

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

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

#> Test passed
#> Test passed
#> Test passed
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```
#> 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	0.1055	100	0.3024	0.3274	0.3585	0.7360	0.8165	0.8310
#> visual=~x3	0.7294	0.1078	100	0.4788	0.4960	0.5182	0.9306	0.9726	0.9791
#> textual=~x4	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> textual=~x5	1.1131	0.0658	100	0.9607	0.9650	0.9908	1.2549	1.2929	1.3148
#> textual=~x6	0.9261	0.0556	100	0.7752	0.7899	0.8199	1.0404	1.0709	1.0789
#> speed=~x7	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> speed=~x8	1.1800	0.1694	100	0.8043	0.8184	0.8652	1.4814	1.5163	1.5293
#> speed=~x9	1.0815	0.1465	100	0.6667	0.7336	0.8505	1.3742	1.4333	1.4817
#> x1~~x1	0.5491	0.1113	100	0.2711	0.3007	0.3469	0.7696	0.8053	0.8160
#> x2~~x2	1.1338	0.1022	100	0.8949	0.9075	0.9316	1.3194	1.3568	1.3796
#> x3~~x3	0.8443	0.0843	100	0.6563	0.6688	0.7344	1.0314	1.1016	1.1562
#> x4~~x4	0.3712	0.0451	100	0.2682	0.2694	0.2834	0.4613	0.4744	0.4762
#> x5~~x5	0.4463	0.0516	100	0.3463	0.3523	0.3630	0.5518	0.5671	0.5794
#> x6~~x6	0.3562	0.0439	100	0.2535	0.2567	0.2802	0.4566	0.4756	0.4781
#> x7~~x7	0.7994	0.0810	100	0.6170	0.6232	0.6386	0.9641	0.9821	0.9888
#> x8~~x8	0.4877	0.0713	100	0.3011	0.3030	0.3376	0.6059	0.6392	0.6473
#> x9~~x9	0.5661	0.0646	100	0.4008	0.4144	0.4485	0.6980	0.7664	0.7974
#> visual~~visual	0.8093	0.1338	100	0.4949	0.5126	0.5602	1.0281	1.0841	1.1214
#> textual~~textual	0.9795	0.1139	100	0.7093	0.7258	0.7813	1.1849	1.2562	1.2569
#> speed~~speed	0.3837	0.0855	100	0.1817	0.1984	0.2211	0.5554	0.6028	0.6168
#> visual~~textual	0.4082	0.0649	100	0.2163	0.2452	0.2870	0.5206	0.5276	0.5278
#> visual~~speed	0.2622	0.0524	100	0.1459	0.1539	0.1664	0.3548	0.3841	0.3977
#> textual~~speed	0.1735	0.0469	100	0.0600	0.0670	0.0919	0.2640	0.2812	0.2833

```
#> 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	0.1018	100	0.2256	0.2924	0.3707	0.7586	0.7879	0.7991
#> visual=~x3	0.7294	0.1199	100	0.4057	0.4409	0.5226	0.9593	1.0582	1.0738
#> textual=~x4	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> textual=~x5	1.1131	0.0669	100	0.9635	0.9672	0.9962	1.2393	1.2637	1.2716
#> textual=~x6	0.9261	0.0548	100	0.8068	0.8086	0.8137	1.0221	1.0429	1.0465
#> speed=~x7	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> speed=~x8	1.1800	0.1741	100	0.7322	0.7400	0.8034	1.4808	1.5728	1.5948
#> speed=~x9	1.0815	0.1556	100	0.6327	0.6747	0.8169	1.4052	1.4717	1.5040
