood unrestricted model (H1) -1014.481

Akaike (AIC) 2105.792

Bayesian (BIC) 2157.983

Sample-size adjusted Bayesian (SABIC) 2076.282

Root Mean Square Error of Approximation:

RMSEA 0.215

90 Percent confidence interval - lower 0.127

90 Percent confidence interval - upper 0.310

P-value H\_0: RMSEA <= 0.050 0.003

P-value H\_0: RMSEA >= 0.080 0.992

Standardized Root Mean Square Residual:

SRMR 0.145

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O (K) 0.147 0.071 2.070 0.038 0.147 0.265

HD ~

O (T) 0.148 0.054 2.737 0.006 0.148 0.335

QT ~

HA (M) 0.894 0.340 2.627 0.009 0.894 0.350

HD (N) 1.086 0.410 2.647 0.008 1.086 0.339

CAN ~

O (A) 0.066 0.140 0.469 0.639 0.066 0.063

C ~

O (X) 0.534 0.249 2.140 0.032 0.534 0.277

QT ~

CAN (G) 0.093 0.131 0.706 0.480 0.093 0.068

C (H) -0.003 0.068 -0.047 0.962 -0.003 -0.004

HA ~

C (F) 0.040 0.037 1.097 0.273 0.040 0.140

CAN (B) 0.121 0.065 1.848 0.065 0.121 0.227

HD ~

C (D) 0.011 0.028 0.411 0.681 0.011 0.050

CAN (E) 0.138 0.050 2.774 0.006 0.138 0.326

P ~

O (J) 0.126 0.053 2.363 0.018 0.126 0.299

C (R) 0.030 0.028 1.094 0.274 0.030 0.138

CAN (Q) 0.087 0.049 1.775 0.076 0.087 0.216

QT ~

P (S) 0.486 0.363 1.341 0.180 0.486 0.145

HD2 -0.492 0.302 -1.629 0.103 -0.492 -0.148

Covariances:

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

.HA ~~

.HD 7.690 1.980 3.884 0.000 7.690 0.615

.HD ~~

.P 2.575 1.318 1.954 0.051 2.575 0.273

.HA ~~

.P 5.264 1.815 2.900 0.004 5.264 0.425

Variances:

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

.HA 16.440 3.135 5.244 0.000 16.440 0.829

.HD 9.515 1.815 5.244 0.000 9.515 0.756

.QT 57.598 10.983 5.244 0.000 57.598 0.446

.CAN 70.025 13.353 5.244 0.000 70.025 0.996

.C 221.305 42.201 5.244 0.000 221.305 0.923

.P 9.338 1.781 5.244 0.000 9.338 0.812

R-Square:

Estimate

HA 0.171

HD 0.244

QT 0.554

CAN 0.004

C 0.077

P 0.188

Defined Parameters:

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

indirctO.HA.QT 0.131 0.081 1.626 0.104 0.131 0.093

indirctO.HD.QT 0.160 0.084 1.903 0.057 0.160 0.113

indirectO.P.QT 0.061 0.053 1.166 0.244 0.061 0.043

indrctO.CAN.HA 0.008 0.017 0.455 0.649 0.008 0.014

indrcO.CRAV.HD 0.006 0.015 0.403 0.687 0.006 0.014

indrctO.CAN.HD 0.009 0.020 0.463 0.644 0.009 0.021

indrcO.CRAV.HA 0.022 0.022 0.976 0.329 0.022 0.039

indrctO.CAN.QT 0.006 0.016 0.391 0.696 0.006 0.004

indrcO.CRAV.QT -0.002 0.037 -0.047 0.963 -0.002 -0.001

indrCRAV.HA.QT 0.036 0.036 1.012 0.311 0.036 0.049

indrCRAV.HD.QT 0.012 0.031 0.406 0.685 0.012 0.017

indrcCAN.HA.QT 0.108 0.071 1.511 0.131 0.108 0.080

indrcCAN.HD.QT 0.150 0.078 1.915 0.055 0.150 0.110

indirctO.CAN.P 0.006 0.013 0.454 0.650 0.006 0.014

indrctO.CRAV.P 0.016 0.017 0.974 0.330 0.016 0.038

indrcCRAV.P.QT 0.015 0.017 0.848 0.397 0.015 0.020

indrctCAN.P.QT 0.043 0.040 1.070 0.285 0.043 0.031

> resid(fit12, type="standardized")

$type

[1] "standardized"

$cov

HA HD QT CAN C P O HD2

HA 0.709

HD 0.709 0.709

QT -2.329 -2.803 -3.881

CAN 0.709 0.709 -2.737 0.000

C 0.709 0.709 0.070 0.709 0.000

P 0.709 0.709 -3.455 0.709 0.709 0.709

O 0.000 0.000 -0.339 0.000 0.000 0.000 0.000

HD2 2.801 3.132 4.121 3.369 1.318 4.079 0.000 0.000

> resid(fit12, type="cor")

