

# 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
```

```
#> 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-semccci-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	0.0964	100	0.2688	0.2950	0.3360	0.7038	0.7434	0.7599
#> visual=~x3	0.7294	0.0947	100	0.4834	0.4911	0.5240	0.8766	0.9797	1.0473
#> textual=~x4	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> textual=~x5	1.1131	0.0709	100	0.9112	0.9331	0.9967	1.2425	1.2884	1.3185
#> textual=~x6	0.9261	0.0556	100	0.7864	0.7872	0.8018	1.0279	1.0453	1.0499
#> speed=~x7	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> speed=~x8	1.1800	0.1765	100	0.7507	0.7762	0.8554	1.5423	1.5601	1.5636
#> speed=~x9	1.0815	0.1674	100	0.6088	0.6512	0.7533	1.3634	1.4446	1.4683
#> x1~~x1	0.5491	0.0984	100	0.3221	0.3266	0.3523	0.7295	0.7752	0.7928
#> x2~~x2	1.1338	0.1014	100	0.9114	0.9297	0.9828	1.3341	1.3862	1.4253
#> x3~~x3	0.8443	0.0833	100	0.5714	0.6172	0.6900	1.0087	1.0192	1.0242
#> x4~~x4	0.3712	0.0384	100	0.2995	0.3023	0.3088	0.4529	0.4723	0.4776
#> x5~~x5	0.4463	0.0555	100	0.3170	0.3235	0.3518	0.5634	0.5823	0.5961
#> x6~~x6	0.3562	0.0425	100	0.2285	0.2507	0.2844	0.4372	0.4822	0.5194
#> x7~~x7	0.7994	0.0817	100	0.5496	0.5604	0.6407	0.9172	1.0004	1.0152
#> x8~~x8	0.4877	0.0737	100	0.3141	0.3244	0.3453	0.6269	0.6827	0.7138
#> x9~~x9	0.5661	0.0648	100	0.4148	0.4205	0.4324	0.6703	0.7020	0.7203
#> visual~~visual	0.8093	0.1356	100	0.4825	0.4987	0.5746	1.0949	1.1095	1.1116
#> textual~~textual	0.9795	0.1089	100	0.6730	0.6879	0.7756	1.1742	1.2114	1.2215
#> speed~~speed	0.3837	0.0850	100	0.1750	0.1826	0.2110	0.5533	0.6070	0.6534
#> visual~~textual	0.4082	0.0715	100	0.2057	0.2245	0.2664	0.5366	0.5566	0.5598
#> visual~~speed	0.2622	0.0569	100	0.1260	0.1369	0.1524	0.3638	0.3735	0.3765
#> textual~~speed	0.1735	0.0447	100	0.0641	0.0664	0.0929	0.2599	0.2782	0.2835

```
#> 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	0.0936	100	0.2862	0.2982	0.3679	0.7276	0.7793	0.7802
#> visual=~x3	0.7294	0.1020	100	0.5012	0.5042	0.5340	0.9520	0.9865	0.9929
#> textual=~x4	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> textual=~x5	1.1131	0.0681	100	0.9651	0.9678	0.9948	1.2609	1.2748	1.2758
#> textual=~x6	0.9261	0.0547	100	0.7887	0.7984	0.8199	1.0214	1.0498	1.0571
#> speed=~x7	1.0000	0.0000	100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
#> speed=~x8	1.1800	0.1751	100	0.7106	0.7173	0.8260	1.4893	1.5246	1.5342
#> speed=~x9	1.0815	0.1423	100	0.6624	0.6992	0.8059	1.3459	1.4080	1.4166
#> x1~~x1	0.5491	0.1108	100	0.2682	0.3005	0.3450	0.7514	0.8057	0.8066
#> x2~~x2	1.1338	0.1128	100	0.8423	0.8640	0.9325	1.3647	1.3899	1.4060
#> x3~~x3	0.8443	0.0950	100	0.6367	0.6443	0.6771	1.0249	1.0525	1.0649
#> x4~~x4	0.3712	0.0493	100	0.2674	0.2675	0.2812	0.4596	0.4971	0.5178
#> x5~~x5	0.4463	0.0500	100	0.3122	0.3208	0.3491	0.5294	0.5638	0.5819
#> x6~~x6	0.3562	0.0420	100	0.2250	0.2490	0.2910	0.4386	0.4565	0.4666
#> x7~~x7	0.7994	0.0729	100	0.6169	0.6264	0.6449	0.9231	0.9794	1.0110

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#> x8~~x8          0.4877 0.0771 100 0.3035 0.3079 0.3167 0.6469 0.6551 0.6558
#> x9~~x9          0.5661 0.0671 100 0.4084 0.4151 0.4287 0.6866 0.7117 0.7179
#> visual~~visual  0.8093 0.1497 100 0.4801 0.5009 0.5568 1.0941 1.1239 1.1300
#> textual~~textual 0.9795 0.1118 100 0.6941 0.7272 0.7814 1.2049 1.2582 1.3009
#> speed~~speed    0.3837 0.0855 100 0.1680 0.1786 0.2094 0.5614 0.5827 0.5870
#> visual~~textual 0.4082 0.0637 100 0.2530 0.2546 0.2798 0.5168 0.5707 0.5840
#> visual~~speed    0.2622 0.0529 100 0.1218 0.1231 0.1536 0.3555 0.3750 0.3868
#> textual~~speed   0.1735 0.0489 100 0.0447 0.0521 0.0826 0.2636 0.2682 0.2696
#> Standardized Monte Carlo Confidence Intervals
#>           est      se    R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> visual=~x1      0.7719 0.0492 100 0.6293 0.6423 0.6792 0.8681 0.8751 0.8791
#> visual=~x2      0.4236 0.0620 100 0.2267 0.2464 0.2809 0.5087 0.5131 0.5141
#> visual=~x3      0.5811 0.0508 100 0.4375 0.4496 0.4716 0.6744 0.7017 0.7161
#> textual=~x4      0.8516 0.0177 100 0.8098 0.8128 0.8173 0.8855 0.8888 0.8900
#> textual=~x5      0.8551 0.0234 100 0.7894 0.7938 0.8115 0.8957 0.9089 0.9119
#> textual=~x6      0.8380 0.0241 100 0.7730 0.7768 0.7831 0.8735 0.8877 0.8888
#> speed=~x7       0.5695 0.0553 100 0.3902 0.4105 0.4442 0.6546 0.6970 0.7279
#> speed=~x8       0.7230 0.0564 100 0.5705 0.5896 0.6169 0.8204 0.8307 0.8326
#> speed=~x9       0.6650 0.0552 100 0.5187 0.5190 0.5353 0.7491 0.7598 0.7617
#> x1~~x1          0.4042 0.0755 100 0.2272 0.2342 0.2464 0.5387 0.5873 0.6040
#> x2~~x2          0.8206 0.0493 100 0.7357 0.7367 0.7412 0.9211 0.9388 0.9485
#> x3~~x3          0.6623 0.0585 100 0.4871 0.5074 0.5452 0.7776 0.7976 0.8086
#> x4~~x4          0.2748 0.0301 100 0.2080 0.2101 0.2159 0.3320 0.3394 0.3442
#> x5~~x5          0.2689 0.0399 100 0.1684 0.1740 0.1978 0.3415 0.3699 0.3769
#> x6~~x6          0.2977 0.0400 100 0.2100 0.2120 0.2370 0.3867 0.3965 0.4025
#> x7~~x7          0.6757 0.0618 100 0.4699 0.5130 0.5715 0.8026 0.8309 0.8477
#> x8~~x8          0.4772 0.0811 100 0.3068 0.3100 0.3270 0.6194 0.6519 0.6745
#> x9~~x9          0.5578 0.0712 100 0.4199 0.4226 0.4388 0.7135 0.7307 0.7310
#> 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 0.0643 100 0.2806 0.2898 0.3259 0.5735 0.5845 0.5881
#> visual~~speed    0.4705 0.0739 100 0.3019 0.3130 0.3343 0.5971 0.6232 0.6362
#> textual~~speed   0.2830 0.0676 100 0.1153 0.1157 0.1518 0.4272 0.4538 0.4617
#> Standardized Monte Carlo Confidence Intervals
#>           est      se    R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> visual=~x1      0.7719 0.0558 100 0.6282 0.6333 0.6528 0.8667 0.8777 0.8815
#> visual=~x2      0.4236 0.0546 100 0.2495 0.2549 0.2994 0.4922 0.5362 0.5445
#> visual=~x3      0.5811 0.0516 100 0.4650 0.4693 0.4796 0.6784 0.6871 0.6918
#> textual=~x4      0.8516 0.0242 100 0.7871 0.7919 0.8052 0.8851 0.8952 0.9036
#> textual=~x5      0.8551 0.0203 100 0.7996 0.8071 0.8191 0.8901 0.8954 0.8966
#> textual=~x6      0.8380 0.0256 100 0.7617 0.7684 0.7803 0.8762 0.8930 0.9041
#> speed=~x7       0.5695 0.0523 100 0.4046 0.4185 0.4383 0.6491 0.6746 0.6856
#> speed=~x8       0.7230 0.0578 100 0.5392 0.5487 0.5921 0.8234 0.8476 0.8570
#> speed=~x9       0.6650 0.0507 100 0.5195 0.5300 0.5471 0.7439 0.7483 0.7504
#> x1~~x1          0.4042 0.0848 100 0.2230 0.2297 0.2487 0.5739 0.5988 0.6054

