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                 0.1200 0.0950 100 -0.0268 0.3095
#> b                  0.3964 0.0782 100  0.2304 0.5701
#> a                  0.1930 0.0875 100  0.0298 0.3953
#> cond~~cond         1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.8101 0.0668 100  0.6453 0.9177
```

```
#> pmi~~pmi           0.9627 0.0382 100  0.8436 0.9991
#> indirect           0.4854 0.0353 100  0.0119 0.1396
#> direct             4.1180 0.0950 100 -0.0268 0.3095
#> total              0.9341 0.0921 100  0.0509 0.3750
```

```
# 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                  0.1827 0.0944 100 -0.1061 0.2520
#> b                   0.3762 0.0860 100  0.2339 0.5530
#> a                   0.2312 0.0896 100  0.0161 0.3737
#> cond~~cond          1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction  0.7933 0.0664 100  0.6868 0.9246
#> pmi~~pmi            0.9465 0.0389 100  0.8603 0.9997
#> indirect            0.0870 0.0374 100  0.0052 0.1589
#> direct              0.1827 0.0944 100 -0.1061 0.2520
#> total               0.2697 0.0964 100 -0.0184 0.3366
```

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/