**---SUPPLEMENTARY MATERIAL---**

Title: **Multisensory integration precision is associated with better cognitive performance over time in older adults: a large-scale exploratory study**

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***Table S1. Full Choice Response Time (CRT) model results***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Accuracy** | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.02 | 0.00 – 0.13 | **<0.001** |
| Age | 0.99 | 0.89 – 1.10 | 0.859 |
| SOA [150] | 0.41 | 0.37 – 0.46 | **<0.001** |
| SOA [230] | 0.49 | 0.44 – 0.55 | **<0.001** |
| CRT [Cog] | 1.05 | 0.95 – 1.16 | 0.377 |
| CRT [Mot] | 0.99 | 0.89 – 1.11 | 0.906 |
| Sex [Female] | 2.15 | 1.74 – 2.64 | **<0.001** |
| Education [Secondary] | 1.26 | 0.95 – 1.67 | 0.110 |
| Education [Third/Higher] | 1.68 | 1.26 – 2.22 | **<0.001** |
| Pre/Post [Pre] | 0.50 | 0.47 – 0.54 | **<0.001** |
| VAS | 0.99 | 0.90 – 1.09 | 0.887 |
| SR. hearing [Fair] | 0.63 | 0.29 – 1.37 | 0.241 |
| SR. hearing [Good] | 0.61 | 0.29 – 1.29 | 0.198 |
| SR. hearing [Very Good] | 0.51 | 0.24 – 1.09 | 0.083 |
| SR. hearing [Excellent] | 0.48 | 0.22 – 1.04 | 0.062 |
| SR. vision [Fair] | 0.29 | 0.10 – 0.82 | **0.020** |
| SR. vision [Good] | 0.23 | 0.08 – 0.63 | **0.004** |
| SR. vision [Very Good] | 0.28 | 0.10 – 0.76 | **0.012** |
| SR. vision [Excellent] | 0.33 | 0.12 – 0.92 | **0.034** |
| 1B1F [0.5] | 124.32 | 32.44 – 476.34 | **<0.001** |
| 1B1F [1] | 320.17 | 92.23 – 1111.42 | **<0.001** |
| 2B0F [0.5] | 0.64 | 0.50 – 0.81 | **<0.001** |
| 2B0F [1] | 0.90 | 0.73 – 1.11 | 0.334 |
| 0B2F [0.5] | 0.51 | 0.41 – 0.63 | **<0.001** |
| 0B2F [1] | 0.45 | 0.33 – 0.60 | **<0.001** |
| Chronic conds [1] | 0.87 | 0.71 – 1.06 | 0.174 |
| Chronic conds [2] | 1.27 | 0.95 – 1.69 | 0.103 |
| Cardio conds [1] | 1.37 | 1.04 – 1.82 | **0.028** |
| Cardio conds [2] | 1.57 | 0.90 – 2.74 | 0.109 |
| Age \* SOA [150] | 0.69 | 0.63 – 0.75 | **<0.001** |
| Age \* SOA [230] | 0.62 | 0.57 – 0.67 | **<0.001** |
| SOA [150] \* CRT [Cog] | 0.88 | 0.81 – 0.95 | **0.001** |
| SOA [230] \* CRT [Cog] | 0.83 | 0.77 – 0.90 | **<0.001** |
| SOA [150] \* CRT [Mot] | 0.80 | 0.73 – 0.87 | **<0.001** |
| SOA [230] \* CRT [Mot] | 0.69 | 0.64 – 0.76 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.36 | 0.31 – 0.41 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.28 | 0.24 – 0.32 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 3.29 | | |
| τ00 tilda\_serial | 4.78 | | |
| ICC | 0.59 | | |
| N tilda\_serial | 2875 | | |
| Observations | 17250 | | |
| Marginal R2 / Conditional R2 | 0.162 / 0.658 | | |