```

```

#> x2~~x2      0.8206 0.0439 100 0.7035 0.7124 0.7578 0.9102 0.9350 0.9377
#> x3~~x3      0.6623 0.0596 100 0.5214 0.5279 0.5398 0.7700 0.7798 0.7837
#> x4~~x4      0.2748 0.0411 100 0.1835 0.1985 0.2167 0.3516 0.3729 0.3804
#> x5~~x5      0.2689 0.0346 100 0.1960 0.1983 0.2077 0.3291 0.3486 0.3606
#> x6~~x6      0.2977 0.0426 100 0.1826 0.2023 0.2322 0.3911 0.4095 0.4198
#> x7~~x7      0.6757 0.0579 100 0.5300 0.5448 0.5787 0.8079 0.8246 0.8363
#> x8~~x8      0.4772 0.0817 100 0.2655 0.2814 0.3219 0.6493 0.6988 0.7092
#> x9~~x9      0.5578 0.0660 100 0.4369 0.4400 0.4467 0.7007 0.7189 0.7301
#> 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 0.0618 100 0.2910 0.2989 0.3491 0.5836 0.5898 0.5919
#> visual~~speed   0.4705 0.0720 100 0.2961 0.3056 0.3332 0.6045 0.6243 0.6340
#> textual~~speed   0.2830 0.0704 100 0.0907 0.1080 0.1377 0.4000 0.4455 0.4757
#> 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]]
#> [[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
#>

```

```

#>
#> [[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
#>
#>          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  0.4230 20000    3.8720    4.1344    4.3739
#> alien67=~anomia67    1.0000  0.0000 20000    1.0000    1.0000    1.0000
#> alien67=~powerless67 0.9787  0.0617 20000    0.7764    0.8186    0.8565
#> alien71=~anomia71    1.0000  0.0000 20000    1.0000    1.0000    1.0000
#> alien71=~powerless71 0.9221  0.0598 20000    0.7310    0.7685    0.8043
#> alien71~alien67      0.6070  0.0512 20000    0.4333    0.4743    0.5073
#> alien71~ses         -0.2268  0.0522 20000   -0.4036   -0.3613   -0.3292
#> alien67~ses         -0.5750  0.0565 20000   -0.7567   -0.7223   -0.6862
#> anomia67~~anomia71    1.6229  0.3161 20000    0.6072    0.8052    0.9906
#> powerless67~~powerless71 0.3387  0.2628 20000   -0.5245   -0.3356   -0.1792
#> education~~education  2.8013  0.5094 20000    1.1972    1.5123    1.7888
#> sei~~sei            264.5971 17.9897 20000  204.5838  217.9986  229.3833
#> anomia67~~anomia67    4.7307  0.4566 20000    3.2688    3.5609    3.8353
#> powerless67~~powerless67 2.5634  0.4033 20000    1.2599    1.5510    1.7828
#> anomia71~~anomia71    4.3992  0.5177 20000    2.7522    3.0767    3.3838

