semmcci: Internal Tests

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Tests

```
#> test-semmcci-mc-func-simple-med
#> Test passed
#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-generic-simple-med-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-latent-med-defined-none

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-latent-med-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-latent-med-std-defined-none

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-latent-med-std-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-moment
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#> Test passed

#> test-semmcci-mc-simple-med-defined-equality

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-defined-inequality

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-defined-meanstructure

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-defined-mi-amelia

#> Test passed

#> test-semmcci-mc-simple-med-defined-mi-list

#> Test passed

#> test-semmcci-mc-simple-med-defined-mi-mice

#> Test passed

#> test-semmcci-mc-simple-med-defined-none

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-std-defined-meanstructure

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-std-defined-none-random-x
```

```
#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-std-defined-none

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-std-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-methods

#> Monte Carlo Confidence Intervals
#>                   est     se   R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> visual=~x1      1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> visual=~x2      0.5535 0.0952 100 0.3153 0.3219 0.3792 0.7582 0.7738 0.7773
#> visual=~x3      0.7294 0.1055 100 0.4848 0.4968 0.5149 0.9160 0.9368 0.9442
#> textual=~x4     1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> textual=~x5     1.1131 0.0627 100 0.9019 0.9145 0.9560 1.2100 1.2398 1.2635
#> textual=~x6     0.9261 0.0584 100 0.8051 0.8082 0.8308 1.0478 1.0837 1.0946
#> speed=~x7       1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> speed=~x8       1.1800 0.1691 100 0.7717 0.7856 0.8611 1.5825 1.6198 1.6201
#> speed=~x9       1.0815 0.1496 100 0.7335 0.7337 0.7882 1.3501 1.4501 1.4936
#> x1~~x1          0.5491 0.1153 100 0.2343 0.2491 0.3651 0.8227 0.9077 0.9110
#> x2~~x2          1.1338 0.1087 100 0.8106 0.8657 0.9560 1.3552 1.3900 1.4005
#> x3~~x3          0.8443 0.0924 100 0.6464 0.6495 0.6706 1.0210 1.0346 1.0360
#> x4~~x4          0.3712 0.0458 100 0.2709 0.2753 0.2848 0.4632 0.4764 0.4789
#> x5~~x5          0.4463 0.0676 100 0.2698 0.2905 0.3196 0.5737 0.6150 0.6331
#> x6~~x6          0.3562 0.0432 100 0.2732 0.2746 0.2852 0.4337 0.4442 0.4492
#> x7~~x7          0.7994 0.0717 100 0.6246 0.6329 0.6672 0.9401 0.9522 0.9529
#> x8~~x8          0.4877 0.0721 100 0.3302 0.3353 0.3548 0.6340 0.6588 0.6788
#> x9~~x9          0.5661 0.0631 100 0.4025 0.4220 0.4473 0.6726 0.7239 0.7451
#> visual~~visual  0.8093 0.1264 100 0.4797 0.5012 0.5709 1.0347 1.0990 1.1101
#> textual~~textual 0.9795 0.1185 100 0.6849 0.6971 0.7521 1.2129 1.2834 1.3306
#> speed~~speed    0.3837 0.0843 100 0.1006 0.1348 0.2298 0.5292 0.5676 0.5756
#> visual~~textual 0.4082 0.0670 100 0.2467 0.2554 0.2661 0.5426 0.5524 0.5571
#> visual~~speed   0.2622 0.0545 100 0.1369 0.1408 0.1645 0.3551 0.3629 0.3638
#> textual~~speed  0.1735 0.0516 100 0.0426 0.0477 0.0821 0.2789 0.3214 0.3349
#> Monte Carlo Confidence Intervals (Multiple Imputation Estimates)
#>                   est     se   R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> visual=~x1      1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> visual=~x2      0.5535 0.1011 100 0.2572 0.2843 0.3692 0.7636 0.8380 0.8663
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```
#> visual=~x3          0.7294 0.1203 100 0.2924 0.3508 0.4939 0.9330 0.9790 0.9896
#> textual=~x4         1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> textual=~x5         1.1131 0.0573 100 0.9818 0.9891 1.0032 1.2323 1.2600 1.2649
#> textual=~x6         0.9261 0.0538 100 0.7889 0.7943 0.8149 1.0323 1.0548 1.0599
#> speed=~x7           1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> speed=~x8           1.1800 0.1645 100 0.8443 0.8692 0.9165 1.5372 1.6276 1.6632
#> speed=~x9           1.0815 0.1442 100 0.7945 0.8077 0.8275 1.3836 1.4658 1.5199
#> x1~~x1              0.5491 0.1232 100 0.2103 0.2113 0.2671 0.7411 0.8158 0.8158
#> x2~~x2              1.1338 0.0981 100 0.8187 0.8669 0.9795 1.3254 1.3461 1.3574
#> x3~~x3              0.8443 0.0986 100 0.5445 0.6078 0.6876 1.0371 1.0821 1.0901
#> x4~~x4              0.3712 0.0495 100 0.2357 0.2564 0.2900 0.4625 0.5028 0.5293
#> x5~~x5              0.4463 0.0568 100 0.3177 0.3254 0.3451 0.5712 0.5920 0.6059
#> x6~~x6              0.3562 0.0415 100 0.2442 0.2546 0.2717 0.4303 0.4440 0.4444
#> x7~~x7              0.7994 0.0806 100 0.6236 0.6321 0.6587 0.9455 1.0475 1.0698
#> x8~~x8              0.4877 0.0755 100 0.2858 0.3163 0.3570 0.6501 0.6735 0.6880
#> x9~~x9              0.5661 0.0652 100 0.3270 0.3676 0.4368 0.6843 0.7001 0.7114
#> visual~~visual      0.8093 0.1566 100 0.4745 0.4779 0.5262 1.1124 1.1807 1.2061
#> textual~~textual    0.9795 0.1147 100 0.6911 0.6990 0.7551 1.1753 1.2905 1.3271
#> speed~~speed        0.3837 0.0784 100 0.1327 0.1641 0.2342 0.5296 0.5426 0.5508
#> visual~~textual     0.4082 0.0724 100 0.2519 0.2534 0.2836 0.5375 0.5721 0.5797
#> visual~~speed       0.2622 0.0528 100 0.1368 0.1480 0.1741 0.3683 0.3828 0.3861