$type

[1] "cor.bollen"

$cov

HA HD QT CAN C P O HD2

HA 0.000

HD 0.002 0.000

QT -0.014 -0.020 0.000

CAN 0.012 0.004 -0.039 0.000

C 0.020 0.030 0.010 0.092 0.000

P 0.003 0.003 -0.040 0.012 0.019 0.000

O -0.001 -0.001 -0.016 0.000 0.000 -0.001 0.000

HD2 0.326 0.352 0.337 0.402 0.164 0.439 0.000 0.000

>

> standardizedSolution(fit12)

lhs op rhs label est.std se z pvalue ci.lower ci.upper

1 HA ~ O K 0.265 0.122 2.170 0.030 0.026 0.504

2 HD ~ O T 0.335 0.113 2.950 0.003 0.112 0.557

3 QT ~ HA M 0.350 0.130 2.686 0.007 0.095 0.606

4 QT ~ HD N 0.339 0.125 2.704 0.007 0.093 0.585

5 CAN ~ O A 0.063 0.134 0.471 0.638 -0.200 0.326

6 C ~ O X 0.277 0.122 2.271 0.023 0.038 0.516

7 QT ~ CAN G 0.068 0.097 0.706 0.480 -0.121 0.258

8 QT ~ C H -0.004 0.093 -0.047 0.962 -0.187 0.179

9 HA ~ C F 0.140 0.127 1.106 0.269 -0.108 0.389

10 HA ~ CAN B 0.227 0.120 1.891 0.059 -0.008 0.463

11 HD ~ C D 0.050 0.122 0.411 0.681 -0.189 0.289

12 HD ~ CAN E 0.326 0.112 2.907 0.004 0.106 0.545

13 HA ~~ HD 0.615 0.084 7.332 0.000 0.451 0.779

14 P ~ O J 0.299 0.119 2.511 0.012 0.066 0.533

15 P ~ C R 0.138 0.126 1.102 0.270 -0.108 0.384

16 P ~ CAN Q 0.216 0.119 1.811 0.070 -0.018 0.450

17 QT ~ P S 0.145 0.108 1.343 0.179 -0.067 0.357

18 HD ~~ P 0.273 0.125 2.189 0.029 0.029 0.518

19 HA ~~ P 0.425 0.111 3.844 0.000 0.208 0.641

20 QT ~ HD2 -0.148 0.090 -1.645 0.100 -0.323 0.028

21 HA ~~ HA 0.829 0.091 9.135 0.000 0.651 1.007

22 HD ~~ HD 0.756 0.099 7.654 0.000 0.562 0.949

23 QT ~~ QT 0.446 0.088 5.045 0.000 0.273 0.619

24 CAN ~~ CAN 0.996 0.017 58.796 0.000 0.963 1.029

25 C ~~ C 0.923 0.068 13.641 0.000 0.791 1.056

26 P ~~ P 0.812 0.093 8.759 0.000 0.631 0.994

27 O ~~ O 1.000 0.000 NA NA 1.000 1.000

28 O ~~ HD2 0.228 0.000 NA NA 0.228 0.228

29 HD2 ~~ HD2 1.000 0.000 NA NA 1.000 1.000

30 indirectO.HA.QT := K\*M indirectO.HA.QT 0.093 0.055 1.676 0.094 -0.016 0.201

31 indirectO.HD.QT := T\*N indirectO.HD.QT 0.113 0.058 1.968 0.049 0.000 0.226

32 indirectO.P.QT := J\*S indirectO.P.QT 0.043 0.037 1.178 0.239 -0.029 0.116

33 indirectO.CAN.HA := A\*B indirectO.CAN.HA 0.014 0.031 0.458 0.647 -0.047 0.076

34 indirectO.CRAV.HD := X\*D indirectO.CRAV.HD 0.014 0.034 0.404 0.686 -0.053 0.081

35 indirectO.CAN.HD := A\*E indirectO.CAN.HD 0.021 0.044 0.467 0.641 -0.066 0.107

36 indirectO.CRAV.HA := X\*F indirectO.CRAV.HA 0.039 0.039 0.989 0.323 -0.038 0.116

37 indirectO.CAN.QT := A\*G indirectO.CAN.QT 0.004 0.011 0.392 0.695 -0.017 0.026

38 indirectO.CRAV.QT := X\*H indirectO.CRAV.QT -0.001 0.026 -0.047 0.963 -0.052 0.049

39 indirectCRAV.HA.QT := F\*M indirectCRAV.HA.QT 0.049 0.048 1.017 0.309 -0.045 0.144