```

```

#> powerless71~~powerless71 3.0699 0.4381 20000 1.6145 1.9267 2.2078
#> ses~~ses 6.7983 0.6478 20000 4.6837 5.1529 5.5329
#> alien67~~alien67 4.8415 0.4678 20000 3.2204 3.6268 3.9208
#> alien71~~alien71 4.0832 0.4035 20000 2.7597 3.0474 3.3021
#> 97.5% 99.5% 99.95%
#> ses=~education 1.0000 1.0000 1.0000
#> ses=~sei 6.0519 6.3003 6.5654
#> alien67=~anomia67 1.0000 1.0000 1.0000
#> alien67=~powerless67 1.0996 1.1364 1.1761
#> alien71=~anomia71 1.0000 1.0000 1.0000
#> alien71=~powerless71 1.0381 1.0771 1.1167
#> alien71~alien67 0.7054 0.7389 0.7816
#> alien71~ses -0.1250 -0.0942 -0.0622
#> alien67~ses -0.4635 -0.4303 -0.3925
#> anomia67~~anomia71 2.2469 2.4313 2.6885
#> powerless67~~powerless71 0.8532 1.0077 1.2028
#> education~~education 3.8090 4.1089 4.5117
#> sei~~sei 299.7700 310.0812 321.4050
#> anomia67~~anomia67 5.6208 5.8814 6.2115
#> powerless67~~powerless67 3.3597 3.5991 3.8861
#> anomia71~~anomia71 5.4095 5.7587 6.1878
#> powerless71~~powerless71 3.9243 4.1879 4.4616
#> ses~~ses 8.0714 8.4587 8.8752
#> alien67~~alien67 5.7588 6.0517 6.3598
#> alien71~~alien71 4.8877 5.1187 5.4336
#>
#>
#> [[1]][[5]]$visible
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#>
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#>
#>
#> [[1]][[6]]$visible
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#>
#>
#> [[1]][[7]]
#> [[1]][[7]]$value
#> [[1]][[7]]$value[[1]]
#> [1] TRUE
#>

```



```

#>
#> [[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]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[15]]
#> [[1]][[15]]$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%
#> visual=~x1 0.6527650 0.8667401
#> visual=~x2 0.2994481 0.4921519
#> visual=~x3 0.4796132 0.6783991
#> textual=~x4 0.8052158 0.8850607
#> textual=~x5 0.8191096 0.8901042
#> textual=~x6 0.7803219 0.8762343
#> speed=~x7 0.4382960 0.6491062
#> speed=~x8 0.5921296 0.8234386
#> speed=~x9 0.5470873 0.7438710
#> x1~~x1 0.2487324 0.5738927
#> x2~~x2 0.7577841 0.9102236
#> x3~~x3 0.5397673 0.7699682
#> x4~~x4 0.2166675 0.3516268
#> x5~~x5 0.2077143 0.3290594
#> x6~~x6 0.2322117 0.3910971
#> x7~~x7 0.5786598 0.8078943
#> x8~~x8 0.3218625 0.6493293
#> x9~~x9 0.4466509 0.7006918
#> visual~~visual 1.0000000 1.0000000
#> textual~~textual 1.0000000 1.0000000
#> speed~~speed 1.0000000 1.0000000
#> visual~~textual 0.3491477 0.5836372
#> visual~~speed 0.3331678 0.6044549
#> textual~~speed 0.1376894 0.3999817
#>
#>
#> [[1]][[18]]$visible
```

```

#> [1] TRUE
#>
#>
#> [[1]][[19]]
#> [[1]][[19]]$value
#> [[1]][[19]]$value[[1]]
#> [[1]][[19]]$value[[1]]$thetahatstar
#>
#>          y1          y2          y3
#> [1,] -9.986530e-01 -0.4817787098 -1.512666992
#> [2,] -2.489695e+00 -4.7895559740 -5.762601791
#> [3,]  1.536225e+00  4.1252757714  4.204996491
#> [4,]  2.551448e+00  5.5705513842  6.273026362
#> [5,]  9.088580e-01  2.7271253337  2.646767800
#> [6,] -1.774130e-01 -0.1336523400 -0.295401899
#> [7,]  8.657057e-01  1.5448938267  1.936868701
#> [8,]  1.224973e+00  2.4354999192  2.879117219
#> [9,]  4.190343e-01  0.6863780165  0.903438277
#> [10,] -3.590649e-01 -1.1770625602 -1.100967008
#> [11,] -1.945380e+00 -4.3025399035 -4.813579164
#> [12,] -2.568730e+00 -4.0568133348 -5.454515853
#> [13,]  1.314979e-01 -0.4500311024 -0.085773253
#> [14,]  2.713590e-01  0.5528073109  0.645164029
#> [15,] -7.315207e-01 -2.2827273979 -2.179009576
#> [16,]  1.260542e+00  1.4478449240  2.375363618
#> [17,] -8.179140e-01 -0.5442398714 -1.321952398
#> [18,] -1.790484e+00 -3.4863179767 -4.167457654
#> [19,] -6.086886e-01  0.7078599189 -0.366189610
#> [20,] -8.839838e-01 -2.4460989271 -2.459792252
#> [21,] -2.711619e-01  0.9812786546  0.206435241
#> [22,] -3.443642e-01 -1.1410243984 -1.062635956
#> [23,] -2.193865e-01  0.1399986837 -0.195877081
#> [24,] -2.096919e+00 -2.7260262135 -4.127645988
#> [25,]  1.891092e+00  3.7411927952  4.434358793
#> [26,]  1.012945e+00  1.7269841974  2.221525480
#> [27,]  1.229113e+00  2.1467144603  2.724015750
#> [28,]  1.298115e+00  1.3217437720  2.352235610
#> [29,] -2.623452e-01 -0.3246272285 -0.507293682
#> [30,]  3.699150e-01 -0.0585307369  0.428794292
#> [31,]  2.125556e-02 -0.6604982035 -0.340043596
#> [32,]  1.931435e-01  0.3899272719  0.457239284
#> [33,] -2.336195e-01  0.2201236867 -0.169159376
#> [34,]  1.006556e+00  1.8008802164  2.254567444
#> [35,] -2.227917e+00 -2.8685146471 -4.370072566
#> [36,] -1.509878e-01 -0.3638671372 -0.390209717
#> [37,] -4.224105e-02 -1.4578923246 -0.861742931

