semmcci: Internal Tests

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Tests

```
\#> 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
#> Test passed
\#> test-semmcci-mc-simple-med-defined-equality
#> Test passed
#> Test passed
#> Test passed
\textit{\#> test-semmcci-mc-simple-med-defined-inequality}
#> Test passed
#> Test passed
#> Test passed
```

```
\#> test-semmcci-mc-simple-med-defined-mean structure
#> 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-mean structure
#> Test passed
#> Test passed
#> Test passed
\textit{\#> 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
\textit{\#> 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 #> visual=~x2 $0.5535\ 0.0940\ 100\ 0.3341\ 0.3450\ 0.3717\ 0.7312\ 0.7844\ 0.8194$ 0.7294 0.1038 100 0.3874 0.4510 0.5523 0.9398 1.0114 1.0329 #> visual=~x3 1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 #> textual=~x4 #> textual=~x5 1.1131 0.0625 100 0.9533 0.9551 0.9716 1.2121 1.2365 1.2406 #> textual=~x6 0.9261 0.0466 100 0.8194 0.8257 0.8402 1.0015 1.0445 1.0622 #> speed=~x7 1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 #> speed=~x8 1.1800 0.1508 100 0.8155 0.8484 0.9070 1.5139 1.6205 1.6353 #> speed=~x9 1.0815 0.1440 100 0.7509 0.7764 0.8274 1.3451 1.3588 1.3639 #> x1~~x1 0.5491 0.1084 100 0.3084 0.3236 0.3475 0.7958 0.8159 0.8246 #> x2~~x2 1.1338 0.0997 100 0.8412 0.8459 0.9355 1.2915 1.3490 1.3657 #> x3~~x3 0.8443 0.0926 100 0.5741 0.6008 0.6736 0.9867 1.0189 1.0290 #> x4~~x4 0.3712 0.0457 100 0.2643 0.2673 0.2800 0.4643 0.4795 0.4844 #> x5~~x5 0.4463 0.0620 100 0.2948 0.2958 0.3339 0.5623 0.5813 0.5830 #> x6~~x6 0.3562 0.0408 100 0.2595 0.2640 0.2722 0.4393 0.4445 0.4449 #> x7~~x7 0.7994 0.0872 100 0.6080 0.6229 0.6806 0.9983 1.0275 1.0336 #> x8~~x8 0.4877 0.0746 100 0.3098 0.3196 0.3413 0.6050 0.6455 0.6536 #> x9~~x9 0.5661 0.0791 100 0.3736 0.3814 0.3962 0.7064 0.7180 0.7239 #> textual~~textual 0.9795 0.1135 100 0.6952 0.7269 0.8112 1.2173 1.2863 1.3059 #> speed~~speed 0.3837 0.0860 100 0.1316 0.1378 0.1874 0.5361 0.5571 0.5735 #> visual~~textual 0.4082 0.0783 100 0.2113 0.2157 0.2500 0.5630 0.5845 0.5885 #> visual~~speed 0.2622 0.0558 100 0.0957 0.1079 0.1480 0.3386 0.3701 0.3856 0.1735 0.0504 100 0.0401 0.0428 0.0633 0.2775 0.2910 0.2923 #> textual~~speed #> Monte Carlo Confidence Intervals (Multiple Imputation Estimates) se R 0.05% 0.5% 2.5% 97.5% 99.5% 99.95% est #> visual=~x1 1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 #> visual=~x2 0.5535 0.1066 100 0.2448 0.2575 0.3289 0.7349 0.7752 0.7895 #> visual=~x3 0.7294 0.1323 100 0.4097 0.4198 0.4594 0.9936 1.0678 1.1102 #> textual=~x4 1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.1131 0.0555 100 0.9893 0.9905 1.0175 1.2157 1.2474 1.2731 #> textual=~x5 0.9261 0.0436 100 0.8078 0.8140 0.8493 1.0155 1.0264 1.0270 #> textual=~x6 #> speed=~x7 1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.1800 0.1516 100 0.7780 0.7993 0.8876 1.4625 1.5228 1.5280 #> speed=~x8 #> speed=~x9 1.0815 0.1397 100 0.7604 0.7617 0.8090 1.3351 1.3637 1.3695 #> x1~~x1 0.5491 0.1244 100 0.1596 0.2026 0.3255 0.7726 0.8013 0.8063 #> x2~~x2 1.1338 0.0904 100 0.9443 0.9475 0.9576 1.2877 1.3586 1.3618 #> x3~~x3 0.8443 0.0939 100 0.6466 0.6583 0.7107 1.0445 1.1341 1.1774 #> x4~~x4 0.3712 0.0478 100 0.2475 0.2491 0.2609 0.4450 0.4677 0.4848 0.4463 0.0605 100 0.3160 0.3208 0.3385 0.5723 0.5904 0.5925 #> x5~~x5 #> x6~~x6 0.3562 0.0397 100 0.2629 0.2719 0.2894 0.4362 0.4527 0.4555 #> x7~~x7 0.7994 0.0808 100 0.6136 0.6229 0.6404 0.9868 1.0175 1.0206

