BACS HW15

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Load Dataset

```
security_sem <- read.csv('D:/桌面/NTHU/Courses/BACS/HW15/security_data_sem.csv')
```

Question 1) Composite Path Models using PLS-PM

a. Create a PLS path model using SEMinR, with all the following characteristics:

i. Measurement model – all constructs are measured as composites:

```
security_mm <- constructs(
  composite('TRUST', multi_items('TRST', 1:4)),
  composite('SEC', multi_items('PSEC', 1:4)),
  composite('REP', multi_items('PREP', 1:4)),
  composite('INV', multi_items('PINV', 1:3)),
  composite('POL', multi_items('PPSS', 1:3)),
  composite('FAML', single_item('FAML1')),
  interaction_term(iv='REP', moderator='POL', method=orthogonal)
)
```

ii. Structural Model – paths between constructs as shown in this causal model:

REP + INV + POL + FAML + (REP×POL) → SEC → TRUST

```
security_sm <- relationships(
  paths(from = c("REP","INV","POL","FAML","REP*POL"), to = "SEC"),
  paths(from = "SEC", to = "TRUST")
)
```

```
pls <- estimate_pls(
  data = security_sem,
  measurement_model = security_mm,
  structural_model = security_sm
)
```

```
## Generating the seminr model
```

```
## All 405 observations are valid.
```

```
summary(pls)
```

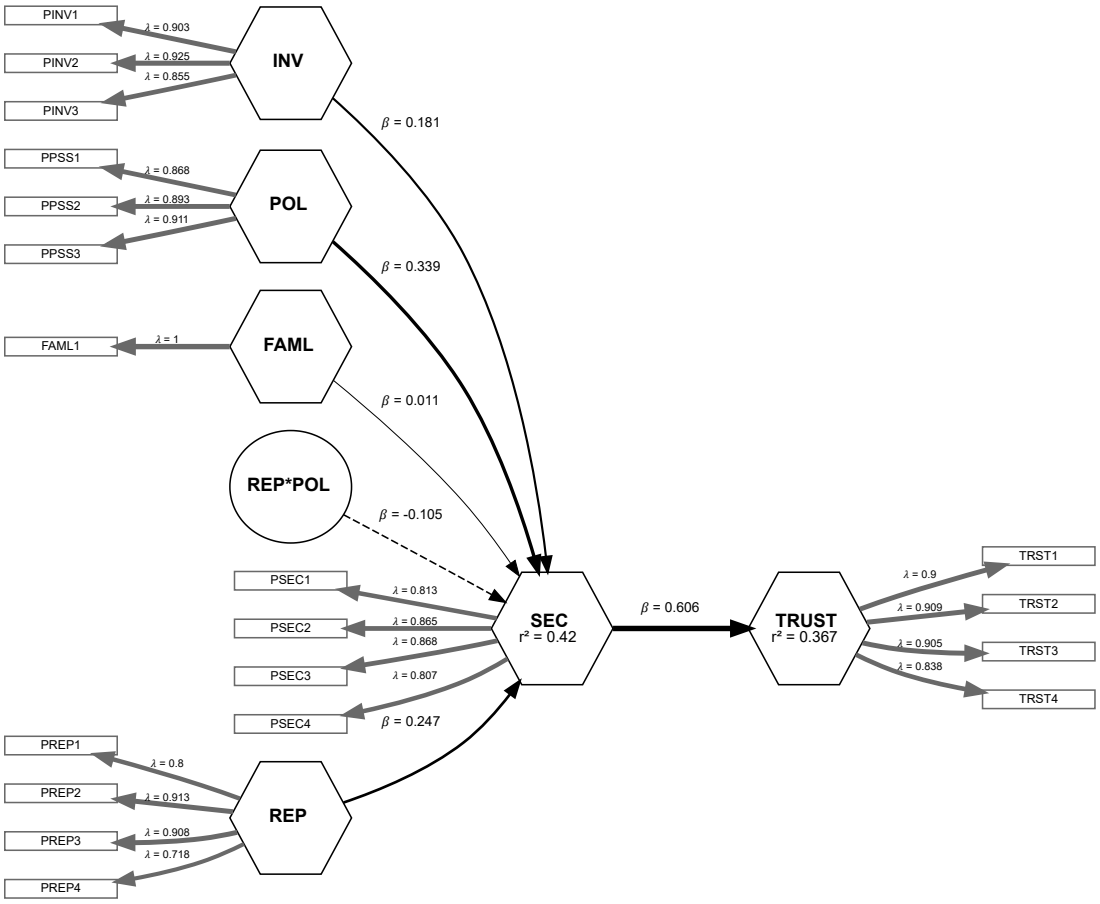
```
##
## Results from  package seminr (2.3.2)
##
## Path Coefficients:
##            SEC TRUST
## R^2      0.420 0.367
## AdjR^2   0.412 0.365
## REP      0.247     .
## INV      0.181     .
## POL      0.339     .
## FAML     0.011     .
## REP*POL -0.105     .
## SEC          . 0.606
##
## Reliability:
##         alpha  rhoC   AVE  rhoA
## REP     0.857 0.904 0.704 0.882
## INV     0.875 0.923 0.801 0.879
## POL     0.870 0.920 0.794 0.872
## FAML    1.000 1.000 1.000 1.000
## REP*POL 0.938 0.853 0.352 1.000
## SEC     0.859 0.905 0.704 0.862
## TRUST   0.911 0.937 0.789 0.911
##
## Alpha, rhoC, and rhoA should exceed 0.7 while AVE should exceed 0.5
```