#> x1~~x1	0.5491	0.1226	100	0.3039	0.3047	0.3193	0.7520	0.8763	0.9010
#> x2~~x2	1.1338	0.1111	100	0.9040	0.9106	0.9592	1.3917	1.4556	1.4817
#> x3~~x3	0.8443	0.0962	100	0.6281	0.6383	0.6757	1.0301	1.0932	1.1340
#> x4~~x4	0.3712	0.0484	100	0.2539	0.2565	0.2657	0.4726	0.4812	0.4836
#> x5~~x5	0.4463	0.0556	100	0.2989	0.3101	0.3357	0.5674	0.5904	0.5907
#> x6~~x6	0.3562	0.0443	100	0.2625	0.2627	0.2828	0.4378	0.4775	0.4895
#> x7~~x7	0.7994	0.0728	100	0.6014	0.6074	0.6349	0.9036	0.9099	0.9135

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#> x8~~x8          0.4877 0.0624 100 0.3384 0.3427 0.3548 0.6057 0.6253 0.6375
#> x9~~x9          0.5661 0.0690 100 0.3952 0.4169 0.4513 0.6912 0.7101 0.7146
#> visual~~visual  0.8093 0.1817 100 0.2622 0.2867 0.4101 1.1150 1.2415 1.2956
#> textual~~textual 0.9795 0.1196 100 0.7125 0.7213 0.7637 1.2153 1.2749 1.3099
#> speed~~speed    0.3837 0.0966 100 0.0724 0.1048 0.1945 0.5505 0.6312 0.6587
#> visual~~textual  0.4082 0.0802 100 0.1919 0.2140 0.2469 0.5608 0.5886 0.5990
#> visual~~speed    0.2622 0.0546 100 0.0701 0.0954 0.1295 0.3479 0.3561 0.3583
#> textual~~speed   0.1735 0.0505 100 0.0238 0.0337 0.0689 0.2695 0.2977 0.3128
#> 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 0.6387 0.6430 0.6552 0.8559 0.8831 0.8972
#> visual=~x2      0.4236 0.0664 100 0.2648 0.2745 0.2893 0.5324 0.5450 0.5497
#> visual=~x3      0.5811 0.0554 100 0.4248 0.4326 0.4493 0.6520 0.6987 0.7174
#> textual=~x4      0.8516 0.0237 100 0.7812 0.7836 0.7983 0.8907 0.8956 0.8957
#> textual=~x5      0.8551 0.0223 100 0.7974 0.7977 0.7991 0.8871 0.8958 0.8989
#> textual=~x6      0.8380 0.0228 100 0.7785 0.7839 0.7921 0.8727 0.8896 0.8956
#> speed=~x7        0.5695 0.0566 100 0.3944 0.4146 0.4414 0.6619 0.6794 0.6857
#> speed=~x8        0.7230 0.0534 100 0.5787 0.5845 0.6272 0.8272 0.8411 0.8437
#> speed=~x9        0.6650 0.0446 100 0.5373 0.5416 0.5708 0.7287 0.7447 0.7515
#> x1~~x1          0.4042 0.0809 100 0.1950 0.2198 0.2675 0.5707 0.5865 0.5921
#> x2~~x2          0.8206 0.0548 100 0.6978 0.7030 0.7165 0.9163 0.9245 0.9298
#> x3~~x3          0.6623 0.0620 100 0.4853 0.5114 0.5749 0.7981 0.8128 0.8195
#> x4~~x4          0.2748 0.0401 100 0.1977 0.1980 0.2067 0.3626 0.3859 0.3897
#> x5~~x5          0.2689 0.0378 100 0.1920 0.1974 0.2130 0.3614 0.3636 0.3641
#> x6~~x6          0.2977 0.0381 100 0.1980 0.2085 0.2384 0.3725 0.3854 0.3939
#> x7~~x7          0.6757 0.0627 100 0.5297 0.5384 0.5618 0.8051 0.8276 0.8443
#> x8~~x8          0.4772 0.0769 100 0.2882 0.2925 0.3157 0.6066 0.6584 0.6651
#> x9~~x9          0.5578 0.0581 100 0.4353 0.4454 0.4690 0.6742 0.7066 0.7113