#> textual~~speed      0.1735 0.0500 100 0.0184 0.0546 0.0983 0.2720 0.2897 0.3006
#> Standardized Monte Carlo Confidence Intervals
#>                       est     se   R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> visual=~x1          0.7719 0.0531 100 0.6020 0.6255 0.6590 0.8537 0.8963 0.8981
#> visual=~x2          0.4236 0.0618 100 0.2511 0.2681 0.3064 0.5476 0.5846 0.5852
#> visual=~x3          0.5811 0.0572 100 0.4183 0.4315 0.4469 0.6823 0.6878 0.6909
#> textual=~x4         0.8516 0.0229 100 0.8019 0.8026 0.8054 0.8859 0.9038 0.9111
#> textual=~x5         0.8551 0.0260 100 0.7683 0.7825 0.8025 0.8970 0.9048 0.9061
#> textual=~x6         0.8380 0.0241 100 0.7815 0.7819 0.7858 0.8768 0.8830 0.8841
#> speed=~x7           0.5695 0.0562 100 0.3134 0.3562 0.4556 0.6476 0.6536 0.6547
#> speed=~x8           0.7230 0.0504 100 0.5693 0.5731 0.5874 0.7977 0.8077 0.8099
#> speed=~x9           0.6650 0.0517 100 0.4951 0.5157 0.5463 0.7582 0.7772 0.7816
#> x1~~x1              0.4042 0.0806 100 0.1934 0.1966 0.2712 0.5657 0.6081 0.6375
#> x2~~x2              0.8206 0.0528 100 0.6576 0.6582 0.7001 0.9061 0.9278 0.9369
#> x3~~x3              0.6623 0.0649 100 0.5226 0.5269 0.5345 0.8003 0.8136 0.8250
#> x4~~x4              0.2748 0.0388 100 0.1698 0.1831 0.2152 0.3514 0.3559 0.3569
#> x5~~x5              0.2689 0.0441 100 0.1789 0.1814 0.1954 0.3560 0.3875 0.4096
#> x6~~x6              0.2977 0.0402 100 0.2184 0.2203 0.2312 0.3824 0.3886 0.3892
#> x7~~x7              0.6757 0.0602 100 0.5713 0.5728 0.5806 0.7921 0.8708 0.9014
#> x8~~x8              0.4772 0.0704 100 0.3441 0.3477 0.3636 0.6549 0.6715 0.6759
#> x9~~x9              0.5578 0.0673 100 0.3892 0.3959 0.4251 0.7015 0.7335 0.7548
#> visual~~visual      1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> textual~~textual    1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> speed~~speed        1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> visual~~textual     0.4585 0.0634 100 0.3010 0.3035 0.3429 0.5760 0.6157 0.6253
```

```
#> visual~~speed    0.4705 0.0838 100 0.2854 0.2962 0.3110 0.6414 0.6646 0.6688
#> textual~~speed   0.2830 0.0689 100 0.0793 0.0914 0.1669 0.4274 0.4399 0.4428
#> Standardized Monte Carlo Confidence Intervals
#>                     est     se   R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> visual=~x1        0.7719 0.0610 100 0.6069 0.6120 0.6421 0.8906 0.9209 0.9221
#> visual=~x2        0.4236 0.0625 100 0.2157 0.2200 0.2806 0.5455 0.5680 0.5685
#> visual=~x3        0.5811 0.0625 100 0.3004 0.3442 0.4381 0.6517 0.6662 0.6701
#> textual=~x4       0.8516 0.0234 100 0.7885 0.7897 0.8025 0.8874 0.9043 0.9130
#> textual=~x5       0.8551 0.0218 100 0.7918 0.7929 0.8018 0.8856 0.8993 0.9045
#> textual=~x6       0.8380 0.0234 100 0.7748 0.7766 0.7971 0.8852 0.8904 0.8915
#> speed=~x7         0.5695 0.0533 100 0.3529 0.3969 0.4532 0.6496 0.6621 0.6674
#> speed=~x8         0.7230 0.0511 100 0.5945 0.5964 0.6124 0.8149 0.8171 0.8181
#> speed=~x9         0.6650 0.0498 100 0.5282 0.5508 0.5807 0.7518 0.7936 0.8123
#> x1~~x1            0.4042 0.0938 100 0.1497 0.1519 0.2068 0.5875 0.6254 0.6317
#> x2~~x2            0.8206 0.0514 100 0.6768 0.6773 0.7025 0.9209 0.9516 0.9535
#> x3~~x3            0.6623 0.0665 100 0.5509 0.5562 0.5752 0.8072 0.8791 0.9093
#> x4~~x4            0.2748 0.0395 100 0.1663 0.1822 0.2124 0.3560 0.3763 0.3783
#> x5~~x5            0.2689 0.0370 100 0.1819 0.1911 0.2157 0.3572 0.3713 0.3730
#> x6~~x6            0.2977 0.0392 100 0.2052 0.2072 0.2165 0.3646 0.3969 0.3997
#> x7~~x7            0.6757 0.0579 100 0.5546 0.5616 0.5780 0.7946 0.8401 0.8750
#> x8~~x8            0.4772 0.0730 100 0.3307 0.3323 0.3359 0.6250 0.6443 0.6466
#> x9~~x9            0.5578 0.0665 100 0.3401 0.3697 0.4348 0.6628 0.6960 0.7209
#> visual~~visual    1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> textual~~textual  1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> speed~~speed      1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> visual~~textual   0.4585 0.0566 100 0.3183 0.3257 0.3461 0.5577 0.5782 0.5803
#> visual~~speed     0.4705 0.0762 100 0.2804 0.2901 0.3417 0.6249 0.6431 0.6441
#> textual~~speed    0.2830 0.0741 100 0.0358 0.0984 0.1786 0.4111 0.4650 0.4973
#> Monte Carlo Confidence Intervals
#> Monte Carlo Confidence Intervals (Multiple Imputation Estimates)
#> Standardized Monte Carlo Confidence Intervals
#> Standardized Monte Carlo Confidence Intervals

#> test-semmcci-npd

#> Test passed
#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-zzz-coverage
#> test-semmcci-zzz-heywood

#> lavaan 0.6-18 ended normally after 18 iterations
#>
#>   Estimator                                         ML
#>   Optimization method                           NLMINB
```

```
#>   Number of model parameters                           8
#>
#>   Number of observations                              50
#>
#> Model Test User Model:
#>
#>   Test statistic                                   0.000
#>   Degrees of freedom                                   2
#>   P-value (Chi-square)                             1.000
#>
#> Parameter Estimates:
#>
#>   Standard errors                              Standard
#>   Information                                  Expected
#>   Information saturated (h1) model           Structured
#>
#> Latent Variables:
#>                   Estimate  Std.Err  z-value  P(>|z|)
#>   eta1 =~
#>     y1               1.000
#>     y2               0.991    0.152    6.524    0.000
#>     y3               0.901    0.138    6.537    0.000
#>     y4               1.399    0.143    9.814    0.000