```

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#> [38,] 2.993404e-03 0.8323651062 0.465660498
#> [39,] -1.754616e-01 -1.5651188004 -1.087372417
#> [40,] -5.310353e-01 0.3034632938 -0.493780732
#> [41,] -3.197720e-01 -1.5641996985 -1.266814488
#> [42,] 1.615101e+00 1.8252882011 3.026956022
#> [43,] 1.359524e+00 3.1444897271 3.440358980
#> [44,] 1.494703e+00 1.8533278969 2.892383636
#> [45,] 1.109272e-01 -1.2841915313 -0.574348560
#> [46,] 4.899431e-02 -0.4200951737 -0.172040324
#> [47,] 6.916083e-01 1.7883146401 1.854861232
#> [48,] -3.894720e-01 -0.2320588542 -0.614446629
#> [49,] -1.341226e-01 -1.1960608788 -0.831011805
#> [50,] -5.697109e-01 -0.7063699074 -1.102423629
#> [51,] -5.776825e-01 -1.2291824818 -1.402503120
#> [52,] -1.234037e+00 -3.0216231047 -3.215693417
#> [53,] -6.592918e-01 -1.8328023435 -1.839252054
#> [54,] -1.455500e+00 -1.9215027124 -2.881332604
#> [55,] -3.647753e+00 -6.0579211579 -7.910565735
#> [56,] -4.057547e-01 -1.2169616412 -1.181330616
#> [57,] -2.612401e-01 -0.3958662406 -0.545450222
#> [58,] -2.233928e+00 -3.7836687951 -4.885440900
#> [59,] -8.364778e-01 -1.6529753908 -1.960402851
#> [60,] 1.878705e+00 3.1754316661 4.104938724
#> [61,] 1.221107e+00 1.3502237240 2.272013446
#> [62,] -2.109603e+00 -4.5025317179 -5.129348027
#> [63,] -7.659511e-01 -1.3300482347 -1.693246494
#> [64,] 4.287981e-01 -0.3424540685 0.344654866
#> [65,] -1.644773e+00 -2.4116126287 -3.389342491
#> [66,] 2.870847e+00 3.9648823436 5.780230984
#> [67,] 7.136728e-01 1.7835371259 1.879723836
#> [68,] -1.552759e+00 -2.4154066931 -3.276708120
#> [69,] 2.215538e+00 2.6405589488 4.228130289
#> [70,] 4.692626e-01 2.4328407589 1.935285615
#> [71,] -5.714040e-01 -0.4219468330 -0.946691989
#> [72,] -4.678356e-02 1.2896093850 0.657341072
#> [73,] -2.567322e+00 -4.6014002301 -5.754982302
#> [74,] -1.179726e+00 -1.1169342360 -2.090946568
#> [75,] -5.511818e-01 -0.2892973874 -0.847860346
#> [76,] 4.396239e-01 1.2052719428 1.217077505
#> [77,] -2.306017e-01 -0.9433265142 -0.811062336
#> [78,] 2.279652e-01 -0.7491719335 -0.131491125
#> [79,] 1.788913e+00 3.1379412729 3.972164594
#> [80,] 2.493129e+00 3.7102498118 5.167914071
#> [81,] -2.546126e-01 -1.0130957831 -0.879722492
#> [82,] -1.197738e+00 -2.0710954158 -2.642926328

