semmcci: Staging

Ivan Jacob Agaloos Pesigan

```r
library(semmcci)
library(lavaan)

# Data ------------------------------------------------------------------------
data("Tal.Or", package = "psych")
df <- mice::ampute(Tal.Or)$amp

# Monte Carlo -----------------------------------------------------------------
## Fit Model in lavaan --------------------------------------------------------
model <- "
  reaction ~ cp * cond + b * pmi
  pmi ~ a * cond
  cond ~~ cond
  indirect := a * b
  direct := cp
  total := cp + (a * b)
"
fit <- sem(data = df, model = model, missing = "fiml")

## MC() ------------------------------------------------------------------------
unstd <- MC(
  fit,
  R = 100L, # use a large value e.g., 20000L for actual research
  alpha = 0.05
)

## Standardized Monte Carlo ----------------------------------------------------
MCStd(unstd, alpha = 0.05)

#> Standardized Monte Carlo Confidence Intervals
#>                        est     se   R    2.5%  97.5%
#> cp                  0.0406 0.0917 100 -0.1584 0.1866
#> b                   0.4107 0.0774 100  0.2556 0.5486
#> a                   0.1813 0.0866 100  0.0299 0.3646
#> cond~~cond          1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.8236 0.0629 100  0.6934 0.9133
```

```
#> pmi~~pmi           0.9671 0.0357 100  0.8670 0.9991
#> indirect           0.4674 0.0403 100  0.0117 0.1576
#> direct             4.1904 0.0917 100 -0.1584 0.1866
#> total              0.9061 0.0926 100 -0.0749 0.2627


# Monte Carlo (Multiple Imputation) ------------------------------------
## Multiple Imputation -------------------------------------------------
mi <- mice::mice(
  data = df,
  print = FALSE,
  m = 5L, # use a large value e.g., 100L for actual research,
  seed = 42
)

## Fit Model in lavaan -------------------------------------------------
fit <- sem(data = df, model = model) # use default listwise deletion

## MCMI() --------------------------------------------------------------
unstd <- MCMI(
  fit,
  mi = mi,
  R = 100L, # use a large value e.g., 20000L for actual research
  alpha = 0.05
)

## Standardized Monte Carlo --------------------------------------------
MCStd(unstd, alpha = 0.05)

#> Standardized Monte Carlo Confidence Intervals
#>                       est     se   R    2.5%  97.5%
#> cp                 0.0540 0.0901 100 -0.1037 0.2206
#> b                  0.4179 0.0759 100  0.2793 0.5624
#> a                  0.1153 0.1068 100 -0.0219 0.3391
#> cond~~cond         1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.8173 0.0644 100  0.6709 0.9167
#> pmi~~pmi           0.9867 0.0381 100  0.8849 0.9999
#> indirect           0.0482 0.0468 100 -0.0104 0.1545
#> direct             0.0540 0.0901 100 -0.1037 0.2206
#> total              0.1021 0.1053 100 -0.1038 0.2910
```

References

R Core Team. (2023). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/