b. Show us the following results in table or figure formats:

i. Plot a figure of the estimated model

```
plot(pls, title="PLS plot")
```

PLS plot



ii. Weights and loadings of composites

```
pls_summary <- summary(pls)
# Weight of composites
pls_summary$weights
```

```
##                REP   INV   POL  FAML REP*POL   SEC TRUST
## TRST1        0.000 0.000 0.000 0.000   0.000 0.000 0.282
## TRST2        0.000 0.000 0.000 0.000   0.000 0.000 0.280
## TRST3        0.000 0.000 0.000 0.000   0.000 0.000 0.286
## TRST4        0.000 0.000 0.000 0.000   0.000 0.000 0.278
## PSEC1        0.000 0.000 0.000 0.000   0.000 0.277 0.000
## PSEC2        0.000 0.000 0.000 0.000   0.000 0.315 0.000
## PSEC3        0.000 0.000 0.000 0.000   0.000 0.307 0.000
## PSEC4        0.000 0.000 0.000 0.000   0.000 0.292 0.000
## PREP1        0.215 0.000 0.000 0.000   0.000 0.000 0.000
## PREP2        0.334 0.000 0.000 0.000   0.000 0.000 0.000
## PREP3        0.349 0.000 0.000 0.000   0.000 0.000 0.000
## PREP4        0.287 0.000 0.000 0.000   0.000 0.000 0.000
## PINV1        0.000 0.363 0.000 0.000   0.000 0.000 0.000
## PINV2        0.000 0.395 0.000 0.000   0.000 0.000 0.000
## PINV3        0.000 0.358 0.000 0.000   0.000 0.000 0.000
## PPSS1        0.000 0.000 0.360 0.000   0.000 0.000 0.000
## PPSS2        0.000 0.000 0.395 0.000   0.000 0.000 0.000
## PPSS3        0.000 0.000 0.367 0.000   0.000 0.000 0.000
## FAML1        0.000 0.000 0.000 1.000   0.000 0.000 0.000
## PREP1*PPSS1 0.000 0.000 0.000 0.000   0.239 0.000 0.000
## PREP1*PPSS2 0.000 0.000 0.000 0.000   0.031 0.000 0.000
## PREP1*PPSS3 0.000 0.000 0.000 0.000   0.021 0.000 0.000
## PREP2*PPSS1 0.000 0.000 0.000 0.000   0.046 0.000 0.000
## PREP2*PPSS2 0.000 0.000 0.000 0.000  -0.104 0.000 0.000
## PREP2*PPSS3 0.000 0.000 0.000 0.000  -0.228 0.000 0.000
## PREP3*PPSS1 0.000 0.000 0.000 0.000  -0.341 0.000 0.000
## PREP3*PPSS2 0.000 0.000 0.000 0.000   0.095 0.000 0.000
## PREP3*PPSS3 0.000 0.000 0.000 0.000   0.108 0.000 0.000
## PREP4*PPSS1 0.000 0.000 0.000 0.000   0.443 0.000 0.000
## PREP4*PPSS2 0.000 0.000 0.000 0.000   0.382 0.000 0.000
## PREP4*PPSS3 0.000 0.000 0.000 0.000   0.271 0.000 0.000
```

```
# Loading of composites
pls_summary$loadings
```

```
##                REP    INV    POL   FAML REP*POL    SEC  TRUST
## TRST1        0.000  0.000  0.000  0.000  -0.000  0.000  0.900
## TRST2        0.000  0.000  0.000  0.000  -0.000  0.000  0.909
## TRST3        0.000  0.000  0.000  0.000  -0.000  0.000  0.905
## TRST4        0.000  0.000  0.000  0.000  -0.000  0.000  0.838
## PSEC1        0.000  0.000  0.000  0.000  -0.000  0.813  0.000
## PSEC2        0.000  0.000  0.000  0.000  -0.000  0.865  0.000
## PSEC3        0.000  0.000  0.000  0.000  -0.000  0.868  0.000
## PSEC4        0.000  0.000  0.000  0.000  -0.000  0.807  0.000
## PREP1        0.800  0.000  0.000  0.000   0.000  0.000  0.000
## PREP2        0.913  0.000  0.000  0.000   0.000  0.000  0.000
## PREP3        0.908  0.000  0.000  0.000   0.000  0.000  0.000
## PREP4        0.718  0.000  0.000  0.000   0.000  0.000  0.000
## PINV1        0.000  0.903  0.000  0.000  -0.000  0.000  0.000
## PINV2        0.000  0.925  0.000  0.000  -0.000  0.000  0.000
## PINV3        0.000  0.855  0.000  0.000  -0.000  0.000  0.000
## PPSS1        0.000  0.000  0.868  0.000   0.000  0.000  0.000
## PPSS2        0.000  0.000  0.893  0.000   0.000  0.000  0.000
## PPSS3        0.000  0.000  0.911  0.000   0.000  0.000  0.000
## FAML1        0.000  0.000  0.000  1.000  -0.000  0.000  0.000
## PREP1*PPSS1 -0.000 -0.000 -0.000 -0.000   0.581 -0.000 -0.000
## PREP1*PPSS2 -0.000 -0.000  0.000 -0.000   0.510 -0.000 -0.000
## PREP1*PPSS3 -0.000 -0.000 -0.000 -0.000   0.506 -0.000 -0.000
## PREP2*PPSS1 -0.000 -0.000 -0.000 -0.000   0.509 -0.000 -0.000
## PREP2*PPSS2 -0.000 -0.000  0.000 -0.000   0.421  0.000  0.000
## PREP2*PPSS3 -0.000 -0.000 -0.000  0.000   0.336  0.000  0.000
## PREP3*PPSS1 -0.000 -0.000 -0.000  0.000   0.236  0.000  0.000
## PREP3*PPSS2 -0.000 -0.000  0.000 -0.000   0.555 -0.000 -0.000
## PREP3*PPSS3 -0.000 -0.000 -0.000  0.000   0.466 -0.000 -0.000
## PREP4*PPSS1  0.000 -0.000  0.000  0.000   0.900 -0.000 -0.000
## PREP4*PPSS2 -0.000 -0.000 -0.000 -0.000   0.836 -0.000  0.000
## PREP4*PPSS3  0.000 -0.000  0.000  0.000   0.859 -0.000  0.000
```