#>
#> Variances:
#>                   Estimate  Std.Err  z-value  P(>|z|)
#>    .y1               0.000    0.055    0.000    1.000
#>    .y2               0.980    0.203    4.822    0.000
#>    .y3               0.807    0.167    4.820    0.000
#>    .y4               0.696    0.176    3.960    0.000
#>     eta1             0.980    0.204    4.815    0.000
#>
#> Standardized Monte Carlo Confidence Intervals
#>              est se R 0.05% 0.5% 2.5% 97.5% 99.5% 99.95%
#> eta1=~y1   1.0000 NA 0    NA   NA   NA    NA    NA     NA
#> eta1=~y2   0.7039 NA 0    NA   NA   NA    NA    NA     NA
#> eta1=~y3   0.7047 NA 0    NA   NA   NA    NA    NA     NA
#> eta1=~y4   0.8566 NA 0    NA   NA   NA    NA    NA     NA
#> y1~~y1     0.0000 NA 0    NA   NA   NA    NA    NA     NA
#> y2~~y2     0.5045 NA 0    NA   NA   NA    NA    NA     NA
#> y3~~y3     0.5034 NA 0    NA   NA   NA    NA    NA     NA
#> y4~~y4     0.2662 NA 0    NA   NA   NA    NA    NA     NA
#> eta1~~eta1 1.0000 NA 0    NA   NA   NA    NA    NA     NA
#> [[1]]
#> [[1]][[1]]
#> [[1]][[1]]$value
```

```
#> [[1]][[1]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[1]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[2]]
#> [[1]][[2]]$value
#> [[1]][[2]]$value[[1]]
#>           est    se    R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> x * m -0.0016 0.003 2000 -0.0168 -0.0116 -0.0086 0.0038 0.0062  0.008
#>
#>
#> [[1]][[2]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[3]]
#> [[1]][[3]]$value
#> [[1]][[3]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[3]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[4]]
#> [[1]][[4]]$value
#> [[1]][[4]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[4]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[5]]
#> [[1]][[5]]$value
#> [[1]][[5]]$value[[1]]
#> [1] TRUE
#>
#>
```

```
#> [[1]][[5]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[6]]
#> [[1]][[6]]$value
#> [[1]][[6]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[6]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[7]]
#> [[1]][[7]]$value
#> [[1]][[7]]$value[[1]]
#> Monte Carlo Confidence Intervals
#>                                est      se      R    0.05%     0.5%     2.5%
#> ses=~education              1.0000  0.0000 20000   1.0000   1.0000   1.0000
#> ses=~sei                    5.2195  0.4211 20000   3.7868   4.1278   4.4008
#> alien67=~anomia67           1.0000  0.0000 20000   1.0000   1.0000   1.0000
#> alien67=~powerless67        0.9787  0.0612 20000   0.7800   0.8247   0.8593
#> alien71=~anomia71           1.0000  0.0000 20000   1.0000   1.0000   1.0000
#> alien71=~powerless71        0.9221  0.0593 20000   0.7192   0.7669   0.8039
#> alien71~alien67             0.6070  0.0503 20000   0.4452   0.4783   0.5092
#> alien71~ses                -0.2268  0.0522 20000  -0.3896  -0.3592  -0.3281
#> alien67~ses                -0.5750  0.0564 20000  -0.7556  -0.7205  -0.6856
#> anomia67~~anomia71          1.6229  0.3153 20000   0.5859   0.8137   1.0053
#> powerless67~~powerless71    0.3387  0.2620 20000  -0.4915  -0.3429  -0.1815
#> education~~education        2.8013  0.5057 20000   1.1334   1.5091   1.8058
#> sei~~sei                  264.5971 17.9755 20000 206.8985 218.2453 229.4909
#> anomia67~~anomia67          4.7307  0.4551 20000   3.2873   3.5747   3.8498
#> powerless67~~powerless67    2.5634  0.4019 20000   1.2591   1.5155   1.7699
#> anomia71~~anomia71          4.3992  0.5156 20000   2.7325   3.0623   3.3710
#> powerless71~~powerless71    3.0699  0.4380 20000   1.5979   1.9235   2.2099
#> ses~~ses                    6.7983  0.6492 20000   4.7251   5.1284   5.5388
#> alien67~~alien67            4.8415  0.4662 20000   3.3999   3.6576   3.9205
#> alien71~~alien71            4.0832  0.4008 20000   2.7666   3.0667   3.3078
#>                              97.5%    99.5%   99.95%
#> ses=~education              1.0000   1.0000   1.0000
#> ses=~sei                    6.0395   6.3070   6.5632
#> alien67=~anomia67           1.0000   1.0000   1.0000
#> alien67=~powerless67        1.1001   1.1379   1.1804
#> alien71=~anomia71           1.0000   1.0000   1.0000
```

```
#> alien71=~powerless71       1.0376    1.0755    1.1176
#> alien71~alien67            0.7057    0.7372    0.7691
#> alien71~ses              -0.1242   -0.0909   -0.0510
#> alien67~ses              -0.4652   -0.4314   -0.3960
#> anomia67~~anomia71         2.2411    2.4356    2.6727
#> powerless67~~powerless71   0.8540    1.0132    1.1764
#> education~~education       3.7746    4.1095    4.4378
#> sei~~sei                 300.1256 311.1796 323.1749
#> anomia67~~anomia67         5.6244    5.9244    6.2183
#> powerless67~~powerless67   3.3506    3.5922    3.9024
#> anomia71~~anomia71         5.3962    5.7309    6.0838
#> powerless71~~powerless71   3.9296    4.2128    4.4850
#> ses~~ses                   8.0804    8.4995    8.8591
#> alien67~~alien67           5.7500    6.0362    6.4045
#> alien71~~alien71           4.8720    5.1547    5.4524
#>
#>
#> [[1]][[7]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[8]]
#> [[1]][[8]]$value
#> [[1]][[8]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[8]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[9]]
#> [[1]][[9]]$value
#> [[1]][[9]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[9]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[10]]
#> [[1]][[10]]$value
#> [[1]][[10]]$value[[1]]
#> [1] TRUE
#>
```

```
#> 
#> [[1]][[10]]$visible
#> [1] TRUE
#> 
#> 
#> [[1]][[11]]
#> [[1]][[11]]$value
#> [[1]][[11]]$value[[1]]
#> [1] TRUE
#> 
#> 
#> [[1]][[11]]$visible