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#> [83,] 1.140261e-01 1.1110332292 0.758765099
#> [84,] -3.315309e-01 -0.7341792430 -0.820851018
#> [85,] 1.932356e+00 2.4646219021 3.777370961
#> [86,] 4.515995e-01 0.5751811497 0.882336875
#> [87,] -6.191933e-01 -1.4251174963 -1.563001917
#> [88,] 1.674168e+00 3.4388278409 3.996058418
#> [89,] 3.094620e+00 5.5083760725 6.915846336
#> [90,] 2.147276e-01 0.4298474253 0.506308216
#> [91,] 9.193190e-01 2.3162774233 2.431809024
#> [92,] -1.891684e+00 -1.1585309009 -3.001827978
#> [93,] -8.485941e-01 -0.8461799821 -1.527774049
#> [94,] 1.341658e+00 2.4133007692 3.012300941
#> [95,] -2.508917e-01 -0.9566466588 -0.843755624
#> [96,] -1.928571e+00 -3.2622951647 -4.215326113
#> [97,] -2.153807e+00 -4.1086300057 -4.965871203
#> [98,] -7.623007e-01 -0.2328353182 -1.079787322
#> [99,] 7.392023e-01 1.8600138970 1.954000037
#> [100,] -1.696673e+00 -4.4960543520 -4.610838979
#> [101,] 5.305150e-01 1.2403023894 1.349857310
#> [102,] 5.803058e-01 0.5213402240 1.012951466
#> [103,] -1.896620e+00 -2.5369227843 -3.772932874
#> [104,] -1.034588e+00 -0.9209817133 -1.801216379
#> [105,] 4.204650e-01 0.1651512213 0.615963260
#> [106,] -2.498164e-01 -0.5428125930 -0.612754179
#> [107,] 1.059176e+00 0.8800017665 1.809134534
#> [108,] 2.336770e-01 0.3764152940 0.500285223
#> [109,] -6.106455e-01 -0.2201590519 -0.883641530
#> [110,] -1.053400e+00 -0.6762851398 -1.688878609
#> [111,] 1.466839e-01 -0.7228335528 -0.218230574
#> [112,] 6.943849e-01 1.0299126469 1.437442181
#> [113,] 1.666188e+00 2.6336092588 3.539245059
#> [114,] -2.466261e-01 0.0682653480 -0.269653308
#> [115,] -2.513454e-01 0.5842306637 0.010801029
#> [116,] 3.811010e-01 -0.3361539291 0.288673794
#> [117,] 3.241118e-01 1.8708729473 1.442416984
#> [118,] -4.655861e-01 -1.9380969800 -1.656139000
#> [119,] -4.217543e-01 -0.1116470329 -0.587878396
#> [120,] 1.376644e+00 3.1460753779 3.462587530
#> [121,] 6.624184e-01 1.6743636741 1.755224000
#> [122,] -3.822205e-02 -0.7121299255 -0.442864408
#> [123,] -1.299371e+00 -1.7329039095 -2.581977645
#> [124,] 8.536305e-02 0.2085510246 0.222183066
#> [125,] -8.269639e-01 -0.8901641188 -1.525210949
#> [126,] 7.652563e-01 1.2642953881 1.655890033
#> [127,] -1.031134e+00 -2.2624100901 -2.541345551

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#> [128,] -7.637011e-01 -0.0651100880 -0.988453074
#> [129,] 1.100119e+00 1.7816054965 2.360542377
#> [130,] -9.200975e-01 -2.6160049711 -2.599116041
#> [131,] -1.012457e+00 -2.7762547964 -2.803218051
#> [132,] -1.595595e-01 -0.7540557408 -0.617436800
#> [133,] -1.864508e-01 -1.4153108595 -1.017938674
#> [134,] 4.687759e-01 0.6530512530 0.946970067
#> [135,] -4.524771e-01 -1.1418335035 -1.197899446
#> [136,] 1.509968e-01 0.0526003108 0.217480921
#> [137,] 6.150276e-01 1.9546785874 1.851691705
#> [138,] 2.933964e-01 0.2783289842 0.520320204
#> [139,] -8.930558e-03 -0.6939189328 -0.396232178
#> [140,] 1.096553e+00 2.0899312241 2.527203030
#> [141,] -4.139252e-01 0.4647351700 -0.258247777
#> [142,] -1.378417e+00 -2.8806480087 -3.317496560
#> [143,] 5.677643e-01 0.7260571376 1.110921794
#> [144,] 1.688112e-01 0.8822352103 0.700107680
#> [145,] -5.118235e-01 -0.9067265567 -1.141428690
#> [146,] -1.505996e+00 -1.8798659268 -2.921193617
#> [147,] 4.383056e-01 0.3929556048 0.764632099
#> [148,] -6.940353e-01 -1.1114197094 -1.482239292
#> [149,] -8.887266e-01 -1.6247473650 -2.009890665
#> [150,] 6.130423e-01 -0.1904032008 0.658785453
#> [151,] -1.793323e-01 -0.0506865199 -0.251752628
#> [152,] -9.142276e-01 -1.3014480185 -1.862272368
#> [153,] -1.098408e+00 -1.3927749006 -2.142624293
#> [154,] 1.030539e+00 1.5821884515 2.163109520
#> [155,] 9.596658e-01 2.1255881751 2.376296086
#> [156,] -1.830971e+00 -2.5761081893 -3.712815541
#> [157,] 1.329306e+00 2.8614257842 3.245589508
#> [158,] 1.314529e+00 1.7242408804 2.596071944
#> [159,] -4.441710e-01 0.0676938346 -0.516304944
#> [160,] -5.545185e-02 0.7292322447 0.335546042
#> [161,] 2.019418e+00 3.2045209719 4.296548314
#> [162,] -1.006956e+00 -1.2466358495 -1.947483761
#> [163,] 2.733513e+00 4.3904773910 5.845166198
#> [164,] 2.578438e+00 4.3525727257 5.630755516
#> [165,] 1.951743e+00 3.7149791272 4.495441146
#> [166,] -1.183243e+00 -0.9149462301 -1.983236779
#> [167,] 1.710428e+00 3.2214736511 3.920651602
#> [168,] -1.722827e+00 -3.2403707478 -3.946600533
#> [169,] -4.676560e-01 -1.7404459268 -1.549032125
#> [170,] 5.502111e-01 2.5995097055 2.128721066
#> [171,] -8.885961e-01 -1.6370310822 -2.016544933
#> [172,] -5.746935e-01 -0.4903407933 -0.988749624