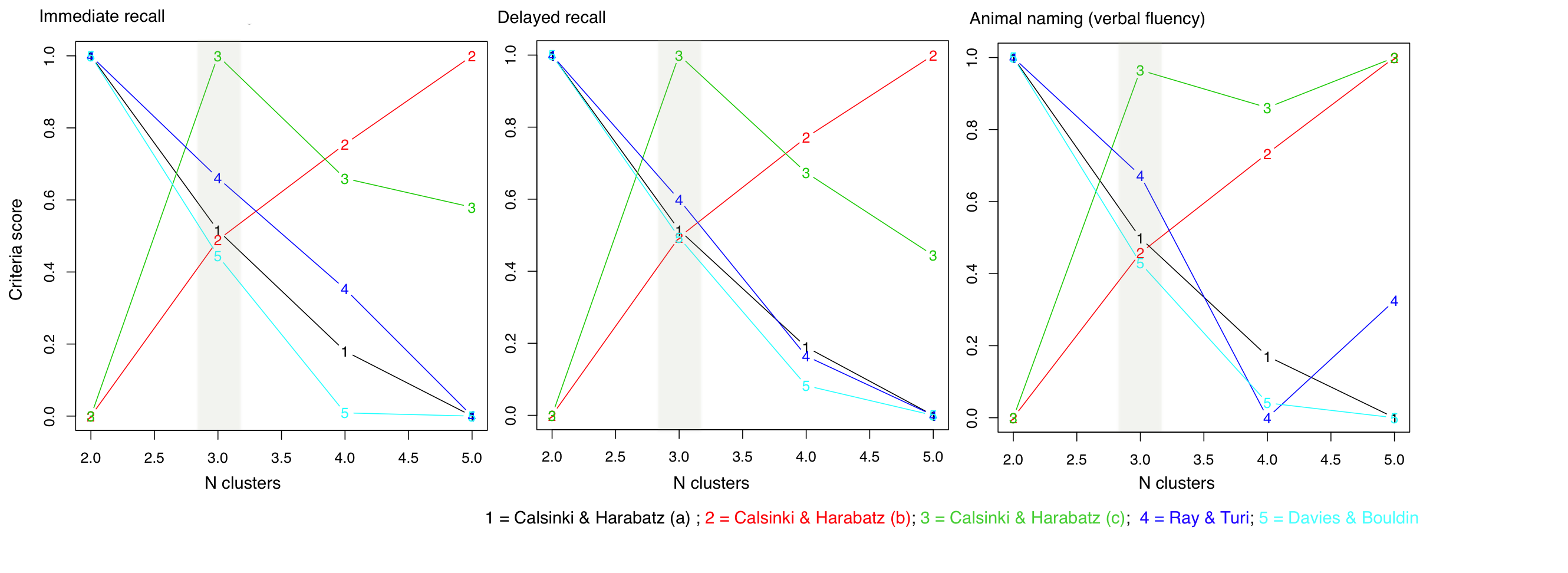
***Table S2. Full Sustained Attention to Response Time (SART) model results***

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Accuracy* | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.02 | 0.00 – 0.12 | **<0.001** |
| Age | 0.98 | 0.88 – 1.09 | 0.699 |
| SOA [150] | 0.42 | 0.38 – 0.47 | **<0.001** |
| SOA [230] | 0.51 | 0.46 – 0.57 | **<0.001** |
| SART om. | 1.08 | 0.96 – 1.21 | 0.204 |
| SART com. | 0.99 | 0.88 – 1.11 | 0.819 |
| Sex [Female] | 2.14 | 1.74 – 2.63 | **<0.001** |
| Education [Secondary] | 1.25 | 0.94 – 1.65 | 0.126 |
| Education [Third/Higher] | 1.67 | 1.26 – 2.22 | **<0.001** |
| Pre/Post [Pre] | 0.51 | 0.48 – 0.54 | **<0.001** |
| VAS | 1.00 | 0.91 – 1.10 | 0.956 |
| SR. hearing [Fair] | 0.62 | 0.29 – 1.36 | 0.235 |
| SR. hearing [Good] | 0.60 | 0.28 – 1.28 | 0.190 |
| SR. hearing [Very Good] | 0.51 | 0.24 – 1.09 | 0.084 |
| SR. hearing [Excellent] | 0.47 | 0.22 – 1.02 | 0.056 |
| SR. vision [Fair] | 0.33 | 0.11 – 0.94 | **0.037** |
| SR. vision [Good] | 0.26 | 0.10 – 0.71 | **0.009** |
| SR. vision [Very Good] | 0.32 | 0.12 – 0.87 | **0.026** |
| SR. vision [Excellent] | 0.38 | 0.14 – 1.06 | 0.063 |
| 1B1F [0.5] | 117.81 | 31.14 – 445.66 | **<0.001** |
| 1B1F [1] | 299.31 | 87.43 – 1024.61 | **<0.001** |
| 2B0F [0.5] | 0.65 | 0.51 – 0.82 | **<0.001** |
| 2B0F [1] | 0.92 | 0.74 – 1.13 | 0.419 |
| 0B2F [0.5] | 0.51 | 0.41 – 0.64 | **<0.001** |
| 0B2F [1] | 0.46 | 0.34 – 0.62 | **<0.001** |
| Chronic conds [1] | 0.86 | 0.70 – 1.05 | 0.139 |
| Chronic conds [2] | 1.29 | 0.96 – 1.72 | 0.088 |
| Cardio conds [1] | 1.39 | 1.05 – 1.85 | **0.022** |
| Cardio conds [2] | 1.60 | 0.92 – 2.78 | 0.098 |
| Depression [1] | 0.90 | 0.65 – 1.25 | 0.535 |
| Age \* SOA [150] | 0.66 | 0.61 – 0.72 | **<0.001** |
| Age \* SOA [230] | 0.58 | 0.53 – 0.63 | **<0.001** |
| SOA [150] \* SART om. | 0.89 | 0.82 – 0.98 | **0.015** |
| SOA [230] \* SART om. | 0.82 | 0.74 – 0.90 | **<0.001** |
| SOA [150] \* SART com. | 0.89 | 0.82 – 0.98 | **0.015** |
| SOA [230] \* SART com. | 0.87 | 0.79 – 0.95 | **0.003** |
| Sex [Female] \* SOA [150] | 0.34 | 0.30 – 0.40 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.26 | 0.23 – 0.31 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 3.29 | | |
| τ00 tilda\_serial | 4.77 | | |
| ICC | 0.59 | | |
| N tilda\_serial | 2867 | | |
| Observations | 17202 | | |
| Marginal R2 / Conditional R2 | 0.156 / 0.656 | | |

