Session Info

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Session

```
sessionInfo()
#> R version 4.4.0 (2024-04-24)
#> Platform: x86_64-pc-linux-gnu
#> Running under: Ubuntu 22.04.4 LTS
#>
#> Matrix products: default
          / usr/lib/x86\_64-linux-gnu/openblas-pthread/libblas.so.3
#> LAPACK: /usr/lib/x86_64-linux-gnu/openblas-pthread/libopenblasp-r0.3.20.so; LAPACK version 3.10
#>
#> locale:
#> [1] LC_CTYPE=en_US.UTF-8
                             LC_NUMERIC=C
   [3] LC_TIME=en_US.UTF-8
                              LC_COLLATE=en_US.UTF-8
#> [5] LC_MONETARY=en_US.UTF-8 LC_MESSAGES=en_US.UTF-8
   [7] LC_PAPER=en_US.UTF-8
                                 LC_NAME=C
#> [9] LC_ADDRESS=C
                                  LC_TELEPHONE=C
#> [11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C
#>
#> time zone: Etc/UTC
```

```
#> tzcode source: system (glibc)
#> attached base packages:
#> [1] stats
               graphics grDevices utils datasets methods
                                                              base
#> other attached packages:
#> [1] lavaan_0.6-17
                     semmcci_1.1.4.9000 rProject_0.0.13
#>
#> loaded via a namespace (and not attached):
#> [1] httr_1.4.7
                     cli_3.6.3.9000 knitr_1.47
                                                      rlang_1.1.4
#> [5] xfun_0.45
                      stringi_1.8.4
                                       highr_0.11
                                                       generics_0.1.3
#> [9] jsonlite_1.8.8 glue_1.7.0
                                       backports_1.5.0 pbivnorm_0.6.0
#> [13] plyr_1.8.9
                      rprojroot_2.0.4 stats4_4.4.0
                                                       RefManageR_1.4.0
#> [17] quadprog_1.5-8 evaluate_0.24.0 lifecycle_1.0.4 stringr_1.5.1
#> [21] compiler_4.4.0 Rcpp_1.0.12
                                       timechange_0.3.0 bibtex_0.5.1
#> [25] R6_2.5.1
                       parallel_4.4.0 mnormt_2.1.1
                                                       magrittr_2.0.3
#> [29] tools_4.4.0 lubridate_1.9.3 xml2_1.3.6
```

Packages

```
unname(installed.packages()[, 1])
     [1] "Amelia"
                                               "bmemLavaan"
#>
                            "arm"
                                                                  "cli"
     [5] "crayon"
                            "downlit"
                                               "evaluate"
                                                                  "mi"
     [9] "rlang"
                            "rProject"
                                               "rsem"
                                                                  "sem"
#>
    [13] "semmcci"
                            "tinytex"
                                               "xfun"
                                                                  "abind"
    [17] "arrow"
                            "ash"
                                               "AsioHeaders"
                                                                  "askpass"
```