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#> [173,] -1.770077e+00 -2.4968064001 -3.592873192
#> [174,] -1.577131e+00 -2.7808101068 -3.509883477
#> [175,] 2.918572e-01 0.2334519148 0.493496028
#> [176,] -7.786450e-01 -1.4601400874 -1.781271028
#> [177,] 4.500905e-02 -0.2201405882 -0.066043439
#> [178,] -9.028376e-01 -2.7594489104 -2.657198729
#> [179,] 2.333282e+00 3.2421946849 4.708836831
#> [180,] 6.046791e-01 0.2945673920 0.917495071
#> [181,] 7.017207e-01 0.7120814649 1.270206822
#> [182,] -1.166062e+00 -0.2738299699 -1.606019582
#> [183,] -1.049520e+00 -2.0238546166 -2.431884599
#> [184,] 6.738118e-01 0.7813758049 1.273860406
#> [185,] -9.399063e-01 -0.9620699165 -1.705952511
#> [186,] -1.634904e+00 -2.2697640529 -3.298316577
#> [187,] -1.162118e+00 -2.5904130636 -2.886707824
#> [188,] -2.160613e+00 -3.1407615738 -4.437231939
#> [189,] 2.046553e-01 -0.2835499664 0.097842582
#> [190,] -8.673053e-01 -1.7011687949 -2.025589477
#> [191,] 9.928085e-01 2.6741258467 2.722039875
#> [192,] 9.290555e-01 2.4170247146 2.499860771
#> [193,] -2.399702e+00 -3.6958794381 -5.043437207
#> [194,] 1.553079e-01 0.1671720239 0.286439207
#> [195,] -1.239168e+00 -2.8470972264 -3.125237483
#> [196,] 1.256510e+00 1.6959595043 2.508029450
#> [197,] 1.492780e+00 1.8900534335 2.910366618
#> [198,] 5.870170e-01 1.9634349296 1.821622392
#> [199,] -2.926956e-01 0.8427316509 0.102695332
#> [200,] -6.341527e-03 -1.6906010185 -0.946120538
#> [201,] 1.529969e+00 2.9345526698 3.536393566
#> [202,] -5.172863e-01 0.0505267475 -0.617005254
#> [203,] -1.297173e+00 -1.5960430865 -2.503285334
#> [204,] 5.326365e-01 0.5703433265 0.980703537
#> [205,] 4.105040e-01 1.2476872212 1.204304250
#> [206,] 7.785605e-01 1.8423234932 1.993261466
#> [207,] 1.245941e+00 2.3841439968 2.876762753
#> [208,] -7.636055e-01 -1.6333254633 -1.858627683
#> [209,] 1.082133e-01 -0.0066762275 0.131234771
#> [210,] 1.591561e+00 3.9464682243 4.174768324
#> [211,] -1.483927e+00 -3.2187437350 -3.636694472
#> [212,] -3.567380e-01 -0.7516723219 -0.861991725
#> [213,] -1.718853e+00 -3.5815604698 -4.130991128
#> [214,] -8.146430e-01 -0.6798112627 -1.393109978
#> [215,] -7.097547e-01 -1.5843697685 -1.764308541
#> [216,] -1.887058e-01 0.0598978593 -0.202071478
#> [217,] -1.764372e+00 -1.7130141271 -3.150786437

```



```

#> [218,] -1.042064e+00 -3.8577356291 -3.440313791
#> [219,] 6.843879e-01 0.5856933871 1.178453025
#> [220,] 1.016673e+00 0.7102320930 1.661919145
#> [221,] 1.973403e+00 2.7492049818 3.986487520
#> [222,] -1.079942e+00 -2.0284943801 -2.472395617
#> [223,] -1.951909e+00 -4.0778134488 -4.697006697
#> [224,] 8.520766e-02 0.0251670838 0.120218896
#> [225,] -9.132547e-01 -1.7002383101 -2.082371122
#> [226,] 6.804671e-01 1.4127181429 1.632528002
#> [227,] -6.417073e-01 -2.1906464012 -2.015912888
#> [228,] -1.195165e+00 -1.7770531963 -2.476536617
#> [229,] -6.526501e-01 -0.7967892260 -1.256025970
#> [230,] -8.519969e-01 -1.8689155802 -2.099592649
#> [231,] 9.413450e-01 2.3956800740 2.503340117
#> [232,] 1.065719e+00 2.5763005945 2.758669354
#> [233,] -1.346405e+00 -1.9240785165 -2.746722377
#> [234,] 7.057593e-01 0.2731931260 1.031678204
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#> [1586,] -6.737351e-01 -0.6800975876 -1.217559670
#> [1587,] -5.718738e-01 -0.8010629210 -1.157671353
#> [1588,]  8.379510e-01  1.5198681716  1.888370990
#> [1589,] -8.222376e-01 -1.7792839858 -2.012741652
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#> [1592,] -1.473642e-01 -0.3562253852 -0.381450299
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#> [1594,] -1.769733e+00 -3.4976572116 -4.147873708
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#> [1607,] -9.186248e-01 -1.7665954627 -2.125892873
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#> [1609,]  2.804890e-01 -0.2066958645  0.235056528
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#> [1612,]  2.681642e-01 -0.7982210676 -0.108584040

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#> [1616,] -3.122257e+00 -4.8777023174 -6.600311319
#> [1617,] -1.291216e+00 -2.3521911793 -2.915487067
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#> [1622,] 6.596994e-01 1.9815684118 1.922319202
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#> [1626,] 1.129918e+00 -0.4118829960 1.180406284
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#> [1657,] -1.769161e+00 -2.3434005014 -3.506597230

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#> [1701,] -4.295269e-01 0.0006363258 -0.535258143
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#> [1755,] 1.009722e+00 1.2861725504 1.972874155
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#> [1767,] 1.132553e+00 1.6257513675 2.314494851
#> [1768,] 3.734373e-01 1.6529872962 1.383007486
#> [1769,] 1.299711e+00 0.9235141493 2.133225195
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#> [1774,] 4.419718e-02 0.2206206977 0.177548236
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#> [1776,] -9.700512e-01 -2.8694732789 -2.802071605
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#> [1781,] -1.859739e+00 -2.6909553642 -3.812423775
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#> [1811,] 2.258563e+00 4.0232418786 5.049112214
#> [1812,] 5.909809e-02 0.0954306035 0.126654106
#> [1813,] 1.131653e+00 0.6295213680 1.760506612
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#> [1816,] -4.899796e-01 -0.9354548464 -1.130132896
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#> [1818,] 1.001436e-01 0.3120227522 0.298036609
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```