#> [1] TRUE
#> 
#> 
#> [[1]][[12]]
#> [[1]][[12]]$value
#> [[1]][[12]]$value[[1]]
#> [1] TRUE
#> 
#> 
#> [[1]][[12]]$visible
#> [1] TRUE
#> 
#> 
#> [[1]][[13]]
#> [[1]][[13]]$value
#> [[1]][[13]]$value[[1]]
#> [1] TRUE
#> 
#> 
#> [[1]][[13]]$visible
#> [1] TRUE
#> 
#> 
#> [[1]][[14]]
#> [[1]][[14]]$value
#> [[1]][[14]]$value[[1]]
#> [1] TRUE
#> 
#> 
#> [[1]][[14]]$visible
#> [1] TRUE
#> 
#> 
#> [[1]][[15]]
```

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#> [[1]][[15]]$value
#> [[1]][[15]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[15]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[16]]
#> [[1]][[16]]$value
#> [[1]][[16]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[16]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[17]]
#> [[1]][[17]]$value
#> [[1]][[17]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[17]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[18]]
#> [[1]][[18]]$value
#> [[1]][[18]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[18]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[19]]
#> [[1]][[19]]$value
#> [[1]][[19]]$value[[1]]
#> [1] TRUE
#>
#>
```

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#> [[1]][[19]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[20]]
#> [[1]][[20]]$value
#> [[1]][[20]]$value[[1]]
#>                         2.5 %     97.5 %
#> visual=~x1        0.6420550 0.8905828
#> visual=~x2        0.2805691 0.5454672
#> visual=~x3        0.4381215 0.6517292
#> textual=~x4       0.8025033 0.8874283
#> textual=~x5       0.8017605 0.8856330
#> textual=~x6       0.7971373 0.8851563
#> speed=~x7         0.4532090 0.6495836
#> speed=~x8         0.6123562 0.8149249
#> speed=~x9         0.5807283 0.7517920
#> x1~~x1            0.2068314 0.5874893
#> x2~~x2            0.7024550 0.9208880
#> x3~~x3            0.5752490 0.8071817
#> x4~~x4            0.2124433 0.3559868
#> x5~~x5            0.2156542 0.3571661
#> x6~~x6            0.2164959 0.3645676
#> x7~~x7            0.5780244 0.7945894
#> x8~~x8            0.3358974 0.6249553
#> x9~~x9            0.4348001 0.6627511
#> visual~~visual   1.0000000 1.0000000
#> textual~~textual 1.0000000 1.0000000
#> speed~~speed     1.0000000 1.0000000
#> visual~~textual  0.3461207 0.5577182
#> visual~~speed    0.3417283 0.6249328
#> textual~~speed   0.1785621 0.4110934
#>
#>
#> [[1]][[20]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[21]]
#> [[1]][[21]]$value
#> [[1]][[21]]$value[[1]]
#> [[1]][[21]]$value[[1]]$thetahatstar
#>                  y1              y2             y3
#>    [1,] -4.246806e-01 -0.5674344544 -0.844470405
#>    [2,]  1.285923e+00  1.3721426626  2.365001749
```

```
#>     [3,]   1.163091e-01 -1.0861272136 -0.457720098
#>     [4,]  -3.702629e-01  0.0087967812 -0.456828435
#>     [5,]   1.718771e-01  0.4957076624  0.489424273
#>     [6,]  -3.411976e-02  0.9067666709  0.460670898
#>     [7,]   9.358973e-01  0.8692087206  1.649419308
#>     [8,]   2.606123e-01 -0.7845996957 -0.110441820
#>     [9,]   3.114685e-01 -0.0535844114  0.358657813
#>    [10,]   9.897516e-01  0.5705621874  1.550838124
#>    [11,]  -1.526909e+00 -1.4936898671 -2.732960029
#>    [12,]   1.092488e+00  0.8953888500  1.859214133
#>    [13,]  -1.256035e+00 -1.2760443405 -2.274401072
#>    [14,]   2.394827e-01  0.8643377866  0.778301301
#>    [15,]  -1.821778e-01 -0.5833480251 -0.550905729
#>    [16,]   1.567170e+00  1.9744495497  3.049966084
#>    [17,]   6.338543e-01  2.4703094599  2.161321764
#>    [18,]   1.391986e+00  2.2150786670  2.965053675
#>    [19,]  -3.775255e-01 -1.3658394759 -1.228750318
#>    [20,]  -1.665505e-01 -0.3868979388 -0.422397255
#>    [21,]  -6.810469e-01 -1.2718366106 -1.555067624
#>    [22,]   1.574423e+00  1.4567694279  2.771719317
#>    [23,]  -5.414014e-01  0.3340344021 -0.489741369
#>    [24,]   1.067092e+00  3.1023927751  3.052340146
#>    [25,]   1.004737e+00  1.2216146971  1.930831486
#>    [26,]  -6.375036e-02  0.0525931144 -0.050308420
#>    [27,]   8.723528e-01  2.5689393198  2.513459921
#>    [28,]   1.073842e+00  1.4806232742  2.160742598
#>    [29,]   3.228785e-01  0.0111139123  0.408790598
#>    [30,]  -9.964082e-01 -1.4121892694 -2.026206560
#>    [31,]   9.750292e-01  1.7286461249  2.175167703
#>    [32,]  -2.641183e+00 -5.6837326372 -6.447734615
#>    [33,]   1.035778e-01  0.0813528760  0.174306817
#>    [34,]  -2.909126e-01 -0.5379891968 -0.661323533
#>    [35,]   2.373802e+00  3.6007962879  4.958374092
#>    [36,]   1.424798e+00  2.4344197578  3.127694820
#>    [37,]   1.949218e-01  2.2931584136  1.515670423
#>    [38,]   9.535264e-02  0.5650217926  0.432466230
#>    [39,]   2.875480e+00  5.1368035275  6.436375300
#>    [40,]   9.874190e-01  1.6623678919  2.153835985
#>    [41,]   2.795543e+00  6.1613362479  6.905269085
#>    [42,]   8.079498e-02 -0.4093790103 -0.126438513
#>    [43,]  -2.187906e+00 -3.0390072179 -4.414795628
#>    [44,]   1.678974e+00  2.9193718438  3.713775208
#>    [45,]  -2.651958e-01  0.0307554419 -0.313625806
#>    [46,]   1.606499e-01  0.2963384546  0.364782531
#>    [47,]  -1.324144e+00 -1.8681300179 -2.687914663
```

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#>    [48,]  6.344300e-01  1.5371237237  1.644160519
#>    [49,] -2.699770e+00 -4.0509676021 -5.614675478
#>    [50,]  9.905222e-02 -0.3274457675 -0.058202590
#>    [51,]  3.272955e-01  0.5980031453  0.739997499
#>    [52,] -8.337031e-01 -2.3033357652 -2.317865663
#>    [53,] -4.818745e-02  0.4095994074  0.167221749
#>    [54,]  3.361049e-01  1.7334477628  1.381106894
#>    [55,]  2.998949e-01  0.1026549873  0.430932101