iii. Regression coefficients of paths between factors

```
pls_summary$paths
```

```
##            SEC TRUST
## R^2      0.420 0.367
## AdjR^2   0.412 0.365
## REP      0.247     .
## INV      0.181     .
## POL      0.339     .
## FAML     0.011     .
## REP*POL -0.105     .
## SEC          . 0.606
```

iv. Bootstrapped path coefficients: t-values, 95% CI

```
boot_pls <- bootstrap_model(pls, nboot=1000)
```

```
## Bootstrapping model using seminr...
```

```
## SEMinR Model successfully bootstrapped
```

```
summary(boot_pls)
```

```
##
## Results from Bootstrap resamples:  1000
##
## Bootstrapped Structural Paths:
##                  Original Est. Bootstrap Mean Bootstrap SD T Stat. 2.5% CI
## REP  ->  SEC             0.247          0.242        0.061   4.067   0.120
## INV  ->  SEC             0.181          0.185        0.059   3.063   0.073
## POL  ->  SEC             0.339          0.341        0.057   5.978   0.229
## FAML  ->  SEC            0.011          0.015        0.062   0.169  -0.111
## REP*POL  ->  SEC        -0.105         -0.018        0.124  -0.841  -0.194
## SEC  ->  TRUST           0.606          0.609        0.034  17.592   0.542
##                  97.5% CI
## REP  ->  SEC        0.359
## INV  ->  SEC        0.300
## POL  ->  SEC        0.450
## FAML  ->  SEC       0.134
## REP*POL  ->  SEC    0.190
## SEC  ->  TRUST      0.671
##
## Bootstrapped Weights:
##                          Original Est. Bootstrap Mean Bootstrap SD T Stat.
## TRST1  ->  TRUST                 0.282          0.281        0.015  19.310
## TRST2  ->  TRUST                 0.280          0.280        0.016  18.057
## TRST3  ->  TRUST                 0.286          0.285        0.017  17.235
## TRST4  ->  TRUST                 0.278          0.278        0.020  13.930
## PSEC1  ->  SEC                   0.277          0.278        0.016  17.551
## PSEC2  ->  SEC                   0.315          0.314        0.017  18.791
## PSEC3  ->  SEC                   0.307          0.307        0.016  19.303
## PSEC4  ->  SEC                   0.292          0.291        0.018  16.671
## PREP1  ->  REP                   0.215          0.213        0.026   8.414
## PREP2  ->  REP                   0.334          0.333        0.018  18.755
## PREP3  ->  REP                   0.349          0.350        0.022  15.654
## PREP4  ->  REP                   0.287          0.286        0.026  11.210
## PINV1  ->  INV                   0.363          0.363        0.026  14.149
## PINV2  ->  INV                   0.395          0.394        0.026  15.226
## PINV3  ->  INV                   0.358          0.359        0.028  12.986
## PPSS1  ->  POL                   0.360          0.361        0.022  16.151
## PPSS2  ->  POL                   0.395          0.394        0.023  17.509
## PPSS3  ->  POL                   0.367          0.367        0.018  20.017
## FAML1  ->  FAML                  1.000          1.000        0.000       .
## PREP1*PPSS1  ->  REP*POL         0.239          0.090        0.156   1.535
## PREP1*PPSS2  ->  REP*POL         0.031          0.063        0.096   0.325
## PREP1*PPSS3  ->  REP*POL         0.021          0.068        0.109   0.195
## PREP2*PPSS1  ->  REP*POL         0.046          0.073        0.109   0.422
## PREP2*PPSS2  ->  REP*POL        -0.104          0.048        0.159  -0.655
## PREP2*PPSS3  ->  REP*POL        -0.228          0.045        0.239  -0.955
## PREP3*PPSS1  ->  REP*POL        -0.341          0.014        0.308  -1.107
## PREP3*PPSS2  ->  REP*POL         0.095          0.088        0.136   0.698
## PREP3*PPSS3  ->  REP*POL         0.108          0.094        0.135   0.805
## PREP4*PPSS1  ->  REP*POL         0.443          0.124        0.283   1.563
## PREP4*PPSS2  ->  REP*POL         0.382          0.099        0.267   1.431
## PREP4*PPSS3  ->  REP*POL         0.271          0.104        0.187   1.451
##                          2.5% CI 97.5% CI
## TRST1  ->  TRUST           0.253    0.310
## TRST2  ->  TRUST           0.249    0.310
```

```