#> [1838,] 6.108773e-01 0.0909227858 0.812209843
#> [1839,] 8.846823e-01 0.9460463279 1.628196942
#> [1840,] -5.131231e-01 -1.0770766268 -1.237586526
#> [1841,] -1.540799e+00 -2.2756954294 -3.184259997
#> [1842,] -2.707062e+00 -4.5050865554 -5.875785396
#> [1843,] -1.546627e+00 -2.6955137530 -3.424510086
#> [1844,] 2.786035e-01 0.4105931137 0.575274858
#> [1845,] -5.932676e-01 -1.0716015366 -1.334486522
#> [1846,] -5.883341e-01 -1.9569316769 -1.819655765
#> [1847,] 7.219547e-01 1.4667784724 1.714263375
#> [1848,] -1.959385e+00 -3.1721290064 -4.203712003
#> [1849,] 1.605374e+00 2.4630179854 3.368740724
#> [1850,] -1.190137e-01 -0.7783719462 -0.580371519
#> [1851,] -7.732959e-01 -0.9469936714 -1.489826031
#> [1852,] -1.917799e-01 -1.8201686327 -1.249263003
#> [1853,] -1.037386e+00 -1.4446149600 -2.095300303
#> [1854,] 4.327921e-01 -1.0898409893 -0.065133239
#> [1855,] -1.541707e+00 -2.0376058877 -3.053263362
#> [1856,] -1.511346e+00 -2.3593338978 -3.193949176
#> [1857,] 7.909793e-01 1.9489499001 2.067920710
#> [1858,] -1.794477e+00 -2.7676582555 -3.773610383
#> [1859,] -1.165331e+00 -2.6691636106 -2.934418167
#> [1860,] 4.442992e-01 0.2936897882 0.717017593
#> [1861,] -1.040567e+00 -2.7135592014 -2.803477005
#> [1862,] -1.354169e+00 -2.3650468131 -3.001123136
#> [1863,] -9.412621e-01 -2.4002335774 -2.505763754
#> [1864,] 8.202248e-01 1.0924991614 1.629094926
#> [1865,] -3.357657e-01 -0.2137877054 -0.537336195
#> [1866,] -2.422875e-01 -1.5583450406 -1.166943871
#> [1867,] -1.863078e+00 -3.5824056268 -4.311305191
#> [1868,] 1.541372e+00 2.0335670213 3.050603962
#> [1869,] 8.366302e-01 1.7204537770 1.998040649
#> [1870,] 7.401364e-01 1.8311543317 1.939148932
#> [1871,] 4.867927e-02 1.6087969657 0.953517011
#> [1872,] 1.128067e-01 0.9931935089 0.691848513
#> [1873,] 1.065864e+00 2.0168531018 2.448379968
#> [1874,] 3.515787e-01 0.7075587251 0.831076894
#> [1875,] 8.827926e-01 1.4722774871 1.917876693
#> [1876,] 1.101473e+00 1.4707748635 2.189733287
#> [1877,] 9.246799e-02 0.5320687558 0.410581575
#> [1878,] 2.699011e-01 -0.3680570074 0.132304975
#> [1879,] 6.248869e-01 1.5810505552 1.656638044
#> [1880,] -1.624670e+00 -2.9023134794 -3.636592548
#> [1881,] 9.827554e-01 0.7019685362 1.615039123
#> [1882,] -1.314175e-01 -0.1122596178 -0.226174296

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#> [1883,] 1.615403e-01 -0.3735076820 -0.005843725
#> [1884,] -5.232471e-01 -0.1737361565 -0.748894712
#> [1885,] 1.030997e+00 1.6870712529 2.221885979
#> [1886,] 1.047290e+00 3.3225985495 3.149852512
#> [1887,] 2.602079e-01 -0.2086204427 0.208698372
#> [1888,] -5.665940e-01 -0.3978760187 -0.927335651
#> [1889,] -3.129352e-01 -1.3378095637 -1.132652108
#> [1890,] -6.056822e-01 -0.8849076072 -1.246360030
#> [1891,] 7.165441e-01 0.6624018318 1.261121221
#> [1892,] -8.376070e-01 -1.6368043520 -1.952836748
#> [1893,] -7.552346e-01 -0.9959947899 -1.494497494
#> [1894,] -2.952994e-02 -1.0053597794 -0.594755818
#> [1895,] 8.258507e-01 2.1421539679 2.218624724
#> [1896,] -1.919364e-01 -0.1703016776 -0.333851109
#> [1897,] -1.431321e+00 -1.8487893218 -2.810829215
#> [1898,] -2.902931e+00 -5.4427302705 -6.640383556
#> [1899,] -9.980185e-01 -0.4369102231 -1.486975565
#> [1900,] 1.309741e+00 2.0069800618 2.747010717
#> [1901,] 1.592264e-01 0.5892568989 0.525565003
#> [1902,] 1.902426e+00 3.5046444803 4.317217673
#> [1903,] 2.169031e-01 -0.3243828206 0.090454878
#> [1904,] -6.981786e-01 -1.0488392186 -1.452676321
#> [1905,] 1.927878e-01 -0.3588955796 0.041230472
#> [1906,] 4.959808e-01 0.5744657883 0.937282358
#> [1907,] 1.785213e+00 3.1823769249 3.992210564
#> [1908,] -1.006960e+00 -1.8832543136 -2.300785485
#> [1909,] 7.078655e-01 -0.4487398297 0.633661990
#> [1910,] -7.367113e-01 -1.4672868021 -1.732946719
#> [1911,] 7.337034e-01 1.1504171228 1.553346499
#> [1912,] -6.360460e-01 -1.4175165833 -1.579798803
#> [1913,] -2.647801e+00 -5.4394997647 -6.320448915
#> [1914,] 1.305101e+00 2.0961604909 2.790715838
#> [1915,] -1.265345e+00 -2.7204680080 -3.087605567
#> [1916,] -1.707493e+00 -2.5584411434 -3.549036186
#> [1917,] 8.885634e-01 2.4192766608 2.450617649
#> [1918,] 3.493752e-01 -0.6791798155 0.058747361
#> [1919,] -2.040793e+00 -3.3899383842 -4.426101011
#> [1920,] 1.308433e+00 1.4330382501 2.426864970
#> [1921,] 1.068453e+00 1.4225016344 2.121768260
#> [1922,] 1.626914e+00 3.4141173910 3.923420369
#> [1923,] 1.228073e+00 2.4952793781 2.916158186
#> [1924,] -9.032428e-01 -2.3467959319 -2.428698887
#> [1925,] -9.163184e-01 -2.2447571571 -2.388376569
#> [1926,] 9.350372e-01 1.8532427773 2.194444406
#> [1927,] -5.629697e-01 -0.4924346294 -0.975292288