***Table S3. Full Color Trails Task (CTT) model results***

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Accuracy* | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.02 | 0.00 – 0.13 | **<0.001** |
| Age | 0.96 | 0.86 – 1.07 | 0.474 |
| SOA [150] | 0.43 | 0.39 – 0.48 | **<0.001** |
| SOA [230] | 0.53 | 0.48 – 0.60 | **<0.001** |
| CTT1 | 1.03 | 0.92 – 1.14 | 0.633 |
| CTT delta | 1.07 | 0.97 – 1.18 | 0.190 |
| Sex [Female] | 2.18 | 1.77 – 2.68 | **<0.001** |
| Education [Secondary] | 1.19 | 0.90 – 1.59 | 0.225 |
| Education [Third/Higher] | 1.58 | 1.18 – 2.10 | **0.002** |
| Pre/Post [Pre] | 0.50 | 0.47 – 0.54 | **<0.001** |
| VAS | 0.99 | 0.90 – 1.08 | 0.776 |
| SR. hearing [Fair] | 0.64 | 0.29 – 1.39 | 0.260 |
| SR. hearing [Good] | 0.62 | 0.29 – 1.32 | 0.216 |
| SR. hearing [Very Good] | 0.52 | 0.24 – 1.11 | 0.090 |
| SR. hearing [Excellent] | 0.48 | 0.22 – 1.03 | 0.060 |
| SR. vision [Fair] | 0.31 | 0.11 – 0.89 | **0.029** |
| SR. vision [Good] | 0.24 | 0.09 – 0.65 | **0.005** |
| SR. vision [Very Good] | 0.29 | 0.11 – 0.80 | **0.016** |
| SR. vision [Excellent] | 0.35 | 0.12 – 0.96 | **0.041** |
| 1B1F [0.5] | 125.40 | 32.83 – 479.04 | **<0.001** |
| 1B1F [1] | 324.38 | 93.79 – 1121.88 | **<0.001** |
| 2B0F [0.5] | 0.65 | 0.51 – 0.82 | **<0.001** |
| 2B0F [1] | 0.89 | 0.72 – 1.10 | 0.292 |
| 0B2F [0.5] | 0.51 | 0.41 – 0.63 | **<0.001** |
| 0B2F [1] | 0.45 | 0.33 – 0.61 | **<0.001** |
| Chronic conds [1] | 0.86 | 0.70 – 1.05 | 0.140 |
| Chronic conds [2] | 1.31 | 0.98 – 1.75 | 0.073 |
| Cardio conds [1] | 1.40 | 1.05 – 1.85 | **0.021** |
| Cardio conds [2] | 1.64 | 0.94 – 2.86 | 0.080 |
| Depression [1] | 0.92 | 0.66 – 1.29 | 0.631 |
| Age \* SOA [150] | 0.72 | 0.67 – 0.79 | **<0.001** |
| Age \* SOA [230] | 0.67 | 0.61 – 0.73 | **<0.001** |
| SOA [150] \* CTT1 | 0.81 | 0.75 – 0.88 | **<0.001** |
| SOA [230] \* CTT1 | 0.68 | 0.62 – 0.73 | **<0.001** |
| SOA [150] \* CTT delta | 0.77 | 0.71 – 0.83 | **<0.001** |
| SOA [230] \* CTT delta | 0.72 | 0.67 – 0.78 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.32 | 0.28 – 0.38 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.24 | 0.20 – 0.28 | **<0.001** |
| **Random Effects** | 3.29 |  |  |
| σ2 | 4.80 |  |  |
| τ00 tilda\_serial | 0.59 |  |  |
| ICC | 2867 |  |  |
| N tilda\_serial | 17202 |  |  |
| Observations | 0.163 / 0.660 |  |  |
| Marginal R2 / Conditional R2 | 3.29 |  |  |

***Figure S1. Cluster validation criteria***



Cluster validation metrics for 2 to 5 clusters tested with kml. Scores closer to 1 indicate better cluster compactness (i.e. reduced within cluster differences and enhanced between cluster differences). An optimal k of three clusters was identified as providing the most parsimonious number of clusters across validation metrics (shaded region). For details on each validation metric see (Genolini et al., 2015)