```
#> x8~~x8
                  0.4877 0.0738 100 0.3471 0.3471 0.3606 0.6371 0.6888 0.6975
                  0.5661 0.0749 100 0.3825 0.4100 0.4502 0.7046 0.7396 0.7509
#> x9~~x9
#> visual~~visual 0.8093 0.1651 100 0.4019 0.4325 0.4955 1.1436 1.1835 1.2009
#> textual~~textual 0.9795 0.1116 100 0.7018 0.7248 0.7833 1.2239 1.2825 1.3054
#> speed~~speed 0.3837 0.0846 100 0.1920 0.1936 0.2205 0.5452 0.6006 0.6011
#> visual~~textual 0.4082 0.0684 100 0.2617 0.2641 0.2778 0.5531 0.5621 0.5655
#> visual~~speed
                  0.2622 0.0556 100 0.1116 0.1239 0.1557 0.3728 0.4260 0.4371
#> textual~~speed
                0.1735 0.0480 100 0.0636 0.0699 0.0852 0.2684 0.3325 0.3429
#> Standardized Monte Carlo Confidence Intervals
                     est
                            se R 0.05% 0.5%
                                                2.5% 97.5% 99.5% 99.95%
#> visual=~x1
                  0.7719\ 0.0534\ 100\ 0.5267\ 0.5620\ 0.6717\ 0.8515\ 0.8723\ 0.8766
                  0.4236 0.0655 100 0.2608 0.2664 0.2839 0.5478 0.5716 0.5851
#> visual=~x2
#> visual=~x3
                  0.5811 0.0567 100 0.3882 0.4031 0.4725 0.6900 0.6972 0.6996
#> textual=~x4
                0.8516 0.0213 100 0.7996 0.8003 0.8066 0.8869 0.8940 0.8962
                  0.8551 0.0242 100 0.7934 0.7940 0.8062 0.8948 0.9105 0.9122
#> textual=~x5
#> textual=~x6
                  0.8380 0.0228 100 0.7829 0.7833 0.7913 0.8817 0.8852 0.8863
#> speed=~x7
                  0.5695 0.0612 100 0.3482 0.3741 0.4165 0.6539 0.6725 0.6845
#> speed=~x8
                  0.7230 0.0543 100 0.6000 0.6001 0.6176 0.8322 0.8503 0.8518
#> speed=~x9
                 0.6650 0.0564 100 0.5325 0.5331 0.5400 0.7721 0.7898 0.7940
#> x1~~x1
                 0.4042 0.0789 100 0.2315 0.2391 0.2750 0.5488 0.6826 0.7223
#> x2~~x2
                 0.8206 0.0551 100 0.6576 0.6731 0.6999 0.9194 0.9290 0.9320
#> x3~~x3
                0.6623 0.0645 100 0.5106 0.5139 0.5239 0.7766 0.8373 0.8492
#> x4~~x4
                 0.2748 0.0363 100 0.1969 0.2007 0.2134 0.3494 0.3595 0.3606
#> x5~~x5
                 0.2689 0.0413 100 0.1679 0.1710 0.1993 0.3501 0.3696 0.3705
                0.2977 0.0381 100 0.2145 0.2164 0.2227 0.3738 0.3865 0.3871
#> x6~~x6
#> x7~~x7
                 0.6757 0.0651 100 0.5314 0.5476 0.5724 0.8264 0.8592 0.8786
#> x8~~x8
                 0.4772 0.0784 100 0.2745 0.2770 0.3075 0.6186 0.6399 0.6400
#> x9~~x9
                 0.5578 0.0739 100 0.3695 0.3762 0.4037 0.7084 0.7158 0.7164
#> textual~~textual 1.0000 0.0000 100 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
#> visual~~textual 0.4585 0.0631 100 0.2713 0.2755 0.3299 0.5604 0.5752 0.5877
                  0.4705 0.0768 100 0.3126 0.3175 0.3259 0.6030 0.6389 0.6642
#> visual~~speed
#> Standardized Monte Carlo Confidence Intervals
                     est
                            se R 0.05% 0.5% 2.5% 97.5% 99.5% 99.95%
#> visual=~x1
                  0.7719 0.0635 100 0.5774 0.5990 0.6303 0.8751 0.9221 0.9367
#> visual=~x2
                  0.4236 0.0623 100 0.2205 0.2370 0.2776 0.5242 0.5586 0.5881
#> visual=~x3
                  0.5811 0.0598 100 0.4008 0.4030 0.4228 0.6797 0.7034 0.7046
                  0.8516 0.0228 100 0.7941 0.7953 0.8070 0.8935 0.8973 0.8976
#> textual=~x4
#> textual=~x5
                  0.8551 0.0210 100 0.8041 0.8055 0.8116 0.8903 0.8927 0.8937
                  0.8380 0.0209 100 0.7808 0.7817 0.7852 0.8726 0.8785 0.8796
#> textual=~x6
#> speed=~x7
                  0.5695 0.0563 100 0.4066 0.4132 0.4357 0.6524 0.6609 0.6643
                  0.7230 0.0480 100 0.5905 0.5966 0.6185 0.7886 0.8065 0.8159
#> speed=~x8
#> speed=~x9
                  0.6650 0.0570 100 0.5085 0.5155 0.5297 0.7354 0.7568 0.7573
                  0.4042 0.0970 100 0.1226 0.1494 0.2341 0.6027 0.6407 0.6665
#> x1~~x1
```