#>	[21]	"assertthat"	"backports"	"base64enc"	"betaDelta"
#>	[25]	"betaMC"	"betaNB"	"betaSandwich"	"BH"
#>	[29]	"bibtex"	"BiocManager"	"bit"	"bit64"
#>	[33]	"bitops"	"blob"	"brew"	"brio"
#>	[37]	"broom"	"bslib"	"cachem"	"callr"
#>	[41]	"car"	"caracas"	"carData"	"cellranger"
#>	[45]	"cffr"	"checkmate"	"cli"	"clipr"
#>	[49]	"clock"	"coda"	"cOde"	"collections"
#>	[53]	"colorspace"	"commonmark"	"conflicted"	"corpcor"
#>	[57]	"covr"	"cowplot"	"cpp11"	"crayon"
#>	[61]	"credentials"	"crosstalk"	"cTMed"	"ctsem"
#>	[65]	"curl"	"cyclocomp"	"data.table"	"DBI"
#>	[69]	"dbplyr"	"Deriv"	"desc"	"deSolve"
#>	[73]	"devtools"	"diagram"	"dials"	"DiceDesign"
#>	[77]	"diffobj"	"digest"	"distributional"	"distro"
#>	[81]	"doBy"	"docopt"	"doFuture"	"downlit"
#> #>		"doBy" "dplyr"	"docopt" "DT"	"doFuture" "dtplyr"	"downlit" "duckdb"
	[85]	-	_		
#>	[85] [89]	"dplyr"	"DT"	"dtplyr"	"duckdb"
#> #>	[85] [89] [93]	"dplyr" "dynr"	"DT" "dynUtils"	"dtplyr" "ellipse"	"duckdb" "ellipsis"
#> #> #>	[85] [89] [93] [97]	"dplyr" "dynr" "evaluate"	"DT" "dynUtils" "expm"	"dtplyr" "ellipse" "fansi"	"duckdb" "ellipsis" "farver"
#> #> #> #>	[85] [89] [93] [97] [101]	"dplyr" "dynr" "evaluate" "fastDummies"	"DT" "dynUtils" "expm" "fastmap"	"dtplyr" "ellipse" "fansi" "fclust"	"duckdb" "ellipsis" "farver" "fda"
#> #> #> #> #>	[85] [89] [93] [97] [101] [105]	"dplyr" "dynr" "evaluate" "fastDummies" "fdrtool"	"DT" "dynUtils" "expm" "fastmap" "fds"	"dtplyr" "ellipse" "fansi" "fclust" "FNN"	"duckdb" "ellipsis" "farver" "fda" "fontawesome"
#> #> #> #> #>	[85] [89] [93] [97] [101] [105] [109]	"dplyr" "dynr" "evaluate" "fastDummies" "fdrtool" "forcats"	"DT" "dynUtils" "expm" "fastmap" "fds" "foreach"	"dtplyr" "ellipse" "fansi" "fclust" "FNN" "Formula"	"duckdb" "ellipsis" "farver" "fda" "fontawesome" "fs"
#> #> #> #> #> #>	[85] [89] [93] [97] [101] [105] [109] [113]	"dplyr" "dynr" "evaluate" "fastDummies" "fdrtool" "forcats" "fst"	"DT" "dynUtils" "expm" "fastmap" "fds" "foreach" "fstcore"	"dtplyr" "ellipse" "fansi" "fclust" "FNN" "Formula" "furrr"	"duckdb" "ellipsis" "farver" "fda" "fontawesome" "fs" "future"
#> #> #> #> #> #> #>	[85] [89] [93] [97] [101] [105] [109] [113]	"dplyr" "dynr" "evaluate" "fastDummies" "fdrtool" "forcats" "fst" "future.apply"	"DT" "dynUtils" "expm" "fastmap" "fds" "foreach" "fstcore" "gargle"	"dtplyr" "ellipse" "fansi" "fclust" "FNN" "Formula" "furrr" "generics"	"duckdb" "ellipsis" "farver" "fda" "fontawesome" "fs" "future" "gert"
#> #> #> #> #> #> #> #>	[85] [89] [93] [97] [101] [105] [109] [113] [117] [121]	"dplyr" "dynr" "evaluate" "fastDummies" "fdrtool" "forcats" "fst" "future.apply" "ggplot2"	"DT" "dynUtils" "expm" "fastmap" "fds" "foreach" "fstcore" "gargle" "ggrepel"	"dtplyr" "ellipse" "fansi" "fclust" "FNN" "Formula" "furrr" "generics" "gh" "globals"	"duckdb" "ellipsis" "farver" "fda" "fontawesome" "fs" "future" "gert" "gitcreds"