***Table S4. Full immediate recall model results***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Accuracy** | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.03 | 0.00 – 0.16 | **<0.001** |
| Age | 1.02 | 0.92 – 1.14 | 0.668 |
| SOA [150] | 0.58 | 0.49 – 0.68 | **<0.001** |
| SOA [230] | 0.86 | 0.73 – 1.01 | 0.064 |
| Trajectory Group [B] | 0.70 | 0.56 – 0.88 | **0.002** |
| Trajectory Group [C] | 0.66 | 0.49 – 0.88 | **0.006** |
| Sex [Female] | 2.04 | 1.66 – 2.51 | **<0.001** |
| Education [Secondary] | 1.14 | 0.86 – 1.52 | 0.349 |
| Education [Third/Higher] | 1.35 | 1.02 – 1.81 | **0.039** |
| Pre/Post [Pre] | 0.50 | 0.48 – 0.54 | **<0.001** |
| VAS | 0.99 | 0.90 – 1.08 | 0.816 |
| SR. hearing [Fair] | 0.68 | 0.31 – 1.46 | 0.318 |
| SR. hearing [Good] | 0.63 | 0.30 – 1.32 | 0.219 |
| SR. hearing [Very Good] | 0.52 | 0.25 – 1.10 | 0.089 |
| SR. hearing [Excellent] | 0.49 | 0.23 – 1.04 | 0.064 |
| SR. vision [Fair] | 0.33 | 0.11 – 0.93 | **0.036** |
| SR. vision [Good] | 0.26 | 0.09 – 0.69 | **0.007** |
| SR. vision [Very Good] | 0.31 | 0.11 – 0.83 | **0.020** |
| SR. vision [Excellent] | 0.36 | 0.13 – 0.99 | **0.047** |
| 1B1F [0.5] | 141.97 | 37.03 – 544.27 | **<0.001** |
| 1B1F [1] | 355.69 | 102.25 – 1237.33 | **<0.001** |
| 2B0F [0.5] | 0.63 | 0.50 – 0.80 | **<0.001** |
| 2B0F [1] | 0.88 | 0.71 – 1.08 | 0.215 |
| 0B2F [0.5] | 0.50 | 0.40 – 0.62 | **<0.001** |
| 0B2F [1] | 0.44 | 0.33 – 0.59 | **<0.001** |
| Chronic conds [1] | 0.85 | 0.70 – 1.04 | 0.124 |
| Chronic conds [2] | 1.26 | 0.95 – 1.69 | 0.110 |
| Cardio conds [1] | 1.41 | 1.07 – 1.87 | **0.015** |
| Cardio conds [2] | 1.70 | 0.98 – 2.95 | 0.058 |
| Depression [1] | 0.92 | 0.66 – 1.28 | 0.615 |
| Age \* SOA [150] | 0.68 | 0.63 – 0.74 | **<0.001** |
| Age \* SOA [230] | 0.61 | 0.56 – 0.66 | **<0.001** |
| SOA [150] \* Trajectory Group [B] | 0.74 | 0.62 – 0.88 | **0.001** |
| SOA [230] \* Trajectory Group [B] | 0.63 | 0.53 – 0.75 | **<0.001** |
| SOA [150] \* Trajectory Group [C] | 0.54 | 0.43 – 0.68 | **<0.001** |
| SOA [230] \* Trajectory Group [C] | 0.34 | 0.27 – 0.43 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.31 | 0.26 – 0.36 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.22 | 0.19 – 0.25 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 3.29 | | |
| τ00 tilda\_serial | 4.70 | | |
| ICC | 0.59 | | |
| N tilda\_serial | 2867 | | |
| Observations | 17202 | | |
| Marginal R2 / Conditional R2 | 0.168 / 0.657 | | |