#>    [56,]  5.450611e-01  0.0501875922  0.707532142
#>    [57,]  8.746309e-02 -1.4153983649 -0.676422141
#>    [58,]  7.552542e-01  1.5836766764  1.820660860
#>    [59,] -1.025963e+00 -2.2365345124 -2.520538097
#>    [60,]  9.907188e-02 -0.5338005578 -0.172696346
#>    [61,] -9.838347e-02 -0.8525640781 -0.595819554
#>    [62,]  3.155431e-01  0.0017227112  0.394431784
#>    [63,] -1.954378e+00 -5.1369835017 -5.287879945
#>    [64,]  1.501999e+00  2.4498420073  3.232521265
#>    [65,] -3.457712e-01 -1.6899558612 -1.369024352
#>    [66,] -3.318195e+00 -5.5655149109 -7.226348882
#>    [67,]  1.642618e+00  2.7951972354  3.599527994
#>    [68,] -2.293105e+00 -4.8326848299 -5.541393089
#>    [69,]  1.125354e+00  3.0106136085  3.074058286
#>    [70,]  3.651434e-02  0.8173336197  0.499118578
#>    [71,]  2.894378e-01 -0.2561143782  0.218790334
#>    [72,]  7.783488e-01  1.5770565970  1.845785450
#>    [73,] -9.790518e-01 -1.8906287698 -2.270077480
#>    [74,]  3.601769e-01  1.7163647709  1.401643848
#>    [75,] -1.558294e+00 -3.6293568919 -3.957302147
#>    [76,] -7.348388e-02 -0.6288763206 -0.440632927
#>    [77,]  8.764688e-02 -0.1623914062  0.019173444
#>    [78,] -9.891151e-01 -1.0850557136 -1.835566833
#>    [79,] -3.655801e-01 -1.3490349707 -1.204528812
#>    [80,] -1.368797e+00 -2.6970252112 -3.203597713
#>    [81,] -6.587049e-01 -0.6158615716 -1.163168937
#>    [82,]  1.661865e+00  2.6976956370  3.569419533
#>    [83,]  1.523454e-01  0.8387330721  0.655433386
#>    [84,]  5.122381e-02  0.5498720600  0.369031021
#>    [85,]  1.279672e+00  3.2563981170  3.402889358
#>    [86,]  1.049299e+00  0.6768178926  1.684060197
#>    [87,]  2.574452e-01  0.3516376273  0.516173065
#>    [88,]  1.857263e-01  0.0538302151  0.261470372
#>    [89,] -6.834880e-01 -1.0993424416 -1.462384657
#>    [90,]  1.573710e+00  2.4485276826  3.321214380
#>    [91,] -2.298735e-01  0.0411480469 -0.263812142
#>    [92,]  2.284738e-02 -0.9978945398 -0.525299473
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#>   [93,]   9.178086e-01   1.5804506351   2.021572517
#>   [94,]   7.582010e-01   0.6021365224   1.279621778
#>   [95,]   8.892111e-02   0.0623609583   0.145490528
#>   [96,]  -1.345773e+00  -1.6758189125  -2.608160733
#>   [97,]  -7.022393e-01  -0.9639956134  -1.410655248
#>   [98,]  -3.241345e-01  -0.8927555622  -0.899631110
#>   [99,]  -1.592216e+00  -2.5465306492  -3.398678583
#>  [100,]  -1.235637e+00  -0.9412125032  -2.063147423
#>  [101,]  -7.721154e-01  -1.5473754479  -1.821540720
#>  [102,]  -1.318354e+00  -2.2232776927  -2.877787163
#>  [103,]  -1.332118e+00  -3.2392120162  -3.458751575
#>  [104,]   1.163599e+00   2.5828514980   2.884358275
#>  [105,]  -3.680232e-01  -0.9040213164  -0.960611389
#>  [106,]   1.392745e+00   2.4089728248   3.073603315
#>  [107,]  -8.511085e-01  -1.5595808416  -1.926817019
#>  [108,]  -1.998420e+00  -3.3217859186  -4.335440475
#>  [109,]   1.282522e+00   2.1808300360   2.809548056
#>  [110,]   1.292492e-01   0.4065028225   0.386763206
#>  [111,]   6.601911e-01  -0.4597792488   0.568086649
#>  [112,]   2.077097e-01  -0.8048703122  -0.187659551
#>  [113,]   2.400029e+00   3.7103095606   5.051853744
#>  [114,]  -6.012069e-01  -1.6650647180  -1.673733999
#>  [115,]   2.703609e+00   3.9186938029   5.546055819
#>  [116,]  -7.728166e-01  -1.9525422907  -2.047265718
#>  [117,]  -1.711421e+00  -4.3465462265  -4.546258477
#>  [118,]   1.307784e+00   1.6555484862   2.549539666
#>  [119,]  -3.032432e-01   0.0961820725  -0.324761020
#>  [120,]   1.394082e+00   1.1904709896   2.399053597
#>  [121,]   1.017682e+00   2.5846551325   2.703404028
#>  [122,]   6.947103e-01   0.7668016609   1.291832416
#>  [123,]   6.558163e-01   1.9350582392   1.891665887
#>  [124,]   9.520668e-01   0.8029117042   1.632790294
#>  [125,]   1.080509e+00   2.0107896367   2.463276956
#>  [126,]  -2.327764e+00  -3.8763618606  -5.053892818
#>  [127,]  -2.744899e-01  -0.9647413325  -0.877674345
#>  [128,]   5.362015e-01   0.5336026653   0.964759527
#>  [129,]   1.105121e+00   1.8913800292   2.427700048
#>  [130,]   1.324506e+00   2.2285941459   2.888408919
#>  [131,]   8.861135e-01   2.5033361888   2.494212271
#>  [132,]   8.819398e-01   2.6193017292   2.553363784
#>  [133,]  -9.555726e-02  -1.2694873580  -0.823670286
#>  [134,]   7.348624e-01   1.0000639634   1.471352026
#>  [135,]  -2.774682e-01  -1.5944426596  -1.230846112
#>  [136,]  -5.329887e-01  -0.5280684713  -0.957681921
#>  [137,]  -1.042850e+00  -2.1409758567  -2.488564781
```

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#>   [138,]   1.987515e+00   4.1848343921   4.800798260
#>   [139,]   1.082528e+00   1.1237307322   1.973513923
#>   [140,]  -1.369158e+00  -1.9317011853  -2.779324859
#>   [141,]  -1.773405e+00  -4.1386283777  -4.508164787
#>   [142,]  -1.033128e+00  -2.5848280513  -2.722761025
#>   [143,]  -2.816424e+00  -3.6107902440  -5.515860990
#>   [144,]   2.363791e-01   0.8318743513   0.756415366
#>   [145,]   9.187832e-01   0.3701867547   1.351142117
#>   [146,]  -4.730818e-01  -0.8044236036  -1.036344715
#>   [147,]  -2.795169e+00  -4.6809350051  -6.083242073
#>   [148,]   9.074772e-01   1.1263301192   1.756671598
#>   [149,]   7.027981e-01   1.8842381009   1.922048167
#>   [150,]   4.453580e-01   0.9150729699   1.063179591
#>   [151,]  -1.369027e+00  -1.6156477119  -2.603766054
#>   [152,]  -1.418097e+00  -2.3150418199  -3.053089044
#>   [153,]   6.608876e-01   0.6488109843   1.184176229
#>   [154,]   5.600098e-01   1.3057058038   1.422932904
#>   [155,]  -1.144720e+00  -2.3862252121  -2.751697899