#> 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 0.0587 100 0.2974 0.3153 0.3533 0.5931 0.6074 0.6130
#> visual~~speed    0.4705 0.0755 100 0.3254 0.3347 0.3587 0.6384 0.6478 0.6494
#> textual~~speed   0.2830 0.0701 100 0.1222 0.1243 0.1550 0.4425 0.4721 0.4740
#> Standardized Monte Carlo Confidence Intervals
#>           est      se    R 0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> visual=~x1      0.7719 0.0709 100 0.4861 0.5051 0.5907 0.8789 0.8912 0.8991
#> visual=~x2      0.4236 0.0543 100 0.2133 0.2469 0.3148 0.4997 0.5256 0.5264
#> visual=~x3      0.5811 0.0552 100 0.4364 0.4465 0.4674 0.6748 0.6839 0.6907
#> textual=~x4      0.8516 0.0237 100 0.7904 0.7907 0.8024 0.8908 0.8984 0.9007
#> textual=~x5      0.8551 0.0233 100 0.7934 0.7953 0.8104 0.8926 0.8990 0.8995
#> textual=~x6      0.8380 0.0236 100 0.7657 0.7668 0.7940 0.8780 0.8854 0.8856
#> speed=~x7        0.5695 0.0654 100 0.2721 0.3257 0.4362 0.6775 0.7064 0.7068
#> speed=~x8        0.7230 0.0552 100 0.4911 0.5242 0.6077 0.8067 0.8257 0.8289
#> speed=~x9        0.6650 0.0537 100 0.4954 0.5150 0.5526 0.7338 0.7723 0.7906
#> x1~~x1          0.4042 0.1035 100 0.1917 0.2057 0.2275 0.6492 0.7444 0.7636

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```

#> x2~~x2      0.8206 0.0433 100 0.7229 0.7237 0.7503 0.9009 0.9376 0.9542
#> x3~~x3      0.6623 0.0627 100 0.5229 0.5322 0.5447 0.7816 0.8005 0.8096
#> x4~~x4      0.2748 0.0401 100 0.1887 0.1928 0.2065 0.3561 0.3748 0.3753
#> x5~~x5      0.2689 0.0396 100 0.1908 0.1919 0.2033 0.3432 0.3675 0.3705
#> x6~~x6      0.2977 0.0393 100 0.2157 0.2161 0.2291 0.3695 0.4120 0.4137
#> x7~~x7      0.6757 0.0700 100 0.5004 0.5010 0.5408 0.8095 0.8903 0.9253
#> x8~~x8      0.4772 0.0766 100 0.3129 0.3181 0.3493 0.6307 0.7238 0.7585
#> x9~~x9      0.5578 0.0689 100 0.3748 0.4032 0.4613 0.6946 0.7343 0.7545
#> 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 0.0674 100 0.2928 0.2959 0.3307 0.5861 0.6244 0.6309
#> visual~~speed   0.4705 0.0762 100 0.2008 0.2333 0.3155 0.5960 0.6673 0.6755
#> textual~~speed   0.2830 0.0777 100 0.0483 0.0642 0.1246 0.4321 0.4673 0.4954
#> 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 0.6.15 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]]
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#> [[1]][[1]]$value
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#>
#>
#> [[1]][[1]]$visible
#> [1] TRUE
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#>
#> [[1]][[2]]
#> [[1]][[2]]$value
#> [[1]][[2]]$value[[1]]
#> [1] TRUE
#>