#>	[129]	"gridExtra"	"gsubfn"	"gtable"	"gtools"
#>	[133]	"hardhat"	"haven"	"hdrcde"	"here"
#>	[137]	"highr"	"Hmisc"	"hms"	"htmlTable"
#>	[141]	"htmltools"	"htmlwidgets"	"httpgd"	"httpuv"
#>	[145]	"httr"	"httr2"	"ids"	"ifaTools"
#>	[149]	"igraph"	"infer"	"ini"	"inline"
#>	[153]	"ipred"	"isoband"	"iterators"	"jomo"
#>	[157]	"jpeg"	"jquerylib"	"jsonlite"	"jsonvalidate"
#>	[161]	"kernlab"	"knitr"	"ks"	"labeling"
#>	[165]	"Lahman"	"languageserver"	"later"	"latex2exp"
#>	[169]	"lava"	"lavaan"	"lazyeval"	"lhs"
#>	[173]	"lifecycle"	"lintr"	"listenv"	"littler"
#>	[177]	"lme4"	"locfit"	"longMI"	"loo"
#>	[181]	"lubridate"	"magick"	"magrittr"	"markdown"
#>	[185]	"MatrixModels"	"matrixStats"	"mclust"	"memoise"
		"MatrixModels" "metaSEM"	"matrixStats" "mice"	"mclust" "microbenchmark"	"memoise" "mime"
#>	[189]				
#> #>	[189] [193]	"metaSEM"	"mice"	"microbenchmark"	"mime"
#> #> #>	[189] [193] [197]	"metaSEM" "miniUI"	"mice" "minqa" "modeldata"	"microbenchmark" "mitml"	"mime" "mize"
#> #> #>	[189] [193] [197] [201]	"metaSEM" "miniUI" "mnormt"	"mice" "minqa" "modeldata"	"microbenchmark" "mitml" "modelenv"	"mime" "mize" "modelr"
#> #> #> #>	[189] [193] [197] [201] [205]	"metaSEM" "miniUI" "mnormt" "MplusAutomation"	"mice" "minqa" "modeldata" "multicool"	"microbenchmark" "mitml" "modelenv" "munsell"	"mime" "mize" "modelr" "mvtnorm"
#> #> #> #> #>	[189] [193] [197] [201] [205] [209]	"metaSEM" "miniUI" "mnormt" "MplusAutomation" "nloptr"	"mice" "minqa" "modeldata" "multicool" "numDeriv"	"microbenchmark" "mitml" "modelenv" "munsell" "nycflights13"	<pre>"mime" "mize" "modelr" "mvtnorm" "OpenMx"</pre>
#> #> #> #> #>	[189] [193] [197] [201] [205] [209] [213]	"metaSEM" "miniUI" "mnormt" "MplusAutomation" "nloptr" "openssl" "parallelly"	"mice" "minqa" "modeldata" "multicool" "numDeriv" "ordinal"	"microbenchmark" "mitml" "modelenv" "munsell" "nycflights13" "pan"	"mime" "mize" "modelr" "mvtnorm" "OpenMx" "pander"
#> #> #> #> #> #>	[189] [193] [197] [201] [205] [209] [213] [217]	"metaSEM" "miniUI" "mnormt" "MplusAutomation" "nloptr" "openss1" "parallelly"	"mice" "minqa" "modeldata" "multicool" "numDeriv" "ordinal" "parsnip"	"microbenchmark" "mitml" "modelenv" "munsell" "nycflights13" "pan" "patchwork"	"mime" "mize" "modelr" "mvtnorm" "OpenMx" "pander" "pbapply"
#> #> #> #> #> #>	[189] [193] [197] [201] [205] [209] [213] [217] [221]	"metaSEM" "miniUI" "mnormt" "MplusAutomation" "nloptr" "openssl" "parallelly" "pbivnorm"	"mice" "minqa" "modeldata" "multicool" "numDeriv" "ordinal" "parsnip" "pbkrtest"	"microbenchmark" "mitml" "modelenv" "munsell" "nycflights13" "pan" "patchwork" "pcaPP"	"mime" "mize" "modelr" "mvtnorm" "OpenMx" "pander" "pbapply" "pdftools"
#> #> #> #> #> #> #> #> #>	[189] [193] [197] [201] [205] [209] [213] [217] [221] [225]	"metaSEM" "miniUI" "mnormt" "MplusAutomation" "nloptr" "openssl" "parallelly" "pbivnorm" "pillar"	"mice" "minqa" "modeldata" "multicool" "numDeriv" "ordinal" "parsnip" "pbkrtest" "pkgbuild"	"microbenchmark" "mitml" "modelenv" "munsell" "nycflights13" "pan" "patchwork" "pcaPP" "pkgconfig"	"mime" "mize" "modelr" "mvtnorm" "OpenMx" "pander" "pbapply" "pdftools" "pkgdown"
#> #> #> #> #> #> #> #> #>	[189] [193] [197] [201] [205] [209] [213] [217] [221] [225] [229]	"metaSEM" "miniUI" "mnormt" "MplusAutomation" "nloptr" "openssl" "parallelly" "pbivnorm" "pillar" "pkgload"	"mice" "minqa" "modeldata" "multicool" "numDeriv" "ordinal" "parsnip" "pbkrtest" "pkgbuild" "plogr"	"microbenchmark" "mitml" "modelenv" "munsell" "nycflights13" "pan" "patchwork" "pcaPP" "pkgconfig" "plyr"	"mime" "mize" "modelr" "mvtnorm" "OpenMx" "pander" "pbapply" "pdftools" "pkgdown" "png"