40 indirectCRAV.HD.QT := D\*N indirectCRAV.HD.QT 0.017 0.042 0.407 0.684 -0.065 0.099

41 indirectCAN.HA.QT := B\*M indirectCAN.HA.QT 0.080 0.051 1.553 0.120 -0.021 0.180

42 indirectCAN.HD.QT := E\*N indirectCAN.HD.QT 0.110 0.056 1.969 0.049 0.001 0.220

43 indirectO.CAN.P := A\*Q indirectO.CAN.P 0.014 0.030 0.457 0.648 -0.045 0.072

44 indirectO.CRAV.P := X\*R indirectO.CRAV.P 0.038 0.039 0.987 0.324 -0.038 0.115

45 indirectCRAV.P.QT := R\*S indirectCRAV.P.QT 0.020 0.024 0.849 0.396 -0.026 0.066

46 indirectCAN.P.QT := Q\*S indirectCAN.P.QT 0.031 0.029 1.079 0.281 -0.026 0.088

> #Supplemntal Treatment Group Analysis

>

> model <- 'HA ~ O

+ HD ~ O

+ QT ~ HA

+ QT ~ HD

+ CAN ~ O

+ C ~ O

+ QT ~ CAN

+ QT ~ C

+ HA ~ C

+ HA ~ CAN

+ HD ~ C

+ HD ~ CAN

+ HA ~~ HD

+ P ~ O

+ P ~ C

+ P ~ CAN

+ QT ~ P

+ HD ~~ P

+ HA ~~ P

+ C ~ TRT

+ P ~ TRT

+ HA ~ TRT

+ HD ~ TRT

+ CAN ~ TRT

+ O ~ TRT

+ QT ~ TRT'

> fit15 <- cfa(model, data = MultigroupData)

> summary(fit15, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)

lavaan 0.6.15 ended normally after 50 iterations

Estimator ML

Optimization method NLMINB

Number of model parameters 33

Number of observations 186

Model Test User Model:

Test statistic 1.732

Degrees of freedom 2

P-value (Chi-square) 0.421

Model Test Baseline Model:

Test statistic 231.551

Degrees of freedom 28

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) -4225.564

Loglikelihood unrestricted model (H1) NA

Akaike (AIC) 8517.129

Bayesian (BIC) 8623.578

Sample-size adjusted Bayesian (SABIC) 8519.055

Root Mean Square Error of Approximation:

RMSEA 0.000

90 Percent confidence interval - lower 0.000

90 Percent confidence interval - upper 0.139

P-value H\_0: RMSEA <= 0.050 0.569

P-value H\_0: RMSEA >= 0.080 0.268

Standardized Root Mean Square Residual:

SRMR 0.014

Parameter Estimates:

Standard errors Standard

Information Expected

Information saturated (h1) model Structured

Regressions:

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

HA ~

O 0.080 0.033 2.411 0.016 0.080 0.181

HD ~

O 0.047 0.029 1.642 0.101 0.047 0.124

QT ~

HA 0.708 0.238 2.969 0.003 0.708 0.263

HD 0.712 0.267 2.664 0.008 0.712 0.228

CAN ~

O 0.080 0.089 0.897 0.370 0.080 0.066

C ~

O 0.585 0.122 4.795 0.000 0.585 0.333

QT ~

CAN -0.050 0.066 -0.753 0.452 -0.050 -0.051

C 0.012 0.047 0.249 0.803 0.012 0.017

HA ~

C 0.033 0.019 1.754 0.079 0.033 0.131

CAN 0.044 0.026 1.691 0.091 0.044 0.119

HD ~

C 0.031 0.016 1.911 0.056 0.031 0.143

CAN 0.041 0.022 1.836 0.066 0.041 0.130

P ~

O 0.081 0.029 2.826 0.005 0.081 0.206

C 0.039 0.016 2.400 0.016 0.039 0.174

CAN 0.048 0.022 2.171 0.030 0.048 0.149

QT ~

P -0.078 0.229 -0.340 0.734 -0.078 -0.026

C ~

TRT 0.535 2.132 0.251 0.802 0.535 0.017

P ~

TRT 0.709 0.475 1.494 0.135 0.709 0.103

HA ~

TRT 0.164 0.549 0.299 0.765 0.164 0.021

HD ~

TRT 0.540 0.476 1.134 0.257 0.540 0.081

CAN ~

TRT 0.039 1.559 0.025 0.980 0.039 0.002

O ~

TRT -1.771 1.275 -1.389 0.165 -1.771 -0.101

QT ~

TRT -0.760 1.392 -0.546 0.585 -0.760 -0.036

Covariances:

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

.HA ~~

.HD 7.145 1.024 6.979 0.000 7.145 0.596

.HD ~~

.P 2.944 0.790 3.727 0.000 2.944 0.284

.HA ~~

.P 4.443 0.935 4.750 0.000 4.443 0.372

Variances:

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

.HA 13.838 1.435 9.644 0.000 13.838 0.917

.HD 10.399 1.078 9.644 0.000 10.399 0.929

.QT 88.506 9.178 9.644 0.000 88.506 0.813

.CAN 111.572 11.569 9.644 0.000 111.572 0.996

.C 208.672 21.638 9.644 0.000 208.672 0.890

.P 10.331 1.071 9.644 0.000 10.331 0.870

.O 75.344 7.813 9.644 0.000 75.344 0.990

R-Square:

Estimate

HA 0.083

HD 0.071

QT 0.187

CAN 0.004

C 0.110

P 0.130

O 0.010

> standardizedSolution(fit15)

lhs op rhs est.std se z pvalue ci.lower ci.upper

1 HA ~ O 0.181 0.074 2.445 0.014 0.036 0.326

2 HD ~ O 0.124 0.075 1.652 0.098 -0.023 0.271

3 QT ~ HA 0.263 0.087 3.025 0.002 0.093 0.434

4 QT ~ HD 0.228 0.084 2.704 0.007 0.063 0.394

5 CAN ~ O 0.066 0.073 0.899 0.369 -0.078 0.210

6 C ~ O 0.333 0.066 5.082 0.000 0.205 0.462

7 QT ~ CAN -0.051 0.067 -0.753 0.451 -0.183 0.081

8 QT ~ C 0.017 0.069 0.249 0.803 -0.118 0.152

9 HA ~ C 0.131 0.074 1.767 0.077 -0.014 0.275

10 HA ~ CAN 0.119 0.070 1.702 0.089 -0.018 0.256

11 HD ~ C 0.143 0.074 1.928 0.054 -0.002 0.289

12 HD ~ CAN 0.130 0.070 1.851 0.064 -0.008 0.268

13 HA ~~ HD 0.596 0.047 12.590 0.000 0.503 0.688

14 P ~ O 0.206 0.072 2.876 0.004 0.066 0.347

15 P ~ C 0.174 0.072 2.431 0.015 0.034 0.314

16 P ~ CAN 0.149 0.068 2.193 0.028 0.016 0.282

17 QT ~ P -0.026 0.076 -0.340 0.734 -0.174 0.123

18 HD ~~ P 0.284 0.067 4.214 0.000 0.152 0.416

19 HA ~~ P 0.372 0.063 5.879 0.000 0.248 0.495

20 C ~ TRT 0.017 0.070 0.251 0.802 -0.119 0.154

21 P ~ TRT 0.103 0.068 1.505 0.132 -0.031 0.237

22 HA ~ TRT 0.021 0.071 0.299 0.765 -0.117 0.159

23 HD ~ TRT 0.081 0.071 1.140 0.254 -0.058 0.219

24 CAN ~ TRT 0.002 0.074 0.025 0.980 -0.142 0.146

25 O ~ TRT -0.101 0.072 -1.400 0.162 -0.243 0.041

26 QT ~ TRT -0.036 0.067 -0.547 0.585 -0.167 0.094

27 HA ~~ HA 0.917 0.039 23.757 0.000 0.842 0.993

28 HD ~~ HD 0.929 0.036 25.575 0.000 0.857 1.000

29 QT ~~ QT 0.813 0.052 15.769 0.000 0.712 0.914

30 CAN ~~ CAN 0.996 0.010 103.629 0.000 0.977 1.015

31 C ~~ C 0.890 0.043 20.537 0.000 0.805 0.975

32 P ~~ P 0.870 0.046 18.990 0.000 0.781 0.960

33 O ~~ O 0.990 0.015 67.474 0.000 0.961 1.018

34 TRT ~~ TRT 1.000 0.000 NA NA 1.000 1.000

> resid(fit15, type="standardized")

$type

[1] "standardized"

$cov

HA HD QT CAN C P O TRT

HA 0.504

HD 0.504 0.504

QT 0.504 0.504 0.504

CAN 0.504 0.504 0.504 0.000

C 0.504 0.504 0.504 0.504 0.000

P 0.504 0.504 0.504 0.504 0.504 0.504

O 0.000 0.000 1.208 0.000 0.000 0.000 0.000

TRT 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

> resid(fit15, type="cor")

$type

[1] "cor.bollen"

$cov

HA HD QT CAN C P O TRT

HA 0.000

HD 0.000 0.000

QT 0.000 0.000 0.000

CAN 0.004 0.005 0.003 0.000

C 0.004 0.004 0.000 0.035 0.000

P 0.001 0.001 0.000 0.006 0.005 0.000

O 0.000 0.000 0.073 0.000 0.000 0.000 0.000

TRT 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000