#>   [156,]  -1.602339e+00  -2.8563421971  -3.583234609
#>   [157,]  -1.619794e+00  -2.0673862043  -3.167162491
#>   [158,]  -2.473715e-01   0.0096865264  -0.303091582
#>   [159,]  -6.361763e-01  -1.0177376865  -1.358100735
#>   [160,]  -1.448368e+00  -1.6412250821  -2.716896887
#>   [161,]   2.406347e+00   4.1119359026   5.282617687
#>   [162,]   1.398565e+00   3.2719748842   3.559790494
#>   [163,]  -9.227862e-02  -0.4751028056  -0.378731719
#>   [164,]  -1.708932e+00  -2.7091045144  -3.634442911
#>   [165,]  -4.559985e-01   0.4693725532  -0.308138654
#>   [166,]  -2.253622e+00  -4.4515434193  -5.280640470
#>   [167,]   1.113106e+00   0.6280225305   1.736546516
#>   [168,]  -1.217251e+00  -2.4419115981  -2.873046192
#>   [169,]  -4.938643e-01  -1.9705592141  -1.709416618
#>   [170,]   1.793389e+00   3.8983074586   4.399716673
#>   [171,]   2.661480e-01   1.2107281599   1.003784518
#>   [172,]  -1.145682e+00  -2.5990820865  -2.871023974
#>   [173,]   6.150889e-01   1.1042720956   1.379828068
#>   [174,]   2.410041e+00   3.0303128073   4.686968497
#>   [175,]   8.849246e-01   0.8820856995   1.593003513
#>   [176,]   1.224204e+00   1.6741328522   2.455630505
#>   [177,]  -9.759834e-01  -2.1869926168  -2.430720739
#>   [178,]  -3.110317e+00  -5.8459402041  -7.122754310
#>   [179,]   4.570654e-01   0.7580907314   0.990659841
#>   [180,]  -1.454782e+00  -3.2324907824  -3.607980384
#>   [181,]   1.481044e+00   2.7139421393   3.352955445
#>   [182,]   1.364860e+00   2.1964623985   2.920897279
```

```
#>  [183,] -4.211436e-01 -0.8986566564 -1.023874283
#>  [184,]  1.318787e-01  1.1699177899  0.813705388
#>  [185,]  8.989654e-01  1.4122401808  1.904725701
#>  [186,] -4.029777e-01 -0.3998129592 -0.724384427
#>  [187,] -1.988870e+00 -4.5910114767 -5.027899328
#>  [188,] -1.177661e-01 -0.2791048555 -0.301743488
#>  [189,]  3.380480e-01  0.2763727380  0.574914237
#>  [190,]  6.644748e-01  0.6461436793  1.187169235
#>  [191,] -2.254166e-01 -0.1589093927 -0.369277979
#>  [192,] -1.328241e+00 -0.9128154374 -2.162864143
#>  [193,] -1.052798e+00 -0.5873204798 -1.638756326
#>  [194,]  6.161067e-01  0.0645647874  0.804103181
#>  [195,] -2.886879e-02  0.1054947446  0.022546371
#>  [196,]  7.050448e-01  1.6154788808  1.775699568
#>  [197,] -1.347606e+00 -2.6189456754 -3.133841865
#>  [198,] -2.859314e-01  0.4653734651 -0.098287882
#>  [199,]  1.772397e-01 -0.2519759217  0.081178171
#>  [200,]  6.208782e-01  0.1051235778  0.832561586
#>  [201,] -1.816967e-01 -0.0577651381 -0.258629267
#>  [202,]  9.045226e-02  0.0488066975  0.139877792
#>  [203,] -3.901156e-01  1.1905772597  0.174254360
#>  [204,]  1.264831e+00  2.4620180080  2.943534924
#>  [205,]  2.458979e-01  0.2541117744  0.447651102
#>  [206,]  1.510236e+00  2.5435382878  3.294790945
#>  [207,]  2.285016e+00  3.4311146923  4.753493114
#>  [208,] -7.054226e-01 -1.4108212912 -1.662594361
#>  [209,] -6.947608e-01 -0.9266899670 -1.380626618
#>  [210,]  4.567817e-02  0.3321752279  0.241303094
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#>   [717,]  1.764573e+00  1.7265588657  3.158554721
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#>  [728,]  -1.799739e-01   0.6862220713   0.156400794
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#>  [743,]   4.104045e-01   0.5363872596   0.809438451
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#> [1715,] -1.508304e+00 -3.3361813504 -3.732265035
#> [1716,] -1.473702e-02 -0.7779572101 -0.450110439
#> [1717,]   1.663375e-01 -0.2314615435   0.078968045
#> [1718,] -8.330953e-01 -1.3648232958 -1.796272677
#> [1719,] -7.569577e-01 -1.7607108083 -1.921031603
#> [1720,] -1.642653e+00 -2.6889831759 -3.540627502
#> [1721,] -3.043119e+00 -4.8556760293 -6.489404383
#> [1722,]   1.690766e+00   2.1686202337   3.311843769
#> [1723,] -1.065699e+00 -1.2216564221 -2.006872707
#> [1724,]   2.165113e-01   0.7751068428   0.700137065
#> [1725,]   8.415299e-02   0.5452263281   0.407514852
#> [1726,] -3.337123e-01 -0.3627063332 -0.617419252
#> [1727,] -2.131711e+00 -3.5858541540 -4.648198855
#> [1728,] -2.616977e+00 -5.2300515933 -6.165777110
#> [1729,] -1.327909e+00 -2.4939566890 -3.039916623
#> [1730,] -4.839332e-01 -0.3853638574 -0.817315589
#> [1731,] -7.038514e-01   0.5623494003 -0.565608002
#> [1732,] -5.456629e-01 -1.0446828723 -1.260185817
#> [1733,]   6.566875e-01   0.7627808518   1.242187388
#> [1734,] -1.617749e+00 -2.5932392310 -3.456439411
#> [1735,] -9.374731e-01 -0.7980093501 -1.611871599
#> [1736,] -1.665045e+00 -2.1239381042 -3.254974277
#> [1737,]   1.231331e+00   1.1091265794   2.150964061
#> [1738,] -5.186382e-01   0.1108901223 -0.585191846
#> [1739,] -1.078642e+00 -0.2149490879 -1.464332572
#> [1740,]   3.438525e-01 -0.9066529591 -0.074377398
#> [1741,]   1.519618e+00   2.4753802928   3.268664974
#> [1742,] -3.582284e-01 -0.7197556447 -0.846137768
#> [1743,] -1.190144e+00 -1.2105086373 -2.155867386
#> [1744,]   9.790336e-01   1.7705875331   2.203436841
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#> [1749,]   1.009199e-01   0.8702579985   0.608801771
#> [1750,] -2.552377e+00 -4.6289964214 -5.751661323
#> [1751,] -3.347791e-01 -0.2994747049 -0.583658614
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#> [1753,] -1.347487e+00 -2.1765550585 -2.888185444
#> [1754,]   5.964727e-01   1.3485348322   1.492169620
#> [1755,] -1.882355e-01   0.0192372744 -0.224049991
#> [1756,]   7.932657e-01   1.7621943353   1.967130187
#> [1757,] -6.743889e-01 -1.0133757250 -1.403330361
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#> [1758,]   1.673494e-01 -1.2954593493 -0.510244396