#>	[237]	"progress"	"progressr"	"promises"	"proto"
#>	[241]	"ps"	"psych"	"purrr"	"qgraph"
#>	[245]	"qpdf"	"quadprog"	"quantreg"	"quarto"
#>	[249]	"QuickJSR"	"R.cache"	"R.methodsS3"	"R.00"
#>	[253]	"R.utils"	"R6"	"ragg"	"rainbow"
#>	[257]	"rappdirs"	"rbibutils"	"rcmdcheck"	"RColorBrewer"
#>	[261]	"Rcpp"	"RcppArmadillo"	"RcppEigen"	"RcppGSL"
#>	[265]	"RcppParallel"	"RcppTOML"	"RCurl"	"Rdpack"
#>	[269]	"readr"	"readxl"	"recipes"	"RefManageR"
#>	[273]	"rematch"	"rematch2"	"remotes"	"reprex"
#>	[277]	"reshape2"	"reticulate"	"rex"	"rhub"
#>	[281]	"rlang"	"RMariaDB"	"rmarkdown"	"roxygen2"
#>	[285]	"rpf"	"RPostgres"	"rProject"	"rprojroot"
#>	[289]	"rsample"	"RSQLite"	"rstan"	"rstantools"
#>	[293]	"rstudioapi"	"rversions"	"rvest"	"Ryacas"
#>	[297]	"sass"	"scales"	"selectr"	"semlbci"
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#>	[305]	"simStateSpace"	"slider"	"snow"	"snowfall"
#>	[309]	"sourcetools"	"SparseM"	"SQUAREM"	"StanHeaders"
#>	[313]	"statmod"	"stringi"	"stringr"	"styler"
#>	[317]	"symSEM"	"sys"	"systemfonts"	"tensorA"
#>	[321]	"testthat"	"texreg"	"textshaping"	"tibble"
#>	[325]	"tidymodels"	"tidyr"	"tidyselect"	"tidyverse"
#>	[329]	"timechange"	"timeDate"	"tinytex"	"tune"
#>	[333]	"tzdb"	"ucminf"	"unigd"	"urlchecker"
#>	[337]	"usethis"	"utf8"	"uuid"	"Λ8"
#>	[341]	"vctrs"	"viridis"	"viridisLite"	"vroom"

#> [345] "waldo"	"warp"	"whisker"	"whoami"
#> [349] "withr"	"workflows"	"workflowsets"	"xfun"
#> [353] "xml2"	"xmlparsedata"	"xopen"	"xtable"
#> [357] "yaml"	"yardstick"	"zip"	"base"
#> [361] "boot"	"class"	"cluster"	"codetools"
#> [365] "compiler"	"datasets"	"foreign"	"graphics"
#> [369] "grDevices"	"grid"	"KernSmooth"	"lattice"
#> [373] "MASS"	"Matrix"	"methods"	"mgcv"
#> [377] "nlme"	"nnet"	"parallel"	"rpart"
#> [381] "spatial"	"splines"	"stats"	"stats4"
#> [385] "survival"	"tcltk"	"tools"	"utils"

References

Pesigan, I. J. A., & Cheung, S. F. (2023). Monte Carlo confidence intervals for the indirect effect with missing data. *Behavior Research Methods*, 56(3), 1678–1696. https://doi.org/10.3758/s13428-023-02114-4

R Core Team. (2024). R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/