```
#> x2~~x2
               0.8206 0.0508 100 0.6540 0.6868 0.7252 0.9226 0.9435 0.9513
                  0.6623 0.0668 100 0.5036 0.5052 0.5380 0.8211 0.8376 0.8394
#> x3~~x3
                 0.2748 0.0388 100 0.1944 0.1949 0.2016 0.3487 0.3675 0.3694
#> x4~~x4
#> x5~~x5
                 0.2689 0.0358 100 0.2012 0.2031 0.2073 0.3413 0.3511 0.3534
#> x6~~x6
                  0.2977 0.0348 100 0.2263 0.2282 0.2385 0.3835 0.3889 0.3903
#> x7~~x7
                 0.6757 0.0620 100 0.5587 0.5631 0.5743 0.8101 0.8292 0.8347
#> x8~~x8
                 0.4772 0.0678 100 0.3343 0.3495 0.3781 0.6175 0.6440 0.6514
#> x9~~x9
                  0.5578 0.0730 100 0.4265 0.4272 0.4592 0.7194 0.7342 0.7414
#> textual~~textual 1.0000 0.0000 100 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
#> visual~~textual 0.4585 0.0688 100 0.3243 0.3262 0.3385 0.6001 0.6548 0.6859
#> visual~~speed 0.4705 0.0729 100 0.2380 0.2642 0.3248 0.6010 0.6242 0.6422
#> textual~~speed 0.2830 0.0672 100 0.1303 0.1391 0.1555 0.4286 0.4556 0.4716
#> 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 0.6.16 ended normally after 18 iterations
#>
#>
    Estimator
                                                   ML
#>
    Optimization method
                                                NLMINB
    Number of model parameters
#>
                                                    8
#>
#>
    Number of observations
                                                    50
#>
#> Model Test User Model:
#>
                                                 0.000
#>
    Test statistic
    Degrees of freedom
#>
#>
    P-value (Chi-square)
                                                 1.000
#>
#> Parameter Estimates:
#>
#>
    Standard errors
                                              Standard
#> Information
                                              Expected
```

