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                 0.0957 0.0918 100 -0.1060 0.2794
#> b                  0.4368 0.0744 100  0.3247 0.5647
#> a                  0.1648 0.0954 100 -0.0180 0.3626
#> cond~~cond         1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.7863 0.0660 100  0.6586 0.8783
```

```
#> pmi~~pmi           0.9728 0.0360 100  0.8684 0.9989
#> indirect           0.2816 0.0458 100 -0.0080 0.1643
#> direct             4.1209 0.0918 100 -0.1060 0.2794
#> total              0.9653 0.0986 100 -0.0378 0.3616


 # 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                 0.0753 0.0842 100 -0.0980 0.2135
#> b                  0.4433 0.0820 100  0.2997 0.6362
#> a                  0.2025 0.1008 100 -0.0160 0.3529
#> cond~~cond         1.0000 0.0000 100  1.0000 1.0000
#> reaction~~reaction 0.7843 0.0790 100  0.5514 0.8822
#> pmi~~pmi           0.9590 0.0387 100  0.8752 0.9998
#> indirect           0.0898 0.0483 100 -0.0060 0.1776
#> direct             0.0753 0.0842 100 -0.0980 0.2135
#> total              0.1650 0.0936 100 -0.0231 0.3188
```

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/