## TRST3  ->  TRUST           0.253    0.320
## TRST4  ->  TRUST           0.239    0.317
## PSEC1  ->  SEC             0.250    0.310
## PSEC2  ->  SEC             0.283    0.348
## PSEC3  ->  SEC             0.277    0.339
## PSEC4  ->  SEC             0.257    0.325
## PREP1  ->  REP             0.160    0.259
## PREP2  ->  REP             0.301    0.371
## PREP3  ->  REP             0.310    0.397
## PREP4  ->  REP             0.241    0.339
## PINV1  ->  INV             0.312    0.412
## PINV2  ->  INV             0.342    0.446
## PINV3  ->  INV             0.306    0.416
## PPSS1  ->  POL             0.314    0.405
## PPSS2  ->  POL             0.354    0.440
## PPSS3  ->  POL             0.331    0.401
## FAML1  ->  FAML            1.000    1.000
## PREP1*PPSS1  ->  REP*POL  -0.264    0.394
## PREP1*PPSS2  ->  REP*POL  -0.153    0.232
## PREP1*PPSS3  ->  REP*POL  -0.171    0.264
## PREP2*PPSS1  ->  REP*POL  -0.170    0.265
## PREP2*PPSS2  ->  REP*POL  -0.301    0.344
## PREP2*PPSS3  ->  REP*POL  -0.399    0.475
## PREP3*PPSS1  ->  REP*POL  -0.586    0.663
## PREP3*PPSS2  ->  REP*POL  -0.240    0.329
## PREP3*PPSS3  ->  REP*POL  -0.234    0.337
## PREP4*PPSS1  ->  REP*POL  -0.439    0.547
## PREP4*PPSS2  ->  REP*POL  -0.430    0.565
## PREP4*PPSS3  ->  REP*POL  -0.281    0.421
##
## Bootstrapped Loadings:
##                          Original Est. Bootstrap Mean Bootstrap SD T Stat.
## TRST1  ->  TRUST                 0.900          0.900        0.016  57.892
## TRST2  ->  TRUST                 0.909          0.910        0.020  45.405
## TRST3  ->  TRUST                 0.905          0.906        0.021  43.612
## TRST4  ->  TRUST                 0.838          0.839        0.031  27.134
## PSEC1  ->  SEC                   0.813          0.813        0.025  32.280
## PSEC2  ->  SEC                   0.865          0.866        0.025  35.156
## PSEC3  ->  SEC                   0.868          0.869        0.021  41.238
## PSEC4  ->  SEC                   0.807          0.807        0.025  32.926
## PREP1  ->  REP                   0.800          0.798        0.039  20.413
## PREP2  ->  REP                   0.913          0.914        0.016  57.392
## PREP3  ->  REP                   0.908          0.910        0.020  45.938
## PREP4  ->  REP                   0.718          0.719        0.033  21.967
## PINV1  ->  INV                   0.903          0.904        0.024  37.488
## PINV2  ->  INV                   0.925          0.925        0.022  41.837
## PINV3  ->  INV                   0.855          0.855        0.026  33.242
## PPSS1  ->  POL                   0.868          0.868        0.023  36.934
## PPSS2  ->  POL                   0.893          0.894        0.014  65.913
## PPSS3  ->  POL                   0.911          0.911        0.017  55.211
## FAML1  ->  FAML                  1.000          1.000        0.000       .
## PREP1*PPSS1  ->  REP*POL         0.581          0.582        0.264   2.202
## PREP1*PPSS2  ->  REP*POL         0.510          0.566        0.250   2.039
## PREP1*PPSS3  ->  REP*POL         0.506          0.583        0.259   1.951
## PREP2*PPSS1  ->  REP*POL         0.509          0.616        0.278   1.835
## PREP2*PPSS2  ->  REP*POL         0.421          0.579        0.296   1.420
```

```
## PREP2*PPSS3  ->  REP*POL         0.336          0.591        0.336   0.999
## PREP3*PPSS1  ->  REP*POL         0.236          0.504        0.345   0.683
## PREP3*PPSS2  ->  REP*POL         0.555          0.610        0.283   1.959
## PREP3*PPSS3  ->  REP*POL         0.466          0.598        0.293   1.592
## PREP4*PPSS1  ->  REP*POL         0.900          0.588        0.362   2.488
## PREP4*PPSS2  ->  REP*POL         0.836          0.505        0.359   2.327
## PREP4*PPSS3  ->  REP*POL         0.859          0.565        0.333   2.582
##                          2.5% CI 97.5% CI
## TRST1  ->  TRUST           0.867    0.928
## TRST2  ->  TRUST           0.861    0.940
## TRST3  ->  TRUST           0.857    0.938
## TRST4  ->  TRUST           