```
#>
#> Latent Variables:
               Estimate Std.Err z-value P(>|z|)
#>
#>
   eta1 =~
#>
                1.000
  y1
                0.991 0.152 6.524 0.000
#>
    y2
                0.901 0.138 6.537 0.000
   уЗ
#>
#>
   y4
                1.399 0.143 9.814 0.000
#>
#> Variances:
              Estimate Std.Err z-value P(>|z|)
#>
               0.000 0.055 0.000 1.000
#>
  .y1
                0.980 0.203 4.822 0.000
#> .y2
#>
    .уЗ
               0.807 0.167 4.820 0.000
                     0.176 3.960 0.000
#>
   .y4
               0.696
               0.980 0.204 4.815 0.000
#>
   eta1
#>
#> 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
#> eta1=~y2 0.7039 NA 0 NA NA NA NA
                                       NA
#> eta1=~y3 0.7047 NA 0 NA NA NA NA
                                       NA
#> eta1=~y4 0.8566 NA 0 NA NA NA NA NA
NA
#> eta1~~eta1 1.0000 NA 0 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]]
#> [1] TRUE
#>
```

```
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#> [[1]][[2]]$visible
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#>
#> [[1]][[3]]
#> [[1]][[3]]$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]]
#> Monte Carlo Confidence Intervals
                                    se R 0.05% 0.5%
                                                                2.5%
                            est
                         1.0000 0.0000 20000 1.0000 1.0000
#> ses=~education
                                                             1.0000
                                                             4.4058
#> ses=~sei
                         5.2195 0.4169 20000 3.8014 4.1309
#> alien67=~anomia67
                         1.0000 0.0000 20000 1.0000 1.0000 1.0000
                         0.9787 0.0615 20000 0.7775 0.8217 0.8579
#> alien67=~powerless67
                         1.0000 0.0000 20000 1.0000 1.0000
#> alien71=~anomia71
                                                             1.0000
#> alien71=~powerless71
                         0.9221 0.0588 20000 0.7345 0.7722 0.8083
#> alien71~alien67
                         0.6070 0.0504 20000 0.4442 0.4762 0.5076
#> alien71~ses
                         #> alien67~ses
                         -0.5750 0.0561 20000 -0.7639 -0.7190 -0.6843
#> anomia67~~anomia71
                         1.6229 0.3136 20000 0.6383 0.8243
                                                             1.0140
#> powerless67~~powerless71 0.3387 0.2590 20000 -0.5000 -0.3360 -0.1677
#> education~~education
                        2.8013 0.5028 20000 1.1253 1.4505
                                                             1.8033
#> sei~~sei
                        264.5971 18.0932 20000 204.4367 217.6900 229.2996
                      4.7307 0.4515 20000 3.2552 3.5638 3.8408
#> anomia67~~anomia67
#> powerless67~~powerless67 2.5634 0.4004 20000 1.2316 1.5184 1.7782
#> anomia71~~anomia71 4.3992 0.5096 20000 2.7642 3.0948 3.4052
```