***Table S5. Full delayed recall model results***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Accuracy** | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.02 | 0.00 – 0.11 | **<0.001** |
| Age | 0.99 | 0.89 – 1.10 | 0.813 |
| SOA [150] | 0.56 | 0.47 – 0.65 | **<0.001** |
| SOA [230] | 0.81 | 0.69 – 0.96 | **0.012** |
| Trajectory Group [B] | 0.99 | 0.79 – 1.24 | 0.918 |
| Trajectory Group [C] | 1.03 | 0.78 – 1.38 | 0.823 |
| Sex [Female] | 2.17 | 1.76 – 2.67 | **<0.001** |
| Education [Secondary] | 1.24 | 0.93 – 1.65 | 0.136 |
| Education [Third/Higher] | 1.61 | 1.21 – 2.14 | **0.001** |
| Pre/Post [Pre] | 0.50 | 0.48 – 0.54 | **<0.001** |
| VAS | 1.00 | 0.91 – 1.09 | 0.960 |
| SR. hearing [Fair] | 0.66 | 0.30 – 1.43 | 0.293 |
| SR. hearing [Good] | 0.62 | 0.29 – 1.32 | 0.216 |
| SR. hearing [Very Good] | 0.53 | 0.25 – 1.12 | 0.097 |
| SR. hearing [Excellent] | 0.49 | 0.23 – 1.05 | 0.067 |
| SR. vision [Fair] | 0.32 | 0.11 – 0.92 | **0.034** |
| SR. vision [Good] | 0.25 | 0.09 – 0.68 | **0.007** |
| SR. vision [Very Good] | 0.31 | 0.11 – 0.83 | **0.020** |
| SR. vision [Excellent] | 0.37 | 0.13 – 1.02 | 0.055 |
| 1B1F [0.5] | 126.71 | 33.08 – 485.34 | **<0.001** |
| 1B1F [1] | 328.67 | 94.71 – 1140.57 | **<0.001** |
| 2B0F [0.5] | 0.64 | 0.51 – 0.82 | **<0.001** |
| 2B0F [1] | 0.92 | 0.75 – 1.14 | 0.450 |
| 0B2F [0.5] | 0.52 | 0.42 – 0.64 | **<0.001** |
| 0B2F [1] | 0.45 | 0.34 – 0.61 | **<0.001** |
| Chronic conds [1] | 0.86 | 0.71 – 1.06 | 0.156 |
| Chronic conds [2] | 1.24 | 0.93 – 1.65 | 0.143 |
| Cardio conds [1] | 1.39 | 1.05 – 1.84 | **0.021** |
| Cardio conds [2] | 1.62 | 0.93 – 2.81 | 0.089 |
| Age \* SOA [150] | 0.67 | 0.61 – 0.72 | **<0.001** |
| Age \* SOA [230] | 0.59 | 0.55 – 0.64 | **<0.001** |
| SOA [150] \* Trajectory Group [B] | 0.73 | 0.62 – 0.87 | **<0.001** |
| SOA [230] \* Trajectory Group [B] | 0.62 | 0.52 – 0.73 | **<0.001** |
| SOA [150] \* Trajectory Group [C] | 0.63 | 0.51 – 0.78 | **<0.001** |
| SOA [230] \* Trajectory Group [C] | 0.44 | 0.35 – 0.54 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.32 | 0.27 – 0.37 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.22 | 0.19 – 0.26 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 3.29 | | |
| τ00 tilda\_serial | 4.78 | | |
| ICC | 0.59 | | |
| N tilda\_serial | 2875 | | |
| Observations | 17250 | | |
| Marginal R2 / Conditional R2 | 0.157 / 0.657 | | |

***S6. Full Animal naming models***

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Accuracy* | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.02 | 0.00 – 0.13 | **<0.001** |
| Age | 1.00 | 0.89 – 1.11 | 0.929 |
| SOA [150] | 0.54 | 0.45 – 0.65 | **<0.001** |
| SOA [230] | 0.84 | 0.70 – 1.00 | **0.048** |
| Trajectory Group [B] | 0.75 | 0.57 – 0.97 | **0.027** |
| Trajectory Group [C] | 0.83 | 0.62 – 1.11 | 0.204 |
| Sex [Female] | 2.18 | 1.77 – 2.67 | **<0.001** |
| Education [Secondary] | 1.24 | 0.93 – 1.64 | 0.136 |
| Education [Third/Higher] | 1.50 | 1.13 – 2.00 | **0.005** |
| Pre/Post [Pre] | 0.50 | 0.48 – 0.54 | **<0.001** |
| VAS | 0.99 | 0.90 – 1.09 | 0.857 |
| SR. hearing [Fair] | 0.65 | 0.30 – 1.40 | 0.271 |
| SR. hearing [Good] | 0.63 | 0.30 – 1.33 | 0.225 |
| SR. hearing [Very Good] | 0.53 | 0.25 – 1.13 | 0.101 |
| SR. hearing [Excellent] | 0.49 | 0.23 – 1.05 | 0.065 |
| SR. vision [Fair] | 0.33 | 0.12 – 0.95 | **0.039** |
| SR. vision [Good] | 0.28 | 0.10 – 0.75 | **0.012** |
| SR. vision [Very Good] | 0.33 | 0.12 – 0.89 | **0.028** |
| SR. vision [Excellent] | 0.39 | 0.14 – 1.08 | 0.069 |
| 1B1F [0.5] | 132.22 | 34.73 – 503.38 | **<0.001** |
| 1B1F [1] | 333.78 | 96.79 – 1151.00 | **<0.001** |
| 2B0F [0.5] | 0.64 | 0.50 – 0.81 | **<0.001** |
| 2B0F [1] | 0.90 | 0.73 – 1.11 | 0.340 |
| 0B2F [0.5] | 0.51 | 0.41 – 0.64 | **<0.001** |
| 0B2F [1] | 0.44 | 0.33 – 0.60 | **<0.001** |
| Chronic conds [1] | 0.85 | 0.70 – 1.04 | 0.123 |
| Chronic conds [2] | 1.25 | 0.94 – 1.67 | 0.124 |
| Cardio conds [1] | 1.36 | 1.03 – 1.81 | **0.031** |
| Cardio conds [2] | 1.57 | 0.91 – 2.73 | 0.107 |
| Depression [1] | 0.91 | 0.66 – 1.27 | 0.581 |
| Age \* SOA [150] | 0.66 | 0.61 – 0.72 | **<0.001** |
| Age \* SOA [230] | 0.58 | 0.54 – 0.63 | **<0.001** |
| SOA [150] \* Trajectory Group [B] | 0.86 | 0.71 – 1.04 | 0.120 |
| SOA [230] \* Trajectory Group [B] | 0.70 | 0.58 – 0.85 | **<0.001** |
| SOA [150] \* Trajectory Group [C] | 0.59 | 0.48 – 0.73 | **<0.001** |
| SOA [230] \* Trajectory Group [C] | 0.38 | 0.31 – 0.47 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.34 | 0.29 – 0.39 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.26 | 0.22 – 0.30 | **<0.001** |
| **Random Effects** |  |  |  |
| σ2 | 3.29 |  |  |
| τ00 tilda\_serial | 4.74 |  |  |
| ICC | 0.59 |  |  |
| N tilda\_serial | 2867 |  |  |
| Observations | 17202 |  |  |
| Marginal R2 / Conditional R2 | 0.162 / 0.657 |  |  |

