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                  0.0532 0.0898 100 -0.1031 0.2524
#> b                   0.4090 0.0705 100  0.2515 0.5177
#> a                   0.2142 0.0946 100  0.0174 0.3714
#> cond~~cond          1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.8205 0.0572 100  0.7077 0.9342
```

```
#> pmi~~pmi           0.9541 0.0418 100  0.8621 0.9980
#> indirect           0.5199 0.0399 100  0.0089 0.1651
#> direct             4.0122 0.0898 100 -0.1031 0.2524
#> total              0.9139 0.0974 100 -0.0347 0.3313


# 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                 0.0286 0.0923 100 -0.1377 0.2202
#> b                  0.4253 0.0782 100  0.2816 0.5655
#> a                  0.2037 0.0867 100  0.0042 0.3211
#> cond~~cond         1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.8134 0.0703 100  0.6558 0.9120
#> pmi~~pmi           0.9585 0.0307 100  0.8969 0.9998
#> indirect           0.0866 0.0392 100  0.0013 0.1494
#> direct             0.0286 0.0923 100 -0.1377 0.2202
#> total              0.1152 0.0981 100 -0.0649 0.3047
```

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/