0.773    0.892
## PSEC1  ->  SEC             0.761    0.859
## PSEC2  ->  SEC             0.814    0.907
## PSEC3  ->  SEC             0.823    0.906
## PSEC4  ->  SEC             0.757    0.852
## PREP1  ->  REP             0.717    0.863
## PREP2  ->  REP             0.878    0.941
## PREP3  ->  REP             0.867    0.939
## PREP4  ->  REP             0.653    0.776
## PINV1  ->  INV             0.847    0.942
## PINV2  ->  INV             0.872    0.959
## PINV3  ->  INV             0.801    0.902
## PPSS1  ->  POL             0.815    0.906
## PPSS2  ->  POL             0.864    0.917
## PPSS3  ->  POL             0.873    0.939
## FAML1  ->  FAML            1.000    1.000
## PREP1*PPSS1  ->  REP*POL  -0.027    0.914
## PREP1*PPSS2  ->  REP*POL  -0.067    0.883
## PREP1*PPSS3  ->  REP*POL  -0.076    0.900
## PREP2*PPSS1  ->  REP*POL  -0.059    0.951
## PREP2*PPSS2  ->  REP*POL  -0.182    0.932
## PREP2*PPSS3  ->  REP*POL  -0.266    0.976
## PREP3*PPSS1  ->  REP*POL  -0.304    0.941
## PREP3*PPSS2  ->  REP*POL  -0.092    0.941
## PREP3*PPSS3  ->  REP*POL  -0.165    0.948
## PREP4*PPSS1  ->  REP*POL  -0.275    0.980
## PREP4*PPSS2  ->  REP*POL  -0.357    0.915
## PREP4*PPSS3  ->  REP*POL  -0.241    0.951
##
## Bootstrapped HTMT:
##                    Original Est. Bootstrap Mean Bootstrap SD 2.5% CI 97.5% CI
## REP  ->  INV               0.705          0.706        0.050   0.597    0.795
## REP  ->  POL               0.543          0.545        0.057   0.428    0.653
## REP  ->  FAML              0.599          0.599        0.056   0.488    0.705
## REP  ->  REP*POL           0.000          0.000        0.000   0.000    0.000
## REP  ->  SEC               0.595          0.595        0.045   0.499    0.680
## REP  ->  TRUST             0.682          0.684        0.044   0.588    0.764
## INV  ->  POL               0.498          0.501        0.058   0.391    0.618
## INV  ->  FAML              0.494          0.495        0.056   0.388    0.606
## INV  ->  REP*POL           0.085          0.102        0.032   0.056    0.175
## INV  ->  SEC               0.568          0.570        0.049   0.471    0.665
## INV  ->  TRUST             0.563          0.564        0.051   0.456    0.662
## POL  ->  FAML              0.596          0.595        0.050   0.491    0.695
## POL  ->  REP*POL           0.000          0.000        0.000   0.000    0.000
## POL  ->  SEC               0.622          0.624        0.053   0.515    0.720
```

```
## POL  ->  TRUST            0.458          0.460        0.061   0.332    0.573
## FAML  ->  REP*POL         0.046          0.065        0.023   0.030    0.122
## FAML  ->  SEC             0.455          0.458        0.054   0.353    0.562
## FAML  ->  TRUST           0.471          0.474        0.054   0.366    0.581
## REP*POL  ->  SEC          0.059          0.081        0.020   0.049    0.128
## REP*POL  ->  TRUST        0.044          0.071        0.018   0.043    0.116
## SEC  ->  TRUST            0.685          0.686        0.036   0.612    0.753
##
## Bootstrapped Total Paths:
##                    Original Est. Bootstrap Mean Bootstrap SD 2.5% CI 97.5% CI
## REP  ->  SEC              0.247          0.242        0.061   0.120    0.359
## REP  ->  TRUST            0.150          0.148        0.039   0.072    0.227
## INV  ->  SEC              0.181          0.185        0.059   0.073    0.300
## INV  ->  TRUST            0.109          0.113        0.036   0.047    0.183
## POL  ->  SEC              0.339          0.341        0.057   0.229    0.450
## POL  ->  TRUST            0.205          0.208        0.037   0.133    0.281
## FAML  ->  SEC             0.011          0.015        0.062  -0.111    0.134
## FAML  ->  TRUST           0.006          0.009        0.038  -0.068    0.085
## REP*POL  ->  SEC         -0.105         -0.018        0.124  -0.194    0.190
## REP*POL  ->  TRUST       -0.063         -0.011        0.076  -0.121    0.115
## SEC  ->  TRUST            0.606          0.609        0.034   0.542    0.671
```

