

```

> 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)
indirectO.HA.QT	0.057	0.030	1.873	0.061
indirectO.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
indrctO.CRAV.HD	0.018	0.010	1.787	0.074
indrctO.CAN.HD	0.003	0.004	0.807	0.420
indrctO.CRAV.HA	0.019	0.012	1.652	0.099
indrctO.CAN.QT	-0.004	0.007	-0.572	0.567
indrctO.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
indrctCAN.HA.QT	0.031	0.021	1.474	0.140
indrctCAN.HD.QT	0.029	0.019	1.502	0.133
indirectO.CAN.P	0.004	0.005	0.830	0.407
indrctO.CRAV.P	0.023	0.011	2.156	0.031
indrctCRAV.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
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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)
indirectO.HA.QT	0.057	0.030	1.873	0.061
indirectO.HD.QT	0.031	0.023	1.322	0.186
indirectO.P.QT	-0.007	0.018	-0.383	0.701
indirectO.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
indirectO.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")
```

npars	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
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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

Number of observations	Used 131	Total 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
indirectO.HA.QT	0.022	0.023	0.996	0.319	0.022	0.020
indirectO.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
indirectO.CAN.HA	0.003	0.004	0.664	0.507	0.003	0.007
indirectO.CRAV.HD	0.024	0.013	1.834	0.067	0.024	0.065
indirectO.CAN.HD	0.002	0.003	0.583	0.560	0.002	0.005
indirectO.CRAV.HA	0.018	0.014	1.347	0.178	0.018	0.046
indirectO.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
indirectO.CAN.P	0.004	0.005	0.738	0.460	0.004	0.009
indrectO.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
indrectCAN.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
indirectO.HA.QT	0.022	0.023	0.996	0.319	0.022	0.020
indirectO.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
indrctO.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
indrctO.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
indrctO.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
indrctCAN.HA.QT	0.013	0.015	0.868	0.385	0.013	0.015
indrctCAN.HD.QT	0.012	0.016	0.735	0.463	0.012	0.013
indirectO.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
indrctCRAV.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
0.424    26.000      0.007    1.717    2.000
      133.526
      baseline.df      baseline.pvalue      cfi      tli
nnfi      rfi
1.026    21.000      0.000    1.000    1.026
      0.865
      nfi      pnfi      ifi      rni
logl  unrestricted.logl
```

```

2985.715      0.987      0.094      1.002      1.003      -
      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      0.022      0.022      0.019
0.019      458.233
      cn_01      gfi      agfi      pgfi
mfi      ecvi      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

```

```

> 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")

```

	npars	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      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      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
indirectO.HA.QT	0.131	0.081	1.617	0.106	0.131	0.097
indirectO.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
indrctO.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
indrctO.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
indrctO.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
indrctCAN.HA.QT	0.108	0.072	1.504	0.133	0.108	0.084
indrctCAN.HD.QT	0.138	0.076	1.818	0.069	0.138	0.107
indirectO.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
indrctCRAV.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
Number of observations	55
	Total
	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 \leq 0.05	0.764

Standardized Root Mean Square Residual:

SRMR	0.021
------	-------

Parameter Estimates:

Standard errors
Information
Information saturated (h1) model

Standard
Expected
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
indirectO.HA.QT	0.131	0.081	1.617	0.106	0.131	0.097
indirectO.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
indrctO.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
indrctO.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
indrctO.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
indrCAN.HA.QT	0.108	0.072	1.504	0.133	0.108	0.084
indrCAN.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
indrCRAV.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
C		12.860	7.307	1.760	0.078	12.860
C	~~					
QT		26.242	22.891	1.146	0.252	26.242

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
pvalue  baseline.chisq
      28.000      0.000
NA      117.764
      baseline.df  baseline.pvalue
nnfi      rfi
```

```
chisq      df
0.000      0.000
cfi      tli
```

	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	42.000000	15.2500000	27.0000000	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 18.000000 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 \leq 0.05	0.760

Standardized Root Mean Square Residual:

SRMR	0.017
------	-------

Parameter Estimates:

Standard errors
Information
Information saturated (h1) model

Standard
Expected
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")

	npars	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      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
indirectO.HA.QT	0.060	0.034	1.788	0.074	0.060	0.050
indirectO.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
indrctO.CAN.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
indrctO.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
indrctO.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
indrctCAN.HA.QT	0.032	0.021	1.516	0.130	0.032	0.033
indrctCAN.HD.QT	0.029	0.019	1.510	0.131	0.029	0.029
indirectO.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
indrctCRAV.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
indirectO.HA.QT	0.060	0.034	1.788	0.074	0.060	0.050
indirectO.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
indirectO.CAN.HA	0.004	0.005	0.800	0.424	0.004	0.008
indirectO.CRAV.HD	0.019	0.010	1.821	0.069	0.019	0.049
indirectO.CAN.HD	0.003	0.004	0.808	0.419	0.003	0.009
indirectO.CRAV.HA	0.021	0.012	1.793	0.073	0.021	0.048
indirectO.CAN.QT	-0.004	0.007	-0.571	0.568	-0.004	-0.003
indirectO.CRAV.QT	0.007	0.028	0.266	0.790	0.007	0.006
indirectCRAV.HA.QT	0.026	0.016	1.627	0.104	0.026	0.038
indirectCRAV.HD.QT	0.023	0.014	1.575	0.115	0.023	0.033
indirectCAN.HA.QT	0.032	0.021	1.516	0.130	0.032	0.033
indirectCAN.HD.QT	0.029	0.019	1.510	0.131	0.029	0.029
indirectO.CAN.P	0.004	0.005	0.846	0.398	0.004	0.011
indirectO.CRAV.P	0.032	0.012	2.738	0.006	0.032	0.079
indirectCRAV.P.QT	-0.005	0.013	-0.385	0.701	-0.005	-0.007
indirectCAN.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
indirectO.HA.QT	0.022	0.023	0.996	0.319	0.022	0.020
indirectO.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
indrctO.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
indrctO.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
indrctO.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
indrctCAN.HA.QT	0.013	0.015	0.868	0.385	0.013	0.015
indrctCAN.HD.QT	0.011	0.016	0.712	0.477	0.011	0.012
indirectO.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
indrctCRAV.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
Information
Information saturated (h1) model

Standard
Expected
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
indirectO.HA.QT	0.022	0.023	0.996	0.319	0.022	0.020
indirectO.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
indrctO.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
indrctO.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
indirectO.CAN.P	0.004	0.005	0.746	0.456	0.004	0.010
indrectO.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
indrectCAN.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
Information
Information saturated (h1) model

Standard
Expected
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
indirectO.HA.QT	0.131	0.081	1.626	0.104	0.131	0.093
indirectO.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
indrcoCAN.HA.QT	0.108	0.071	1.511	0.131	0.108	0.080
indrcoCAN.HD.QT	0.150	0.078	1.915	0.055	0.150	0.110
indirectO.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
indrcoCRAV.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
indirectO.HA.QT	0.131	0.081	1.626	0.104	0.131	0.093
indirectO.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
indrcoCAN.HA.QT	0.108	0.071	1.511	0.131	0.108	0.080
indrcoCAN.HD.QT	0.150	0.078	1.915	0.055	0.150	0.110
indirectO.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
indrcoCRAV.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
```