***Table S7. Word recall tasks (immediate and delayed) – one list was randomly selected and pesented to the participant via computer audio recording. If the participant could not hear a sample sound presented by the computer it was read alloud by the interviewer.***

|  |  |  |  |
| --- | --- | --- | --- |
| Word List A | Word List B | Word List C | Word List D |
| Hotel  River  Tree  Skin  Gold  Market  Paper  Child  King  Book | Sky  Ocean  Flag  Dollar  Wife  Machine  Home  Earth  College  Butter | Women  Rock  Blood  Corner  Shoes  Letter  Girl  House  Valley  Engine | Water  Church  Doctor  Palace  Fire  Garden  Sea  Village  Baby  Table |

***Table S8.*** *Supplementary cross-sectional analysis of Choice Reaction Time (CRT) with full sample (n = 3487). A likelihood ratio test indicated that both the CRT [cog] \* SOA interaction term and CRT [mot] \* SOA interaction term still improved model fit (*χ2(2) = 10.609, *p* = .004 χ2(2) = 105.99, *p* < 2.2e-16 and  *respectively)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Accuracy** | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.03 | 0.01 – 0.15 | **<0.001** |
| Age | 1.01 | 0.91 – 1.11 | 0.904 |
| SOA [150] | 0.42 | 0.38 – 0.47 | **<0.001** |
| SOA [230] | 0.49 | 0.45 – 0.55 | **<0.001** |
| CRT [Cognitive] | 1.02 | 0.93 – 1.12 | 0.636 |
| CRT [Motor] | 1.02 | 0.93 – 1.12 | 0.670 |
| Sex [Female] | 2.17 | 1.81 – 2.60 | **<0.001** |
| Education [Secondary] | 1.17 | 0.92 – 1.49 | 0.206 |
| Education [Third/Higher] | 1.59 | 1.24 – 2.03 | **<0.001** |
| Pre/Post [Pre] | 0.51 | 0.48 – 0.54 | **<0.001** |
| VAS | 1.01 | 0.92 – 1.09 | 0.905 |
| SR. hearing [Fair] | 0.92 | 0.46 – 1.86 | 0.824 |
| SR. hearing [Good] | 0.83 | 0.42 – 1.64 | 0.592 |
| SR. hearing [Very Good] | 0.64 | 0.32 – 1.26 | 0.197 |
| SR. hearing [Excellent] | 0.62 | 0.31 – 1.23 | 0.171 |
| SR. vision [Fair] | 0.30 | 0.12 – 0.75 | **0.011** |
| SR. vision [Good] | 0.24 | 0.10 – 0.58 | **0.001** |
| SR. vision [Very Good] | 0.28 | 0.12 – 0.68 | **0.005** |
| SR. vision [Excellent] | 0.33 | 0.14 – 0.82 | **0.017** |
| 1B1F [0.5] | 68.70 | 22.42 – 210.51 | **<0.001** |
| 1B1F [1] | 170.14 | 60.76 – 476.41 | **<0.001** |
| 2B0F [0.5] | 0.68 | 0.55 – 0.85 | **0.001** |
| 2B0F [1] | 0.84 | 0.69 – 1.01 | 0.068 |
| 0B2F [0.5] | 0.55 | 0.45 – 0.67 | **<0.001** |
| 0B2F [1] | 0.49 | 0.37 – 0.64 | **<0.001** |
| Age \* SOA [150] | 0.69 | 0.64 – 0.75 | **<0.001** |
| Age \* SOA [230] | 0.63 | 0.58 – 0.68 | **<0.001** |
| SOA [150] \* CRT [Cognitive] | 0.91 | 0.85 – 0.98 | **0.011** |
| SOA [230] \* CRT [Cognitive] | 0.90 | 0.83 – 0.96 | **0.003** |
| SOA [150] \* CRT [Motor] | 0.80 | 0.74 – 0.87 | **<0.001** |
| SOA [230] \* CRT [Motor] | 0.67 | 0.62 – 0.72 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.34 | 0.30 – 0.39 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.26 | 0.23 – 0.30 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 3.29 | | |
| τ00 tilda\_serial | 4.72 | | |
| ICC | 0.59 | | |
| N tilda\_serial | 3487 | | |
| Observations | 20922 | | |
| Marginal R2 / Conditional R2 | 0.149 / 0.650 | | |

