

## Supplementary Materials

**Supplementary Table 1:** Models of N-back Performance ( $d'$ , Bias and RT). Choice of the best-fitting model following akaike selection and lr test.

| <b>Global <math>d'</math></b>                                                                                                                                                    | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|---------------|----------------------------|------------------------------------|
| d'Global1: $d' \sim WM\ Load + (1   Participant)$                                                                                                                                | 4         | 44069.58   | -22031        | -                          | -                                  |
| d'Global2: $d' \sim WM\ Load + ILI + (1   Participant)$                                                                                                                          | 5         | 44020.01   | -22005        | 51.57                      | 6.916e-13 ***                      |
| d'Global3: $d' \sim WM\ Load + ILI + Duration + (1   Participant)$                                                                                                               | 6         | 42888.12   | -21438        | 1133.9                     | < 2.2e-16 ***                      |
| d'Global4: $d' \sim WM\ Load + ILI + Duration + Direction + (1   Participant)$                                                                                                   | 7         | 42818.72   | -21402        | 71.39                      | < 2.2e-16 ***                      |
| d'Global5: $d' \sim WM\ Load + ILI + Duration * Direction + (1   Participant)$                                                                                                   | 8         | 42809.56   | -21397        | 11.16                      | 0.00084 ***                        |
| d'Global6: $d' \sim WM\ Load + ILI + Duration * Direction + (WM\ Load   Participant)$                                                                                            | 10        | 41677.98   | -20829        | 1135.6                     | < 2.2e-16 ***                      |
| d'Global7: $d' \sim WM\ Load + ILI + Duration * Direction + (WM\ Load + Direction   Participant)$                                                                                | 13        | 41657.03   | -20816        | 25.95                      | 6.025e-06 ***                      |
| <b>Global Bias</b>                                                                                                                                                               | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
| BiasGlobal1: $Bias \sim Duration + (1   Participant)$                                                                                                                            | 4         | 49405.34   | -24699        | -                          | -                                  |
| BiasGlobal2: $Bias \sim Duration + ILI + (1   Participant)$                                                                                                                      | 5         | 49356.94   | -24674        | 50.40                      | 1.256e-12 ***                      |
| BiasGlobal3: $Bias \sim Duration + ILI + WM\ Load + (1   Participant)$                                                                                                           | 6         | 48731.86   | -24360        | 627.08                     | < 2.2e-16 ***                      |
| BiasGlobal4: $Bias \sim Duration * WM\ Load + ILI + (1   Participant)$                                                                                                           | 7         | 48545.96   | -24266        | 187.9                      | < 2.2e-16 ***                      |
| BiasGlobal5: $Bias \sim Duration * WM\ Load * ILI + (1   Participant)$                                                                                                           | 10        | 48507.21   | -24244        | 44.74                      | 1.049e-09 ***                      |
| BiasGlobal6: $Bias \sim Duration * WM\ Load * ILI + Session + d':WM\ Load + (1   Participant)$                                                                                   | 11        | 48505.42   | -24242        | 3.79                       | 0.05156 .                          |
| BiasGlobal7: $Bias \sim Duration * WM\ Load * ILI + Session + Direction + (1   Participant)$                                                                                     | 12        | 48315.70   | -24146        | 191.73                     | < 2.2e-16 ***                      |
| BiasGlobal8: $Bias \sim Duration * WM\ Load * ILI + Session + Direction + Session:Duration + Direction:Duration + Direction:ILI + Direction:WM\ Load + (1   Participant)$        | 16        | 48261.49   | -24115        | 62.20                      | 9.984e-13 ***                      |
| BiasGlobal9: $Bias \sim Duration * WM\ Load * ILI + Session + Direction + Session:Duration + Direction:Duration + Direction:ILI + Direction:WM\ Load + (WM\ Load   Participant)$ | 18        | 47853.05   | -23908        | 412.44                     | < 2.2e-16 ***                      |
| <b>Global mRT</b>                                                                                                                                                                | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
| mRTGlobal1: $mRT \sim Duration + (1   Participant)$                                                                                                                              | 4         | 193093.4   | -96543        | -                          | -                                  |