```
#> powerless71~~powerless71 3.0699 0.4299 20000 1.6952 1.9767 2.2169
           6.7983 0.6492 20000 4.6783 5.1251 5.5393
#> ses~~ses
                         4.8415 0.4678 20000 3.2404 3.6214 3.9266
#> alien67~~alien67
#> alien71~~alien71
                         4.0832 0.4037 20000 2.8045 3.0500 3.2964
#>
                          97.5%
                                 99.5% 99.95%
#> ses=~education
                        1.0000 1.0000 1.0000
#> ses=~sei
                        6.0405 6.2937 6.5785
#> alien67=~anomia67
                        1.0000 1.0000 1.0000
#> alien67=~powerless67
                         1.0993 1.1387
                                        1.1771
#> alien71=~anomia71
                         1.0000 1.0000 1.0000
                       1.0384 1.0757 1.1105
#> alien71=~powerless71
#> alien71~alien67
                         0.7057 0.7383 0.7656
                         -0.1242 -0.0943 -0.0603
#> alien71~ses
                        -0.4645 -0.4276 -0.3739
#> alien67~ses
                     2.2386 2.4389 2.6630
#> anomia67~~anomia71
#> powerless67~~powerless71     0.8482     1.0098
                                        1.1625
#> education~~education 3.7767 4.0984
                                         4.4851
#> sei~~sei
                       300.0216 312.0341 322.3460
#> anomia67~~anomia67 5.6204 5.8799 6.2104
#> powerless67~~powerless67 3.3500 3.6001 3.8787
#> anomia71~~anomia71 5.4034 5.7121 6.0442
#> powerless71~~powerless71 3.9043 4.1677 4.4824
                    8.0723 8.5075 9.0094
#> ses~~ses
                         5.7722 6.0460
#> alien67~~alien67
                                         6.3281
#> alien71~~alien71
                         4.8903 5.1288 5.3997
#>
#>
#> [[1]][[5]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[6]]
#> [[1]][[6]]$value
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#>
#>
#> [[1]][[6]]$visible
#> [1] TRUE
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#>
#> [[1]][[7]]
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#> [1] TRUE
#>
```

```
#> [[1]][[7]]$visible
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#>
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#> [1] TRUE
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#>
#> [[1]][[8]]$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]]$visible
#> [1] TRUE
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#>
#> [[1]][[13]]
#> [[1]][[13]]$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]]$visible
#> [1] TRUE
#>
#> [[1]][[15]]
#> [[1]][[15]]$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]]
                    2.5 % 97.5 %
#> textual=~x4
                0.8070202 0.8935427
#> x1~~x1
                0.2341447 0.6027298
#> x2~~x2
                0.7252272 0.9226451
#> x3~~x3
                0.5379558 0.8211178
#> x4~~x4
#> x5~~x5
               0.2015729 0.3487170
0.2073279 0.3412808
0.2385329 0.3834977
0.5743190 0.8100573
#> x6~~x6
#> x7~~x7
#> visual~~visual 1.0000000 1.0000000
#> textual~~textual 1.0000000 1.0000000
#> speed~~speed 1.0000000 1.0000000
#> visual~~textual  0.3384963 0.6001184
#> visual~~speed 0.3247955 0.6010497
#> textual~~speed 0.1555354 0.4285573
#>
#>
#> [[1]][[18]]$visible
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#>
#>
#> [[1]][[19]]
#> [[1]][[19]]$value
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#> [[1]][[19]]$value[[1]]$thetahatstar
#>
                     y1
                                   y2
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#> [1963,] 0.4645672640 1.6090676927 1.472271104
#> [1964,] -2.5566926059 -4.0566100000 -5.439392241
#> [1965,] 1.6406983089 3.4343738752 3.951851038
#> [1966,] -0.0197025847 -1.2631379961 -0.725557424
#> [1968,] -0.2760743914 -1.3508228968 -1.093909287
#> [1970,] -0.8166985493 -1.7750625426 -2.003491826
#> [1971,] 0.8680788362 0.8015130011 1.527282761
#> [1972,] -1.6127051440 -1.9597976727 -3.098616077
```