Question 2) Common-Factor Models using CB-SEM

a. Create a common factor model using SEMinR, with the following characteristics:

i. Either respecify all the constructs as being `reflective()`, or use the `as.reflective()` function to convert your earlier measurement model to being entirely reflective.

```
ref_mm <- as.reflective(security_mm)
```

ii. Use the same structural model as before (you can just reuse it again!)

```
security_sm
```

```
##      source    target
## [1,] "REP"     "SEC"
## [2,] "INV"     "SEC"
## [3,] "POL"     "SEC"
## [4,] "FAML"    "SEC"
## [5,] "REP*POL" "SEC"
## [6,] "SEC"     "TRUST"
## attr(,"class")
## [1] "matrix"           "array"            "structural_model" "seminr_model"
```

b. Show us the following results in table or figure formats

```
sec_cbsem <- estimate_cbsem(
  data = security_sem,
  measurement_model = ref_mm,
  structural_model = security_sm
)
```

```
## Generating the seminr model for CBSEM
```

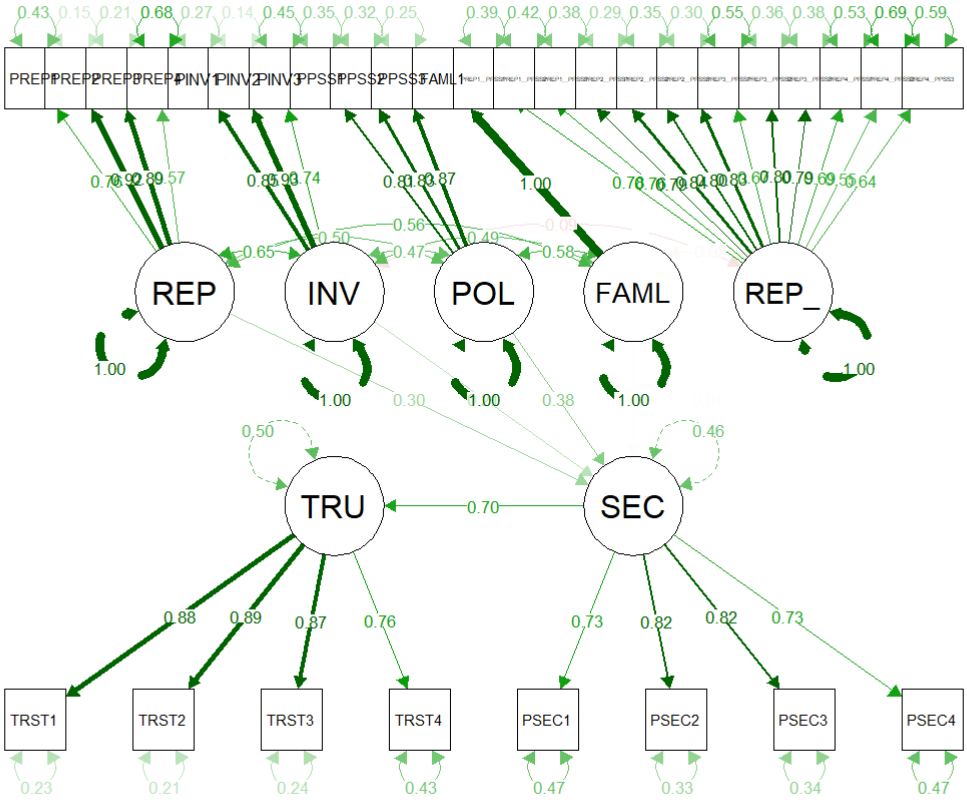
```
summary(sec_cbsem)
```

```
##
## Results from  package seminr (2.3.2)
## Estimation used  package seminr (2.3.2)
##
## Fit metrics:
##       npar       fmin       logl        aic        bic     ntotal       bic2
##     77.000      3.529 -17296.241  34746.482  35054.781    405.000  34810.451
##        rmr       srmr       crmr        gfi       agfi       pgfi        mfi
##      0.116      0.063      0.065      0.742      0.694      0.627      0.049
##       ecvi
##      7.439
##
##                          metric   scaled robust
## cfi                       0.764    0.772  0.799
## tli                       0.738    0.747  0.777
## nnfi                      0.738    0.747  0.777
## rni                       0.764    0.772  0.799
## rmsea                     0.120    0.072  0.107
## rmsea.ci.lower            0.116    0.069  0.100
## rmsea.ci.upper            0.124    0.075  0.114
## rmsea.pvalue              0.000    0.000  0.000
## rmsea.notclose.pvalue     1.000    0.000  1.000
## chisq                  2858.871 1303.538      .
## df                      419.000  419.000      .
## pvalue                    0.000    0.000      .
## baseline.chisq        10812.133 4340.588      .
## baseline.df             465.000  465.000      .
## baseline.pvalue           0.000    0.000      .
## rfi                       0.707    0.667      .
## nfi                       0.736    0.700      .
## pnfi                      0.663    0.630      .
## ifi                       0.765    0.774      .
##
## Reliability:
##       rhoC  AVE
## TRUST 0.91 0.72
## SEC   0.86 0.60
## REP   0.87 0.63
## INV   0.88 0.71
## POL   0.87 0.70
## FAML  1.00 1.00
##
## Path Coefficients:
##             SEC TRUST
## R^2        0.54  0.50
## REP        0.30     .
## INV        0.21     .
## POL        0.38     .
## FAML      -0.01     .
## REP_x_POL  0.01     .
## SEC           .  0.70
```