#> [1759,] -4.567731e-01 -0.6384220556 -0.923884285
#> [1760,] -8.840507e-01 -0.8170849500 -1.555841142
#> [1761,] -1.492206e+00 -3.5441812543 -3.827623121
#> [1762,] -5.804046e-01 -0.8388731052 -1.189292174
#> [1763,] -6.178293e-01  0.2936022903 -0.607483537
#> [1764,] -1.407136e+00 -2.5684881441 -3.180072965
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#> [1766,]  2.529590e+00  3.3900731254  5.035695909
#> [1767,] -5.906350e-01  0.2920793507 -0.574418036
#> [1768,]  5.076029e-02  0.9281750452  0.578395342
#> [1769,]  1.208541e+00  1.8384316323  2.527278188
#> [1770,]  4.135030e-01  0.7023578232  0.905408987
#> [1771,] -4.205681e-01 -1.3980133009 -1.300278658
#> [1772,] -1.662920e+00 -1.8280681959 -3.088129177
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#> [1793,]  1.638262e-01 -0.4111288183 -0.023871364
#> [1794,] -1.272077e+00 -0.4467795291 -1.834198337
#> [1795,]  4.631803e-01 -0.5697755448  0.261374857
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#> [1799,]  3.222728e-01  0.2025483065  0.514273404
#> [1800,]  4.546169e-01  0.3839559873  0.779977477
#> [1801,]  1.752071e+00  3.0035770321  3.851656385
#> [1802,] -1.151965e+00 -2.9544080598 -3.076049445
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#> [1805,] -2.744271e-01  0.2908269171 -0.180808286
#> [1806,] -2.842117e-01 -1.2134849998 -1.027839557
#> [1807,] -6.997963e-02  0.1325378951 -0.013710185
#> [1808,] -2.913396e-01  0.0501476768 -0.335464733
#> [1809,]  1.651802e+00  2.9455536110  3.694421914
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#> [1822,]  1.923324e+00  2.9397184273  4.029766128
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#> [1825,]  9.442478e-01  0.0710095628  1.216865043
#> [1826,] -1.027465e+00 -1.9514825253 -2.364218580
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#> [1841,]  2.657635e-01  1.2192190096  1.008017163
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#> [1843,] -1.184226e+00 -2.3419486434 -2.776388953
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#> [1848,]   1.599642e+00   2.7688219877   3.531300779
#> [1849,]  -5.679944e-01  -1.4181438006  -1.495287889
#> [1850,]  -3.420655e-01   1.0365625088   0.148700152
#> [1851,]   1.781018e-01  -0.4715950064  -0.039626221
#> [1852,]   1.006569e+00   1.9836753415   2.356027559
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#> [1854,]  -5.256051e-01  -0.7978647655  -1.098200363
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#> [1856,]  -2.286089e+00  -4.2421205987  -5.204905773
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#> [1858,]  -9.518880e-01  -1.4173336105  -1.973545693
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#> [1861,]   1.980609e+00   2.7634558377   4.003380786
#> [1862,]   1.981767e-02  -0.0675257971  -0.012761756
#> [1863,]   2.207322e-01   0.6983375886   0.662796643
#> [1864,]   7.568137e-01   1.0566685406   1.530138074
#> [1865,]   1.245167e+00   2.5241990787   2.953523131
#> [1866,]  -3.001144e-01   0.1176940031  -0.308921323
#> [1867,]  -1.172445e+00  -1.8872043604  -2.509334182
#> [1868,]   2.317781e-01   1.6743961670   1.218242318
#> [1869,]  -8.306281e-01  -2.4798128651  -2.411968579
#> [1870,]  -8.494284e-01  -0.5099515742  -1.342221700
#> [1871,]  -6.920945e-01  -1.0001160503  -1.418050204
#> [1872,]  -7.019204e-01  -1.7094091083  -1.823930948
#> [1873,]   7.083018e-01   0.8472281507   1.353413988
#> [1874,]   1.513100e+00   2.6190729446   3.340280728
#> [1875,]   5.393668e-01   0.7220872918   1.073307599
#> [1876,]   1.570542e+00   2.4400138201   3.312539766
#> [1877,]   1.385532e+00   2.6793681422   3.214667674
#> [1878,]   4.897640e-01   0.8173910028   1.064343517
#> [1879,]   2.245749e+00   4.0861126886   5.068024928
#> [1880,]   1.850450e-01  -1.2231174897  -0.448031640
#> [1881,]   1.502703e+00   2.0956481569   3.036837162
#> [1882,]   1.786055e+00   1.7843490377   3.217413023
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#> [1884,]  -4.985731e-01  -1.2851109972  -1.334893306
#> [1885,]  -1.539934e+00  -2.7664346300  -3.455521956
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#> [1889,]  -2.470742e-01  -1.7607040242  -1.285213469
#> [1890,]   1.584463e+00   1.9397306842   3.052261801
#> [1891,]  -1.936260e+00  -4.4039497322  -4.858484445
#> [1892,]   5.618165e-01   0.9113296334   1.206323555
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#> [1897,]  8.616328e-01  1.6485736347  1.989327859
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#> [1899,] -1.251428e+00 -2.7310706847 -3.076135650
#> [1900,] -6.581081e-01 -0.2543508525 -0.961801402
#> [1901,]  5.184317e-02  0.2705653547  0.214799817
#> [1902,]  3.259528e-01  1.5485174610  1.265818844
#> [1903,]  2.168287e-01  1.2694548573  0.974875214
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#> [1907,]  1.792409e-01  0.0384298558  0.244836739
#> [1908,]  6.083347e-01  1.2244351384  1.438091230
#> [1909,] -1.308000e+00 -2.4281036078 -2.978545553
#> [1910,] -4.943796e-01 -0.1909064223 -0.722426328
#> [1911,] -9.786356e-01 -2.1123511485 -2.392605065
#> [1912,]  2.857161e-01  0.5568770712  0.665325561
#> [1913,] -1.946338e+00 -1.8946928540 -3.478518825
#> [1914,]  3.849135e-01  0.8018557345  0.924975695
#> [1915,] -4.767156e-02  0.1975269506  0.050173721
#> [1916,] -8.549068e-01 -1.6380243526 -1.975086318
#> [1917,] -4.533790e-01 -0.2550966835 -0.706922355
#> [1918,]  3.534257e-01  0.4441079691  0.687175914
#> [1919,]  2.094577e+00  4.0226574468  4.844300802
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#> [1921,] -2.892735e+00 -4.4175286744 -6.058725344