```
#> [1973,] 0.5004953713 0.5216143661 0.913581654
#> [1974,] -1.4736413798 -2.1401310348 -3.025283865
#> [1975,] -0.9033119918 -1.9274595329 -2.196070972
#> [1976,] 1.7157534273 4.0056062306 4.362453280
#> [1977,] 1.3382565747 2.1715296021 2.873886665
#> [1978,] -1.0624864809 -2.1404682900 -2.512769255
#> [1979,] -1.4750656873 -2.1374736837 -3.025585229
#> [1980,] -2.2514140584 -3.8672699611 -4.953640324
#> [1981,] 0.5652457672 1.2386889846 1.392270468
#> [1982,] -0.2632573310 -0.2251425149 -0.453221192
#> [1983,] 0.0591282133 0.4302450191 0.312499648
#> [1984,] 2.5362410770 4.5741353007 5.701094475
#> [1985,] 1.9267730909 3.7648888446 4.492002426
#> [1986,] 1.4564267911 2.3328869530 3.110789089
#> [1987,] -0.4967888327 -0.8675738924 -1.100952729
#> [1988,] 0.5861531675 1.6395992396 1.640829976
#> [1989,] 1.8490225241 2.4232498724 3.650495597
#> [1990,] -0.3258290825 -0.5084980051 -0.688497323
#> [1991,] 1.3054862523 3.9497142580 3.819840776
#> [1992,] -0.0480918466  0.5104975033  0.223335189
#> [1993,] 0.7052181462 1.5463983612 1.737578990
#> [1994,] 0.4702071205 2.0444148123 1.720903314
#> [1995,] -2.1763181673 -4.8994652497 -5.432822449
#> [1996,] -1.5843863747 -1.5264926561 -2.822837007
#> [1997,] 1.8529086261 2.5392240723 3.719702312
#> [1998,] 2.3243894645 2.7903233385 4.446978881
#> [1999,] -1.6749951452 -3.0981221441 -3.808012860
#> [2000,] 0.5213917151 0.6950798252 1.035905036
#> [[1]][[19]]$value[[1]]$decomposition
#> [1] "eigen"
#>
#>
#>
#> [[1]][[19]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[20]]
#> [[1]][[20]]$value
#> [[1]][[20]]$value[[1]]
#> [[1]][[20]]$value[[1]]$M
#> [1] 2
#>
#> [[1]][[20]]$value[[1]]$est
```

```
#> [1] 0 0 0
#>
#> [[1]][[20]]$value[[1]]$within
#> [,1] [,2] [,3]
#> [1,] 1 0 0
#> [2,] 0 1 0
#> [3,] 0 0 1
#> [[1]][[20]]$value[[1]]$between
#> [,1] [,2] [,3]
#> [1,] 0 0 0
             0
      0 0
#> [2,]
#> [3,] 0 0 0
#>
#> [[1]][[20]]$value[[1]]$total
#> [,1] [,2] [,3]
#> [1,] 1 0 0
#> [2,] 0 1 0
#> [3,] 0 0 1
#> [[1]][[20]]$value[[1]]$ariv
#> [1] NA
#>
#> [[1]][[20]]$value[[1]]$total_adi
#> [1] NA
#>
#>
#>
#> [[1]][[20]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[21]]
#> [[1]][[21]]$value
#> [[1]][[21]]$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
#> eta1=~y2 0.7039 NA 0
                   NA NA NA NA
                                        NA
#> eta1=~y3 0.7047 NA 0
                   NA NA NA NA
                                        NA
#> eta1=~y4 0.8566 NA 0 NA NA NA NA
                                        NA
NA NA NA NA
                                        NA
                   NA NA
                           NA NA NA
                                        NA
NA NA NA NA
                                        NA
                                        NA
#> eta1~~eta1 1.0000 NA 0 NA NA NA NA NA
                                        NA
```

```
#>
#>
#> [[1]][[21]]$visible
#> [1] TRUE
```

Environment

```
ls()
#> [1] "i" "root" "tex_file"
```

Class

```
#> [[1]]
#> [1] "character"

#>
#> [[2]]
#> [1] "root_criterion"
#>
#> [[3]]
#> [1] "character"
```

References

Pesigan, I. J. A., & Cheung, S. F. (2023). Monte Carlo confidence intervals for the indirect effect with missing data. Behavior Research Methods. https://doi.org/10.3758/s13428-023-02114-4 R Core Team. (2023). R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/