|                                                                                                                                                                                     |    |          |        |        |               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----------|--------|--------|---------------|
| mRTGlobal2: <i>mRT ~ Duration + ILI + (1   Participant)</i>                                                                                                                         | 5  | 192951.8 | -96471 | 143.59 | < 2.2e-16 *** |
| mRTGlobal3: <i>mRT ~ Duration + ILI + WM Load + (1   Participant)</i>                                                                                                               | 6  | 192155.6 | -96072 | 798.19 | < 2.2e-16 *** |
| mRTGlobal4: <i>mRT ~ Duration + ILI + WM Load + Duration:WM Load + ILI:WM Load + (1   Participant)</i>                                                                              | 8  | 192121.0 | -96053 | 38.62  | 4.108e-09 *** |
| mRTGlobal5: <i>mRT ~ Duration + ILI + WM Load + Duration:WM Load + ILI:WM Load + Session + (1   Participant)</i>                                                                    | 9  | 192112.0 | -96047 | 10.976 | 0.00092 ***   |
| mRTGlobal6: <i>mRT ~ Duration + ILI + WM Load + Duration:WM Load + ILI:WM Load + Session + Direction + (WM Load   Participant)</i>                                                  | 10 | 191848.9 | -95914 | 265.15 | < 2.2e-16 *** |
| mRTGlobal7: <i>mRT ~ Duration + ILI + WM Load + Duration:WM Load + ILI:WM Load + Session + Direction + Direction:WM Load + (1   Participant)</i>                                    | 11 | 191832.2 | -95905 | 18.731 | 1.505e-05 *** |
| mRTGlobal8: <i>mRT ~ Duration + ILI + WM Load + Duration:WM Load + ILI:WM Load + Session + Direction + Direction:WM Load + Direction:ILI + (1   Participant)</i>                    | 12 | 191812.8 | -95894 | 21.349 | 3.827e-06 *** |
| mRTGlobal9: <i>mRT ~ Duration + ILI + WM Load + Duration:WM Load + ILI:WM Load + Session + Direction + Direction:WM Load + Direction:ILI + (WM Load   Participant)</i>              | 14 | 189387.9 | -94680 | 2429   | < 2.2e-16 *** |
| mRTGlobal10: <i>mRT ~ Duration + ILI + WM Load + Duration:WM Load + ILI:WM Load + Session + Direction + Direction:WM Load + Direction:ILI + (WM Load * Direction   Participant)</i> | 21 | 189159.5 | -94559 | 242.4  | < 2.2e-16 *** |

**Supplementary Table 2:** Models of relative Duration Estimation (rDE). Choice of the best-fitting model following akaike selection and Ir test.

| <b>Retrospective rDE</b>                                                                                                 | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
|--------------------------------------------------------------------------------------------------------------------------|-----------|------------|---------------|----------------------------|------------------------------------|
| rDEretro1: $rDE \sim d'$                                                                                                 | 3         | 1430.3     | -712.14       | -                          | -                                  |
| rDEretro2: $rDE \sim WM\ Load * d'$                                                                                      | 5         | 1428.6     | -709.28       | 5.72                       | 0.05728 .                          |
| rDEretro3: $rDE \sim WM\ Load * d' + Session$                                                                            | 6         | 1414.1     | -701.06       | 16.43                      | 5.051e-05***                       |
| <b>Prospective rDE</b>                                                                                                   | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
| rDEpro1: $rDE \sim Duration + (1   Participant)$                                                                         | 4         | 15152.2    | -7572.1       | -                          | -                                  |
| rDEpro2: $rDE \sim Duration + WM\ Load + (1   Participant)$                                                              | 5         | 15141.5    | -7565.7       | 12.77                      | 0.0003***                          |
| rDEpro3: $rDE \sim Duration + WM\ Load + d' + (1   Participant)$                                                         | 6         | 15129.6    | -7558.8       | 13.90                      | 0.0002***                          |
| rDEpro4: $rDE \sim Duration + WM\ Load + d' + Bias + (1   Participant)$                                                  | 7         | 15125.8    | -7555.9       | 5.75                       | 0.0165*                            |
| rDEpro5: $rDE \sim Duration + WM\ Load + d' + Bias + Session + (1   Participant)$                                        | 8         | 15107.9    | -7546.0       | 19.91                      | 8.124e-06***                       |
| rDEpro6: $rDE \sim Duration + WM\ Load + d' + Bias + Session + d':WM\ Load + (1   Participant)$                          | 9         | 15095.9    | -7539.0       | 14.00                      | 0.0002***                          |
| rDEpro7: $rDE \sim Duration + WM\ Load + d' + Bias + Session + d':WM\ Load + d':Duration + (1   Participant)$            | 10        | 15091.1    | -7535.5       | 6.85                       | 0.0088**                           |
| rDEpro8: $rDE \sim Duration + WM\ Load + d' + Bias + Session + d':WM\ Load + d':Duration + (Duration   Participant)$     | 12        | 14895.5    | -7435.8       | 199.53                     | < 2.2e-16 ***                      |
| <b>Global rDE</b>                                                                                                        | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
| rDEglobal1: $rDE \sim Duration + (1   Participant)$                                                                      | 4         | 16249.00   | -8120.5       | -                          | -                                  |
| rDEglobal2: $rDE \sim Duration + WM\ Load + (1   Participant)$                                                           | 5         | 16238.71   | -8114.4       | 12.2875                    | 0.000456 ***                       |
| rDEglobal3: $rDE \sim Duration + WM\ Load + ILI:WM\ Load + (1   Participant)$                                            | 7         | 16235.13   | -8110.6       | 7.58                       | 0.022546 *                         |
| rDEglobal4: $rDE \sim Duration + WM\ Load + ILI:WM\ Load + d' + (1   Participant)$                                       | 8         | 16220.31   | -8102.2       | 16.81                      | 4.120e-05 ***                      |
| rDEglobal5: $rDE \sim Duration + WM\ Load + ILI:WM\ Load + d' + Bias + (1   Participant)$                                | 9         | 16216.55   | -8099.3       | 5.76                       | 0.016367 *                         |
| rDEglobal6: $rDE \sim Duration + WM\ Load + ILI:WM\ Load + d' + Bias + Session + (1   Participant)$                      | 10        | 16197.19   | -8088.6       | 21.36                      | 3.804e-06 ***                      |
| rDEglobal7: $rDE \sim Duration + WM\ Load + ILI:WM\ Load + d' + Bias + Session + Direction:Duration + (1   Participant)$ | 12        | 16159.95   | -8068.0       | 41.24                      | 1.108e-09 ***                      |