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#> [1925,] -5.354221e-01 -0.4108082768 -0.895641794
#> [1926,] -1.615704e-01  0.8420010072  0.265800284
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#> [1930,] -4.050491e-01 -1.2733691101 -1.211754478
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#> [1933,] -1.014775e+00 -2.7121171565 -2.770514642
#> [1934,]  9.893625e-02  1.0348772313  0.697685022
#> [1935,] -7.161154e-01 -1.3875481892 -1.663012412
#> [1936,]  6.644394e-01  0.3438304733  1.019353847
#> [1937,]  2.214262e-01  1.3179067710  1.007497030
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#> [1938,] -1.386690e+00 -2.1737317325 -2.935503872
#> [1939,]  8.644289e-01  1.6334770308  1.984436558
#> [1940,]  1.097050e-01 -0.2360071705  0.005825856
#> [1941,]  1.265274e-01 -0.8702786002 -0.325191124
#> [1942,] -8.372518e-01 -1.2919386918 -1.761007851
#> [1943,] -3.347568e-01 -1.3904009241 -1.189049218
#> [1944,]  2.161592e-01  0.1696572965  0.363698797
#> [1945,] -1.084723e+00 -0.8298860991 -1.813179997
#> [1946,]  3.306022e-02  0.3226199251  0.220265967
#> [1947,] -6.629877e-01 -1.8393806530 -1.847511341
#> [1948,]  1.089397e+00  1.7300331242  2.318552106
#> [1949,] -7.923771e-01 -2.8004096705 -2.542188160
#> [1950,]  1.480753e+00  1.4980399353  2.677818209
#> [1951,] -1.587792e+00 -2.3974445248 -3.310425286
#> [1952,]  5.830965e-01  2.8900480422  2.330965111
#> [1953,]  6.562020e-01  0.6533309581  1.180841893
#> [1954,] -1.621898e-01 -0.8813655537 -0.691368353
#> [1955,]  9.499440e-01  1.9509026061  2.267229998
#> [1956,]  6.908838e-01  2.1475779399  2.053333877
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#> [1958,] -9.223656e-01 -1.0189435270 -1.715642067
#> [1959,] -9.539502e-01 -1.2505358122 -1.883551432
#> [1960,] -1.531442e+00 -3.0818437968 -3.619970852
#> [1961,] -3.395726e-02  1.1724339351  0.608307739
#> [1962,] -7.871690e-01 -1.0226524282 -1.549113002
#> [1963,] -2.186513e+00 -3.6101488035 -4.730018497
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#> [1965,] -2.806200e+00 -4.4052940609 -5.944027934
#> [1966,]  4.119151e-01  0.9703087646  1.052130447
#> [1967,]  7.796729e-01  0.8173819376  1.425848962
#> [1968,]  6.860902e-01  0.2260355623  0.980980813
#> [1969,]  1.296920e+00  1.4925881478  2.445556781
#> [1970,]  1.645752e+00  2.3462460143  3.354287407
#> [1971,] -4.638702e-01 -0.7246752698 -0.980601113
#> [1972,] -9.349258e-01 -0.2048858263 -1.279536414
#> [1973,] -5.216834e-01 -0.8416500049 -1.117609076
#> [1974,] -7.057597e-02  0.2980869487  0.077418987
#> [1975,] -1.408524e+00 -3.3066748157 -3.591467146
#> [1976,] -4.285182e-02 -0.2529623960 -0.193818884
#> [1977,] -1.594761e+00 -2.9523940715 -3.627089839
#> [1978,]  1.439954e+00  2.2265592977  3.031240020
#> [1979,] -1.702954e+00 -2.6458116710 -3.591863386
#> [1980,] -3.977133e-01  0.9812809438  0.048629498
#> [1981,]  1.618050e+00  3.6272844437  4.030666598
#> [1982,] -1.460555e+00 -3.1236674340 -3.554786792
```

```
#> [1983,] -4.506009e-01 -1.3024276916 -1.284683013
#> [1984,] -1.983810e-01  0.8990881290  0.251579235
#> [1985,] -5.258611e-01 -0.1834056624 -0.757520482
#> [1986,] -1.139864e+00 -1.5954386813 -2.306788704
#> [1987,]  3.660857e-02  0.0449265396  0.070582492
#> [1988,]  2.295783e+00  3.8844758685  5.018516275
#> [1989,] -5.540542e-01 -0.6766618100 -1.066413279
#> [1990,] -1.228960e+00 -2.4142150343 -2.872276672
#> [1991,]  1.904886e+00  2.5395997793  3.784725775
#> [1992,] -2.819741e-01 -0.7869651607 -0.788348693
#> [1993,]  3.961480e+00  5.6490117315  8.074849871
#> [1994,] -1.631457e+00 -2.1341136753 -3.218737342
#> [1995,] -1.214776e+00 -1.9786218079 -2.612853469
#> [1996,]  3.992245e-01  1.0953806010  1.105715126
#> [1997,]  2.540290e+00  3.5350541849  5.129497190
#> [1998,] -1.163480e+00 -0.7396546999 -1.861313802
#> [1999,]  6.990512e-01  2.0548380063  2.012051633
#> [2000,] -4.494133e-01 -1.2760224599 -1.268548255
#>
#> [[1]][[21]]$value[[1]]$decomposition
#> [1] "eigen"
#>
#>
#>
#> [[1]][[21]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[22]]
#> [[1]][[22]]$value
#> [[1]][[22]]$value[[1]]
#> [[1]][[22]]$value[[1]]$M
#> [1] 2
#>
#> [[1]][[22]]$value[[1]]$est
#> [1] 0 0 0
#>
#> [[1]][[22]]$value[[1]]$within
#>      [,1] [,2] [,3]
#> [1,]    1    0    0
#> [2,]    0    1    0
#> [3,]    0    0    1
#>
#> [[1]][[22]]$value[[1]]$between
#>      [,1] [,2] [,3]
```

```
#> [1,]    0    0    0
#> [2,]    0    0    0
#> [3,]    0    0    0
#>
#> [[1]][[22]]$value[[1]]$total
#>      [,1] [,2] [,3]
#> [1,]    1    0    0
#> [2,]    0    1    0
#> [3,]    0    0    1
#>
#> [[1]][[22]]$value[[1]]$ariv
#> [1] NA
#>
#> [[1]][[22]]$value[[1]]$total_adj
#> [1] NA
#>
#>
#>
#> [[1]][[22]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[23]]
#> [[1]][[23]]$value
#> [[1]][[23]]$value[[1]]
#>             est se R 0.05% 0.5% 2.5% 97.5% 99.5% 99.95%
#> eta1=~y1   1.0000 NA 0    NA   NA   NA    NA    NA     NA
#> eta1=~y2   0.7039 NA 0    NA   NA   NA    NA    NA     NA
#> eta1=~y3   0.7047 NA 0    NA   NA   NA    NA    NA     NA
#> eta1=~y4   0.8566 NA 0    NA   NA   NA    NA    NA     NA
#> y1~~y1     0.0000 NA 0    NA   NA   NA    NA    NA     NA
#> y2~~y2     0.5045 NA 0    NA   NA   NA    NA    NA     NA
#> y3~~y3     0.5034 NA 0    NA   NA   NA    NA    NA     NA
#> y4~~y4     0.2662 NA 0    NA   NA   NA    NA    NA     NA
#> eta1~~eta1 1.0000 NA 0    NA   NA   NA    NA    NA     NA
#>
#>
#> [[1]][[23]]$visible
#> [1] TRUE
```

Environment

```
ls()

#> [1] "root"
```

Class

```
#> [[1]]
#> [1] "root_criterion"
```

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/