***Table S9.*** *Supplementary cross-sectional analysis of Sustained Attention to Response Task (SART) with full sample (n = 3487). A likelihood ratio test indicated that both the SART [om.] \* SOA interaction term and SART [com.] \* SOA interaction term still improved model fit (*χ2(2) = 14.677, *p* = .0006502 χ2(2) = 13.907, *p* = 0.0009552 and  *respectively)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Accuracy** | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.03 | 0.01 – 0.13 | **<0.001** |
| Age | 1.00 | 0.91 – 1.10 | 0.992 |
| SOA [150] | 0.43 | 0.39 – 0.48 | **<0.001** |
| SOA [230] | 0.51 | 0.47 – 0.57 | **<0.001** |
| SART omissions | 1.10 | 0.99 – 1.22 | 0.065 |
| SART commissions | 0.98 | 0.88 – 1.09 | 0.691 |
| Sex [Female] | 2.16 | 1.80 – 2.58 | **<0.001** |
| Education [Secondary] | 1.16 | 0.91 – 1.48 | 0.226 |
| Education [Third/Higher] | 1.61 | 1.26 – 2.05 | **<0.001** |
| Pre/Post [Pre] | 0.51 | 0.48 – 0.54 | **<0.001** |
| VAS | 1.01 | 0.93 – 1.10 | 0.816 |
| SR. hearing [Fair] | 0.93 | 0.46 – 1.88 | 0.839 |
| SR. hearing [Good] | 0.84 | 0.43 – 1.65 | 0.612 |
| SR. hearing [Very Good] | 0.65 | 0.33 – 1.28 | 0.209 |
| SR. hearing [Excellent] | 0.62 | 0.31 – 1.25 | 0.183 |
| SR. vision [Fair] | 0.33 | 0.13 – 0.84 | **0.020** |
| SR. vision [Good] | 0.26 | 0.11 – 0.63 | **0.003** |
| SR. vision [Very Good] | 0.32 | 0.13 – 0.76 | **0.010** |
| SR. vision [Excellent] | 0.38 | 0.15 – 0.93 | **0.033** |
| 1B1F [0.5] | 70.52 | 22.90 – 217.20 | **<0.001** |
| 1B1F [1] | 172.64 | 61.29 – 486.34 | **<0.001** |
| 2B0F [0.5] | 0.69 | 0.56 – 0.86 | **0.001** |
| 2B0F [1] | 0.86 | 0.71 – 1.04 | 0.110 |
| 0B2F [0.5] | 0.56 | 0.46 – 0.68 | **<0.001** |
| 0B2F [1] | 0.50 | 0.38 – 0.66 | **<0.001** |
| Age \* SOA [150] | 0.66 | 0.62 – 0.71 | **<0.001** |
| Age \* SOA [230] | 0.59 | 0.54 – 0.63 | **<0.001** |
| SOA [150] \* SART omissions | 0.95 | 0.88 – 1.03 | 0.214 |
| SOA [230] \* SART omissions | 0.86 | 0.79 – 0.94 | **<0.001** |
| SOA [150] \* SART commissions | 0.90 | 0.83 – 0.97 | **0.008** |
| SOA [230] \* SART commissions | 0.85 | 0.79 – 0.93 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.33 | 0.29 – 0.38 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.25 | 0.22 – 0.29 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 3.29 | | |
| τ00 tilda\_serial | 4.71 | | |
| ICC | 0.59 | | |
| N tilda\_serial | 3487 | | |
| Observations | 20922 | | |
| Marginal R2 / Conditional R2 | 0.145 / 0.648 | | |