|                                                                                                                                                                                                                                                                    |    |          |         |        |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----------|---------|--------|---------------|
| rDEglobal8: $rDE \sim \text{Duration} + \text{WM Load} + \text{ILI:WM Load} + d' + \text{Bias} + \text{Session} + \text{Direction:Duration} + d':\text{Bias} + (1 \mid \text{Participant})$                                                                        | 13 | 16153.47 | -8063.7 | 8.48   | 0.003590 **   |
| rDEglobal9: $rDE \sim \text{Duration} + \text{WM Load} + \text{ILI:WM Load} + d' + \text{Bias} + \text{Session} + \text{Direction:Duration} + d':\text{Bias} + d':\text{Duration} + (1 \mid \text{Participant})$                                                   | 14 | 16150.80 | -8061.4 | 4.66   | 0.030857 *    |
| rDEglobal10: $rDE \sim \text{Duration} + \text{WM Load} + \text{ILI:WM Load} + d' + \text{Bias} + \text{Session} + \text{Direction:Duration} + d':\text{Bias} + d':\text{Duration} + d':\text{WM Load} + (1 \mid \text{Participant})$                              | 15 | 16143.53 | -8056.8 | 9.28   | 0.002318 **   |
| rDEglobal11: $rDE \sim \text{Duration} + \text{WM Load} + \text{ILI:WM Load} + d' + \text{Bias} + \text{Session} + \text{Direction:Duration} + d':\text{Bias} + d':\text{Duration} + d':\text{WM Load} + (\text{WM Load} \mid \text{Participant})$                 | 17 | 15952.46 | -7959.2 | 195.06 | < 2.2e-16 *** |
| rDEpro12: $rDE \sim \text{Duration} + \text{WM Load} + \text{ILI:WM Load} + d' + \text{Bias} + \text{Session} + \text{Direction:Duration} + d':\text{Bias} + d':\text{Duration} + d':\text{WM Load} + (\text{Direction} + \text{WM Load} \mid \text{Participant})$ | 20 | 15916.59 | -7938.3 | 41.88  | 4.257e-09 *** |

**Supplementary Table 3:** Models of Passing of Time Judgment (PoTJ). Choice of the best-fitting model following akaike selection and Ir test.