```

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#>
#>
#> [[1]][[3]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[4]]
#> [[1]][[4]]$value
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#> [1] TRUE
#>
#>
#> [[1]][[4]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[5]]
#> [[1]][[5]]$value
#> [[1]][[5]]$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  0.4200 20000      3.8916      4.1393      4.4083
#> alien67=~anomia67      1.0000  0.0000 20000      1.0000      1.0000      1.0000
#> alien67=~powerless67      0.9787  0.0623 20000      0.7650      0.8151      0.8560
#> alien71=~anomia71      1.0000  0.0000 20000      1.0000      1.0000      1.0000
#> alien71=~powerless71      0.9221  0.0595 20000      0.7218      0.7687      0.8050
#> alien71~alien67      0.6070  0.0507 20000      0.4416      0.4780      0.5083
#> alien71~ses      -0.2268  0.0521 20000     -0.4062     -0.3606     -0.3278
#> alien67~ses      -0.5750  0.0561 20000     -0.7615     -0.7202     -0.6843
#> anomia67~~anomia71      1.6229  0.3116 20000      0.6553      0.8144      1.0001
#> powerless67~~powerless71      0.3387  0.2610 20000     -0.5001     -0.3248     -0.1753
#> education~~education      2.8013  0.5036 20000      1.1182      1.5337      1.8247
#> sei~~sei      264.5971 18.1169 20000    205.2337    218.3694    228.9636
#> anomia67~~anomia67      4.7307  0.4551 20000      3.2206      3.5563      3.8368
#> powerless67~~powerless67      2.5634  0.4080 20000      1.1795      1.5261      1.7670
#> anomia71~~anomia71      4.3992  0.5161 20000      2.8025      3.0720      3.3925

```

```

#> powerless71~~powerless71 3.0699 0.4366 20000 1.6820 1.9596 2.2266
#> ses~~ses 6.7983 0.6464 20000 4.6688 5.1099 5.5102
#> alien67~~alien67 4.8415 0.4699 20000 3.3399 3.6284 3.9301
#> alien71~~alien71 4.0832 0.4072 20000 2.8020 3.0276 3.2805
#> 97.5% 99.5% 99.95%
#> ses=~education 1.0000 1.0000 1.0000
#> ses=~sei 6.0625 6.3145 6.5356
#> alien67=~anomia67 1.0000 1.0000 1.0000
#> alien67=~powerless67 1.0999 1.1350 1.1766
#> alien71=~anomia71 1.0000 1.0000 1.0000
#> alien71=~powerless71 1.0379 1.0785 1.1214
#> alien71~alien67 0.7062 0.7391 0.7735
#> alien71~ses -0.1242 -0.0930 -0.0614
#> alien67~ses -0.4657 -0.4319 -0.4000
#> anomia67~~anomia71 2.2279 2.4247 2.6312
#> powerless67~~powerless71 0.8516 1.0220 1.2294
#> education~~education 3.7992 4.1446 4.4599
#> sei~~sei 299.5463 310.5994 321.4219
#> anomia67~~anomia67 5.6145 5.9053 6.2055
#> powerless67~~powerless67 3.3601 3.6147 3.9172
#> anomia71~~anomia71 5.4143 5.7117 6.0837
#> powerless71~~powerless71 3.9258 4.1967 4.5047
#> ses~~ses 8.0657 8.4287 8.9626
#> alien67~~alien67 5.7543 6.0384 6.4063
#> alien71~~alien71 4.8728 5.1324 5.4424
#>
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#> [[1]][[7]]
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#> [[1]][[7]]$value[[1]]
#> [1] TRUE
#>

```