i. Plot a figure of the estimated model (it will look different from your PLS model!)

```
plot(sec_cbsem, title="Common-Factor Models using CB-SEM")
```

```
## Plotting of lavaan models using semPlot.
```




```
## NULL
```

ii. Loadings of composites

```
summary_cbsem <- summary(sec_cbsem)
summary_cbsem$loadings
```

```
## $coefficients
##           TRUST       SEC       REP       INV       POL FAML
## TRST1 0.8800240        NA        NA        NA        NA   NA
## TRST2 0.8886342        NA        NA        NA        NA   NA
## TRST3 0.8690644        NA        NA        NA        NA   NA
## TRST4 0.7575988        NA        NA        NA        NA   NA
## PSEC1        NA 0.7308766        NA        NA        NA   NA
## PSEC2        NA 0.8173481        NA        NA        NA   NA
## PSEC3        NA 0.8151708        NA        NA        NA   NA
## PSEC4        NA 0.7260444        NA        NA        NA   NA
## PREP1        NA        NA 0.7551328        NA        NA   NA
## PREP2        NA        NA 0.9199208        NA        NA   NA
## PREP3        NA        NA 0.8871362        NA        NA   NA
## PREP4        NA        NA 0.5650059        NA        NA   NA
## PINV1        NA        NA        NA 0.8520004        NA   NA
## PINV2        NA        NA        NA 0.9257476        NA   NA
## PINV3        NA        NA        NA 0.7388750        NA   NA
## PPSS1        NA        NA        NA        NA 0.8051533   NA
## PPSS2        NA        NA        NA        NA 0.8272576   NA
## PPSS3        NA        NA        NA        NA 0.8674335   NA
## FAML1        NA        NA        NA        NA        NA    1
##
## $significance
##                            Std Estimate         SE      t-Value   2.5% CI
## TRUST -> TRST1                0.8800240 0.02272091 0.000000e+00 0.8354919
## TRUST -> TRST2                0.8886342 0.03330783 0.000000e+00 0.8233521
## TRUST -> TRST3                0.8690644 0.03749444 0.000000e+00 0.7955767
## TRUST -> TRST4                0.7575988 0.04846748 0.000000e+00 0.6626042
## SEC -> PSEC1                  0.7308766 0.03679205 0.000000e+00 0.6587655
## SEC -> PSEC2                  0.8173481 0.04480183 0.000000e+00 0.7295381
## SEC -> PSEC3                  0.8151708 0.03728082 0.000000e+00 0.7421017
## SEC -> PSEC4                  0.7260444 0.03811841 0.000000e+00 0.6513337
## REP -> PREP1                  0.7551328 0.04464916 0.000000e+00 0.6676220
## REP -> PREP2                  0.9199208 0.02635333 0.000000e+00 0.8682692
## REP -> PREP3                  0.8871362 0.04015103 0.000000e+00 0.8084416
## REP -> PREP4                  0.5650059 0.04585583 0.000000e+00 0.4751302
## INV -> PINV1                  0.8520004 0.04489927 0.000000e+00 0.7639994
## INV -> PINV2                  0.9257476 0.04556425 0.000000e+00 0.8364433
## INV -> PINV3                  0.7388750 0.04511601 0.000000e+00 0.6504492
## POL -> PPSS1                  0.8051533 0.04355300 0.000000e+00 0.7197910
## POL -> PPSS2                  0.8272576 0.02807169 0.000000e+00 0.7722381
## POL -> PPSS3                  0.8674335 0.03273664 0.000000e+00 0.8032708
## FAML -> FAML1                 1.0000000 0.00000000           NA 1.0000000
## REP_x_POL -> PREP1_x_PPSS1    0.7781584 0.05799871 0.000000e+00 0.6644831
## REP_x_POL -> PREP1_x_PPSS2    0.7597768 0.05931838 