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#> [1928,] -1.218176e+00 -1.5937188890 -2.403487635
#> [1929,]  1.066637e+00  1.1300014134  1.957178354
#> [1930,]  1.285228e+00  2.8288653652  3.172554556
#> [1931,]  1.542898e+00  2.2153978410  3.153415312
#> [1932,]  1.485287e+00  1.7677113553  2.833128080
#> [1933,] -6.699648e-01 -0.6808885559 -1.213297092
#> [1934,]  8.541266e-01  2.4061760797  2.400405390
#> [1935,] -8.408528e-02 -1.7539452298 -1.078218794
#> [1936,] -3.484455e-01 -0.8631157207 -0.913497501
#> [1937,] -1.188037e-01 -0.5745290490 -0.466985411
#> [1938,] -9.093931e-01 -2.2130371058 -2.362137611
#> [1939,] -4.242889e-01 -1.0647456306 -1.119968878
#> [1940,] -6.239990e-01 -0.8804156510 -1.266707909
#> [1941,]  1.519260e+00  1.1662494923  2.541706436
#> [1942,] -2.949490e-01 -1.6005854194 -1.256053337
#> [1943,] -5.318729e-01 -1.0053293095 -1.221150384
#> [1944,]  1.968111e+00  4.5436891603  4.975751442
#> [1945,] -2.033138e+00 -2.7844296203 -4.080523051
#> [1946,] -2.221783e+00 -2.3036628646 -4.048954182
#> [1947,] -1.083619e-01 -0.2202453362 -0.257351998
#> [1948,]  1.864406e+00  1.9198146480  3.390293434
#> [1949,]  1.061590e+00  0.7270093416  1.727241096
#> [1950,] -1.137039e+00 -1.6296813545 -2.322268946
#> [1951,]  3.072491e-01 -0.0673423142  0.345761139
#> [1952,]  1.074983e+00  1.5910004601  2.223421096
#> [1953,] -9.260826e-01 -2.1505500404 -2.348271288
#> [1954,]  1.273849e-01  0.0687391319  0.196993652
#> [1955,]  1.027891e-01  0.8621566551  0.606636717
#> [1956,]  1.768378e+00  2.9210231999  3.826177396
#> [1957,]  2.268842e-01  0.5538665972  0.590292714
#> [1958,]  5.836518e-01  1.2614700054  1.427864969
#> [1959,]  6.003456e-01  0.1711543657  0.843602209
#> [1960,] -7.817425e-01 -1.8673998721 -2.011145732
#> [1961,] -6.487145e-01 -0.7005404293 -1.197704391
#> [1962,]  8.282108e-01  1.5607792899  1.898929106
#> [1963,]  4.096004e-01 -0.1853447439  0.407904823
#> [1964,]  6.769240e-01  0.9156117010  1.352236619
#> [1965,]  6.352231e-01  0.8342232631  1.255069273
#> [1966,] -1.771484e-01  0.2752220787 -0.068163703
#> [1967,] -1.382986e+00 -1.8746244201 -2.764893179
#> [1968,] -3.517449e-01 -0.1606209175 -0.527756621
#> [1969,] -1.939473e-01  0.4560788268  0.011256302
#> [1970,] -5.417465e-01 -1.1447388582 -1.310828937
#> [1971,]  1.553563e-01  0.0976350886  0.247909554
#> [1972,]  1.202068e+00  3.3759716855  3.372477190

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#> [1973,] 6.185972e-01 2.6050219179 2.217056147
#> [1974,] 1.252290e+00 2.0644610507 2.707269654
#> [1975,] 5.469381e-01 0.9855801933 1.228976445
#> [1976,] -7.708076e-01 -0.3232332375 -1.140562288
#> [1977,] 1.293744e+00 2.4711354846 2.984649526
#> [1978,] -2.685495e-01 -0.7050432735 -0.726145287
#> [1979,] 2.789663e-01 0.7062571059 0.739808372
#> [1980,] 5.265651e-01 1.2795630845 1.366719866
#> [1981,] -2.319622e-01 -1.7762466360 -1.274994698
#> [1982,] -7.714475e-01 -2.4897947703 -2.343711183
#> [1983,] 1.829655e+00 3.6425113426 4.302983492
#> [1984,] 1.311624e+00 3.1537001649 3.385740260
#> [1985,] -1.286062e+00 -3.2361145308 -3.399601637
#> [1986,] -9.589281e-02 -1.4911490044 -0.947101646
#> [1987,] 6.692168e-01 0.9976802987 1.388170483
#> [1988,] 1.398973e+00 1.7334917495 2.706505947
#> [1989,] -1.256159e+00 -1.5831822510 -2.445004119
#> [1990,] 1.378116e+00 0.9941683445 2.270204632
#> [1991,] -3.408119e-01 -0.4127821613 -0.654062314
#> [1992,] -3.741076e-01 0.0329307264 -0.448229359
#> [1993,] -4.224881e-01 -0.3120466149 -0.700006879
#> [1994,] -6.739248e-01 -1.1105713281 -1.456691046
#> [1995,] -1.028677e+00 -1.4479188729 -2.086273596
#> [1996,] 2.921841e+00 4.6215502874 6.208243511
#> [1997,] 2.033523e+00 4.0093177650 4.760764785
#> [1998,] 5.060843e-01 1.0384143325 1.207353294
#> [1999,] -1.446510e+00 -2.0309140921 -2.930840162
#> [2000,] 1.241050e+00 2.3993812183 2.879120526
#>
#> [[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/>