```

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#>
#> [[1]][[8]]
#> [[1]][[8]]$value
#> [[1]][[8]]$value[[1]]
#> [1] TRUE
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#> [[1]][[8]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[9]]
#> [[1]][[9]]$value
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#> [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
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#> [1] TRUE
#>
#>
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#>
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#> [1946,]  1.7206469896  3.2637388061  3.956850093
#> [1947,]  0.6640453631  1.1786735160  1.482165476
#> [1948,]  1.5474971615  2.7576299200  3.460066547
#> [1949,]  1.3905397272  2.1849595448  2.946535746
#> [1950,] -0.8119940490 -0.3383245679 -1.200295988
#> [1951,] -0.9128368831 -1.7808299782 -2.126575053
#> [1952,]  0.9034347089  0.2546928006  1.267908496
#> [1953,] -1.1398597426 -1.8530432373 -2.449743264
#> [1954,]  3.2701419531  5.5477673045  7.156578897
#> [1955,]  0.3698549098  0.5036490592  0.740705670
#> [1956,] -0.1491558650 -1.1244853722 -0.810036623
#> [1957,]  1.3627331541  3.4895650908  3.635862973
#> [1958,] -0.0647918018  0.3757841477  0.127750413
#> [1959,] -1.4237145821 -2.8187514531 -3.339632087
#> [1960,]  1.2015174522  1.7255798444  2.455892324
#> [1961,] -1.8327659799 -3.2041028139 -4.063564708
#> [1962,]  0.6148427451  1.1425307722  1.400753106
#> [1963,]  1.6488420545  3.2141692650  3.839801783
#> [1964,]  0.4646528505 -1.1600525765 -0.064367984
#> [1965,] -0.4255277851  1.2246207721  0.148988787
#> [1966,]  0.6590706466  0.5240083634  1.112650356
#> [1967,]  1.4852648394  0.7762963238  2.282906919
#> [1968,]  0.0509482818 -1.5916158512 -0.819748692
#> [1969,] -1.3141933763 -1.3938408119 -2.412295629
#> [1970,] -0.6467054236 -0.3592525213 -1.005798581
#> [1971,]  0.0878637041  0.3837344136  0.322520780
#> [1972,]  0.6178547800  0.2049069254  0.884167073

```

```

#> [1973,] 0.8099641744 0.6466237277 1.368857901
#> [1974,] -0.6426870070 -1.0665792841 -1.393324436
#> [1975,] -0.9143152506 -1.2059924834 -1.809407805
#> [1976,] 2.2126279838 3.9105753051 4.929307533
#> [1977,] -1.8273033099 -4.1146112710 -4.562046942
#> [1978,] -0.3546420267 -0.9165925296 -0.950901852
#> [1979,] 0.7971842901 0.9959849363 1.546802490
#> [1980,] 1.2107569338 1.3022609279 2.232489493
#> [1981,] 1.2077124027 0.8785688639 1.993561669
#> [1982,] -0.4929633209 -1.0237097018 -1.182831230
#> [1983,] -0.8249571562 -1.0525024526 -1.612799543
#> [1984,] 0.3648017288 -0.0764659816 0.412464897
#> [1985,] 0.6373890824 2.2185854580 2.026033227
#> [1986,] -0.2874125648 0.0504485607 -0.330400767
#> [1987,] -1.3828730530 -2.6149883726 -3.175623554
#> [1988,] -1.7818848033 -2.1280243731 -3.402938437
#> [1989,] -1.5407121785 -3.8718894387 -4.069973192
#> [1990,] -1.0438988311 -1.4644002160 -2.114401359
#> [1991,] -1.2822237129 -1.6578271176 -2.518931458
#> [1992,] -2.1866850552 -4.1011414693 -5.002713473
#> [1993,] -0.1348532514 -0.3315138575 -0.352135565
#> [1994,] -2.6904716207 -5.0595596124 -6.162806987
#> [1995,] 0.0665347258 0.0815852883 0.128243865
#> [1996,] -1.6230206458 -2.6686203954 -3.504846232
#> [1997,] 0.3973500933 1.1113246870 1.112226134
#> [1998,] 0.3707909350 1.1201105956 1.083983217
#> [1999,] 1.9671325494 2.5716738470 3.880145481
#> [2000,] -0.3886110916 -0.7228005400 -0.885714143
#>
#> [[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
#> [2,]    0    0    0
#> [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_adj
#> [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    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]][[21]]$visible  
#> [1] TRUE
```

Environment

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

Class

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

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/>