0.000000e+00 0.6435149
## REP_x_POL -> PREP1_x_PPSS3    0.7879106 0.05013554 0.000000e+00 0.6896467
## REP_x_POL -> PREP2_x_PPSS1    0.8447368 0.03649041 0.000000e+00 0.7732169
## REP_x_POL -> PREP2_x_PPSS2    0.8034561 0.03639411 0.000000e+00 0.7321250
## REP_x_POL -> PREP2_x_PPSS3    0.8342444 0.03536430 0.000000e+00 0.7649317
## REP_x_POL -> PREP3_x_PPSS1    0.6736451 0.12948899 1.967998e-07 0.4198514
## REP_x_POL -> PREP3_x_PPSS2    0.8011944 0.03780427 0.000000e+00 0.7270994
## REP_x_POL -> PREP3_x_PPSS3    0.7902063 0.06416741 0.000000e+00 0.6644405
## REP_x_POL -> PREP4_x_PPSS1    0.6854770 0.06906812 0.000000e+00 0.5501059
## REP_x_POL -> PREP4_x_PPSS2    0.5531922 0.06212434 0.000000e+00 0.4314307
## REP_x_POL -> PREP4_x_PPSS3    0.6405843 0.05794028 0.000000e+00 0.5270235
```

```
##                              97.5% CI
## TRUST -> TRST1             0.9245562
## TRUST -> TRST2             0.9539164
## TRUST -> TRST3             0.9425522
## TRUST -> TRST4             0.8525933
## SEC -> PSEC1               0.8029877
## SEC -> PSEC2               0.9051581
## SEC -> PSEC3               0.8882399
## SEC -> PSEC4               0.8007551
## REP -> PREP1               0.8426435
## REP -> PREP2               0.9715724
## REP -> PREP3               0.9658307
## REP -> PREP4               0.6548817
## INV -> PINV1               0.9400013
## INV -> PINV2               1.0150518
## INV -> PINV3               0.8273007
## POL -> PPSS1               0.8905156
## POL -> PPSS2               0.8822771
## POL -> PPSS3               0.9315961
## FAML -> FAML1              1.0000000
## REP_x_POL -> PREP1_x_PPSS1 0.8918338
## REP_x_POL -> PREP1_x_PPSS2 0.8760387
## REP_x_POL -> PREP1_x_PPSS3 0.8861744
## REP_x_POL -> PREP2_x_PPSS1 0.9162567
## REP_x_POL -> PREP2_x_PPSS2 0.8747873
## REP_x_POL -> PREP2_x_PPSS3 0.9035572
## REP_x_POL -> PREP3_x_PPSS1 0.9274389
## REP_x_POL -> PREP3_x_PPSS2 0.8752894
## REP_x_POL -> PREP3_x_PPSS3 0.9159721
## REP_x_POL -> PREP4_x_PPSS1 0.8208480
## REP_x_POL -> PREP4_x_PPSS2 0.6749536
## REP_x_POL -> PREP4_x_PPSS3 0.7541452
```

iii. Regression coefficients of paths between factors, and their p-values

```
summary_cbsem$paths
```

```
## $coefficients
##                    SEC     TRUST
## R^2        0.540381651 0.4951084
## REP        0.299536782        NA
## INV        0.214253245        NA
## POL        0.376401499        NA
## FAML      -0.008837653        NA
## REP_x_POL  0.008355287        NA
## SEC                 NA 0.7036394
##
## $pvalues
##                    SEC TRUST
## REP       3.817182e-05    NA
## INV       3.534482e-03    NA
## POL       4.380975e-09    NA
## FAML      8.996836e-01    NA
## REP_x_POL 8.516847e-01    NA
## SEC                 NA     0
##
## $significance
##                  Std Estimate         SE      t-Value     2.5% CI   97.5% CI
## SEC -> REP        0.299536782 0.07273355 3.817182e-05  0.15698165 0.44209191
## SEC -> INV        0.214253245 0.07345058 3.534482e-03  0.07029275 0.35821374
## SEC -> POL        0.376401499 0.06413246 4.380975e-09  0.25070419 0.50209881
## SEC -> FAML      -0.008837653 0.07010617 8.996836e-01 -0.14624321 0.12856791
## SEC -> REP_x_POL  0.008355287 0.04468802 8.516847e-01 -0.07923162 0.09594219
## TRUST -> SEC      0.703639369 0.03721629 0.000000e+00  0.63069677 0.77658197
```