

Final Configural Invariance Model

```
cfa_config <- '
  group: ELS
  math =~ NA * i1 + l2_1 * i2 + l3 * i3 + l4_1 * i4 + l5_1 * i5
  i1 ~ nu1_1 * 1
  i2 ~ nu2_1 * 1
  i3 ~ nu3_1 * 1
  i4 ~ nu4_1 * 1
  i5 ~ nu5_1 * 1
  i1 ~~ theta1_1 * i1
  i2 ~~ theta2_1 * i2
  i3 ~~ theta3_1 * i3
  i4 ~~ theta4_1 * i4
  i5 ~~ theta5_1 * i5
  i1 ~~ i2
  i2 ~~ cov3 * i3
  i2 ~~ i4
  math ~~ 1 * math
  math ~ 0 * 1

  group: HSLS
  math =~ NA * i1 + l2_2 * i2 + l4_2 * i4 + l5_2 * i5
  i1 ~ nu1_2 * 1
  i2 ~ nu2_2 * 1
  i4 ~ nu4_2 * 1
  i5 ~ nu5_2 * 1
  i1 ~~ theta1_2 * i1
  i2 ~~ theta2_2 * i2
  i4 ~~ theta4_2 * i4
  i5 ~~ theta5_2 * i5
  i1 ~~ i2
  i2 ~~ i4
  math ~~ 1 * math
  math ~ 0 * 1
',

fit_config <- cfa(cfa_config, data = dat, group = "sample",
                  estimator = "MLR", missing = "FIML",
                  se = "robust.mlr")
s_config <- summary(fit_config, fit.measures = TRUE)
```

Final Partial Invariance Model

```
cfa_partial <- '
  group: ELS
  math =~ NA * i1 + i2 + 13 * i3 + 14 * i4 + 15 * i5
  i1 ~ NA * 1
  i2 ~ NA * 1
  i3 ~ nu3 * 1
  i4 ~ nu4 * 1
  i5 ~ nu5 * 1
  i1 ~~ theta1_1 * i1
  i2 ~~ theta2_1 * i2
  i3 ~~ theta3_1 * i3
  i4 ~~ theta4_1 * i4
  i5 ~~ theta5_1 * i5
  i1 ~~ i2
  i2 ~~ cov3 * i3
  i2 ~~ i4
  math ~~ 1 * math
  math ~ 0 * 1

  group: HSLS
  math =~ NA * i1 + i2 + 14 * i4 + 15 * i5
  i1 ~ NA * 1
  i2 ~ NA * 1
  i4 ~ nu4 * 1
  i5 ~ nu5 * 1
  i1 ~~ theta1_2 * i1
  i2 ~~ theta2_2 * i2
  i4 ~~ theta4_2 * i4
  i5 ~~ theta5_2 * i5
  i1 ~~ i2
  i2 ~~ i4
  math ~~ NA * math
  math ~ NA * 1
'

fit_partial <- cfa(cfa_partial, data = dat, group = "sample",
  estimator = "MLR", missing = "fiml",
  se = "robust.mlr")
```