| <b>Retrospective PoTJ Model (polr)</b>                                                                                                                                                                        | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|---------------|----------------------------|------------------------------------|
| PoTJretro1: PoTJ ~ <i>Duration</i>                                                                                                                                                                            | 5         | 2797.99    | -1394.0       | -                          | -                                  |
| PoTJretro2: PoTJ ~ <i>Duration</i> + <i>ILI</i>                                                                                                                                                               | 6         | 2791.77    | -1389.9       | 8.22                       | 0.004142 **                        |
| PoTJretro3: PoTJ ~ <i>Duration</i> + <i>ILI</i> + <i>WM Load</i>                                                                                                                                              | 7         | 2789.01    | -1387.5       | 4.7532                     | 0.02924 *                          |
| <b>Prospective PoTJ Model (clmm)</b>                                                                                                                                                                          | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
| PoTJpro1: PoTJ ~ <i>Duration</i> + (1   <i>Participant</i> )                                                                                                                                                  | 6         | 35383.91   | -17686        | -                          | -                                  |
| PoTJpro2: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + (1   <i>Participant</i> )                                                                                                                                 | 7         | 35374.41   | -17680        | 11.50                      | 0.0007 ***                         |
| PoTJpro3: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + <i>ILI</i> + (1   <i>Participant</i> )                                                                                                                    | 8         | 35273.38   | -17629        | 103.03                     | < 2.2e-16 ***                      |
| PoTJpro4: PoTJ ~ <i>Duration</i> + <i>d'</i> + <i>ILI</i> + (1   <i>Participant</i> )                                                                                                                         | 8         | 35264.06   | -17624        | 9.32                       | < 2.2e-16 ***                      |
| PoTJpro5: PoTJ ~ <i>Duration</i> + <i>d'</i> + <i>ILI</i> + <i>Session</i> + (1   <i>Participant</i> )                                                                                                        | 9         | 35261.33   | -17622        | 4.73                       | 0.02956 *                          |
| PoTJpro6: PoTJ ~ <i>Duration</i> + <i>d'</i> + <i>ILI</i> + <i>Session</i> + <i>d':ILI</i> + (1   <i>Participant</i> )                                                                                        | 10        | 35250.72   | -17615        | 12.61                      | 0.0004 ***                         |
| <b>Global PoTJ (clmm)</b>                                                                                                                                                                                     | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |
| PoTJglobal1: PoTJ ~ <i>Duration</i> + (1   <i>Participant</i> )                                                                                                                                               | 6         | 38519.20   | -19254        | -                          | -                                  |
| PoTJglobal2: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + (1   <i>Participant</i> )                                                                                                                              | 7         | 38504.66   | -19245        | 16.54                      | 4.761e-05 ***                      |
| PoTJglobal3: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + <i>ILI</i> + (1   <i>Participant</i> )                                                                                                                 | 8         | 38397.49   | -19191        | 109.17                     | < 2.2e-16 ***                      |
| PoTJglobal4: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + <i>ILI</i> + <i>Bias</i> + (1   <i>Participant</i> )                                                                                                   | 9         | 38373.68   | -19178        | 25.81                      | 3.77e-07 ***                       |
| PoTJglobal5: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + <i>ILI</i> + <i>Bias</i> + <i>Direction</i> + (1   <i>Participant</i> )                                                                                | 10        | 37835.96   | -18908        | 539.72                     | < 2.2e-16 ***                      |
| PoTJglobal6: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + <i>ILI</i> + <i>Bias</i> + <i>Direction</i> + <i>Session:Duration</i> + (1   <i>Participant</i> )                                                      | 12        | 37822.71   | -18899        | 17.251                     | 0.0002 ***                         |
| PoTJglobal7: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + <i>ILI</i> + <i>Bias</i> + <i>Direction</i> + <i>Session:Duration</i> + <i>Session:WM Load</i> + (1   <i>Participant</i> )                             | 13        | 37820.32   | -18897        | 4.38                       | 0.03631 *                          |
| PoTJglobal8: PoTJ ~ <i>Duration</i> + <i>WM Load</i> + <i>ILI</i> + <i>Bias</i> + <i>Direction</i> + <i>Session:Duration</i> + <i>Session:WM Load</i> + <i>Direction:Duration</i> + (1   <i>Participant</i> ) | 14        | 37815.19   | -18894        | 7.13                       | 0.007571 **                        |
| <b>Global PoTJ x rDE (clmm)</b>                                                                                                                                                                               | <b>Df</b> | <b>AIC</b> | <b>LogLik</b> | <b><math>\chi^2</math></b> | <b>Pr(&gt;<math>\chi^2</math>)</b> |

|                                                               |   |          |        |        |            |
|---------------------------------------------------------------|---|----------|--------|--------|------------|
| PoTJrDE1: PoTJ ~ $rDE + (1 \mid Participant)$                 | 6 | 39628.46 | -19808 | -      | -          |
| PoTJrDE2: PoTJ ~ $rDE + rDE:Session + (1 \mid Participant)$   | 7 | 39630.30 | -19808 | 0.1609 | 0.6884     |
| PoTJrDE3: PoTJ ~ $rDE + rDE:Direction + (1 \mid Participant)$ | 7 | 39277.47 | -19632 | 352.83 | <2e-16 *** |