semmcci: Staging

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```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                  0.0480 0.0870 100 -0.0970 0.2474
#> b                   0.4662 0.0764 100  0.2969 0.6033
#> a                   0.1755 0.1041 100 -0.0033 0.3818
#> cond~~cond          1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.7724 0.0688 100  0.6261 0.8937
```

```
#> pmi~~pmi           0.9692 0.0394 100  0.8543 0.9999
#> indirect           0.1904 0.0527 100 -0.0011 0.1932
#> direct             4.0367 0.0870 100 -0.0970 0.2474
#> total              0.8929 0.0941 100 -0.0534 0.3228


# 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                 0.0545 0.0781 100 -0.1144 0.1826
#> b                  0.4639 0.0811 100  0.3328 0.6101
#> a                  0.1924 0.0932 100  0.0291 0.3992
#> cond~~cond         1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.7721 0.0757 100  0.6228 0.8820
#> pmi~~pmi           0.9630 0.0391 100  0.8407 0.9989
#> indirect           0.0893 0.0516 100  0.0118 0.2002
#> direct             0.0545 0.0781 100 -0.1144 0.1826
#> total              0.1438 0.0914 100 -0.0253 0.2934
```

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/