***Table S10.*** *Supplementary cross-sectional analysis of the Color Trails Task (CTT) with full sample (n = 3487). A likelihood ratio test indicated that both the CTT1 \* SOA interaction term and CTTdelta \* SOA interaction term still improved model fit (*χ2(2) = 87.852, *p* < 2.2e-16, χ2(2) = 118.71 , *p* < 2.2e-16 and  *respectively)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Accuracy** | | |
| *Predictors* | *Odds Ratios* | *CI* | *p* |
| Intercept | 0.03 | 0.01 – 0.15 | **<0.001** |
| Age | 0.99 | 0.90 – 1.09 | 0.829 |
| SOA [150] | 0.44 | 0.40 – 0.49 | **<0.001** |
| SOA [230] | 0.54 | 0.49 – 0.59 | **<0.001** |
| CTT1 | 1.02 | 0.93 – 1.12 | 0.683 |
| CTT delta | 1.05 | 0.96 – 1.15 | 0.252 |
| Sex [Female] | 2.21 | 1.84 – 2.64 | **<0.001** |
| Education [Secondary] | 1.10 | 0.86 – 1.41 | 0.453 |
| Education [Third/Higher] | 1.48 | 1.16 – 1.90 | **0.002** |
| Pre/Post [Pre] | 0.51 | 0.48 – 0.54 | **<0.001** |
| VAS | 0.99 | 0.91 – 1.08 | 0.905 |
| SR. hearing [Fair] | 0.93 | 0.46 – 1.87 | 0.830 |
| SR. hearing [Good] | 0.84 | 0.42 – 1.66 | 0.614 |
| SR. hearing [Very Good] | 0.64 | 0.32 – 1.27 | 0.202 |
| SR. hearing [Excellent] | 0.62 | 0.31 – 1.24 | 0.173 |
| SR. vision [Fair] | 0.31 | 0.12 – 0.80 | **0.015** |
| SR. vision [Good] | 0.24 | 0.10 – 0.59 | **0.002** |
| SR. vision [Very Good] | 0.29 | 0.12 – 0.70 | **0.006** |
| SR. vision [Excellent] | 0.34 | 0.14 – 0.85 | **0.020** |
| 1B1F [0.5] | 71.92 | 23.27 – 222.29 | **<0.001** |
| 1B1F [1] | 176.41 | 62.43 – 498.49 | **<0.001** |
| 2B0F [0.5] | 0.69 | 0.56 – 0.86 | **0.001** |
| 2B0F [1] | 0.84 | 0.69 – 1.01 | 0.063 |
| 0B2F [0.5] | 0.54 | 0.45 – 0.66 | **<0.001** |
| 0B2F [1] | 0.49 | 0.37 – 0.64 | **<0.001** |
| Age \* SOA [150] | 0.73 | 0.67 – 0.78 | **<0.001** |
| Age \* SOA [230] | 0.67 | 0.62 – 0.73 | **<0.001** |
| SOA [150] \* CTT1 | 0.83 | 0.77 – 0.90 | **<0.001** |
| SOA [230] \* CTT1 | 0.70 | 0.65 – 0.75 | **<0.001** |
| SOA [150] \* CTT delta | 0.75 | 0.70 – 0.81 | **<0.001** |
| SOA [230] \* CTT delta | 0.69 | 0.64 – 0.74 | **<0.001** |
| Sex [Female] \* SOA [150] | 0.31 | 0.27 – 0.36 | **<0.001** |
| Sex [Female] \* SOA [230] | 0.22 | 0.20 – 0.26 | **<0.001** |
| **Random Effects** | | | |
| σ2 | 3.29 | | |
| τ00 tilda\_serial | 4.75 | | |
| ICC | 0.59 | | |
| N tilda\_serial | 3487 | | |
| Observations | 20922 | | |
| Marginal R2 / Conditional R2 | 0.152 / 0.653 | | |

***Comparison of trajectory group performance from wave 1 to 5***

For immediate recall, the number of words recalled by group A increased between wave 1 (M = 7.98, SD = 1.65, range = 8 – 20, words recalled) and wave 5 (M = 8.21, SD = 1.58 range = 7 – 20 words recalled) *p* = 9.896e-08; in group B the number of words recalled remained relatively stable and did not significantly differ between wave 1 and 5 (M = 6.58, SD = 1.81, range = 2 – 20, at wave 1 and M = 6.38, SD = 1.91, range = 4 - 20 at wave 5) *p* = 0.1604; the number of words recalled in group C significantly decreased between waves (M = 4.93, SD = 1.85 range = 2 – 17 at wave 1 and M = 4.24, range 0 – 16 at wave 5) *p* = 4.051e-10.

For delayed recall, the number of words recalled by group A (‘high performance’ group) improved between wave 1 (M = 8.24, SD = 1.47, range = 1 – 10) and wave 5 (M = 8.52, SD = 1.28, range = 3 – 1), *p* = 0.02646; the number of words recalled increased between waves in group B (M = 7.98 , range = 8 – 20, at wave 1 and M = 8.21, range = 7 - 20 at wave 5) *p* = 9.896e-08; the number of words recalled in group C (‘low performance’ group) significantly decreased between waves (M = 4.93, range = 2 – 17 at wave 1 and M = 4.24, range 0 – 16 at wave 5) *p* = 4.051e-10.

For animal naming, all three groups showed significant declines between wave 1 and wave 5. Group A (‘high performance’ group) dropped from a mean of 29.9 (SD = 5.83, range 0 – 50) at wave 1 to 26.16 at wave 5 (SD = 4.70, range 9 – 46), *p* < 2.2e-16. Group B (‘mid performance’ group) dropped from a mean of 23.75 (SD = 23.75, range 3 – 47) at wave 1 to 20.38 at wave 5 (SD = 20.38, range 1 - 38), *p* < 2.2e-16. Group C (‘low performance’ group) dropped from a mean of 16.89 (SD = 16.89, range 0 - 31) at wave 1 to 15 at wave 5 (SD = 15.00, range 0 - 32), *p* < 2.2e-16.