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| **Supplementary data table 1: absolute single- and dual-task performance and DTCs of pwMS and HC in the ‘walk’ conditions** |  |
|  | **Parameter** |  | **T:** $\overbar{X}$ **(SD)** | **RT:** $\overbar{X}$ **(SD)** | **t-Test*****p*-value** | **ICC (95%CI)/****Spearman *r*** | **SEM** | **MDC** |
| **Single Task performance** | Gait Speed (m/s) | MS (33) | 1.3 (0.2) | 1.3 (0.2) | ns | .942 (.886-.971)$ | 0.05 | 0.14 |
| DS Correct Answers (#n) | 6.5 (2.9) | 7.3 (2.8) | 0.030\* | .712 (.480-.849)$ | 1.53 | 4.24 |
| SS Correct Answers (#n) | 12.3 (6.7) | 14.7 (6.3) | a 0.002\*\* | *r*: .820$ |  |  |
| AV Correct Answers (#n) | 23.8 (0.4) | 23.7 (0.5) | a ns | *r:* .050 |  |  |
| **Single Task performance** | Gait Speed (m/s) | HC (31) | 1.4 (0.2) | 1.4 (0.2) | ns | .880 (.766-.940)$ | 0.06 | 0.17 |
| DS Correct Answers (#n) | 6.7 (2.3) | 7.2 (2.9) | ns | .603 (.327-.785)$ | 1.63 | 4.52 |
| SS Correct Answers (#n) | 18.5 (8.2) | 22.4 (8.8) | <0.000$ | .793 (.296-.923)$ | 3.88 | 10.75 |
| AV Correct Answers (#n) | 23.9 (0.4) | 23.7 (0.7) | a ns | *r:* 0.550\*\* |  |  |
| **Digit Span Walk Condition** |
| **Motor** | **Dual Task Performance (m/s)** | Gait Speed (m/s) | MS (33) | 1.1 (0.2) | 1.1 (0.2) | ns | .907 (.820-.953)$ | 0.07 | 0.19 |
|  | HC (29) | 1.2 (0.2) | 1.2 (0.2) | ns | .931 (.858-.967)$ | 0.04 | 0.12 |
| **Dual task cost (%)** | Gait speed (%) | MS (33) | 14.6 (10.7) | 13.8 (8.9) | a ns | *r:* .821$ |  |  |
| HC (29) | 11.4 (7.3) | 12.2 (7.3) | ns | .657 (.390-.823)$ | 4.28 | 11.86 |
| **Cognitive** | **Dual Task Performance (#n)** | DS Correct Answers (#n) | MS (30) | 5.7 (2.8) | 7.0 (2.4) | 0.003\*\* | .628 (.281-.817)$ | 1.61 | 4.47 |
|  | HC (30) | 6.1 (2.9) | 7.3 (2.5) | <0.000$ | .772 (.369-.907)$ | 1.29 | 3.58 |
| **Dual task cost (%)** | DS Correct Answers (%) | MS (30) | 15.2 (42.5) | 9.0 (19.3) | ns | .231 (-.137-.542) | 28.92 | 80.15 |
| HC (30) | 8.9 (35.9) | -0.8 (21.7) | a ns | *r*: -.237 |  |  |
| **Subtraction Walk Condition** |
| **Motor** | **Dual Task Performance (m/s)** | Gait Speed (m/s) | MS (33) | 1.1 (0.2) | 1.1 (0.2) | ns | .873 (.759-.935)$ | 0.07 | 0.20 |
|  | HC (31) | 1.2 (0.2) | 1.2 (0.2) | ns | .894 (.793-.947)$ | 0.06 | 0.15 |
| **Dual task cost (%)** | Gait speed (%) | MS (33) | 16.2 (9.0)  | 15.0 (7.8) | ns | .754 (.561-.870)$ | 4.18 | 11.59 |
| HC (31) | 16.9 (8.8) | 16.2 (9.0) | a ns | *r:* .736$ |  |  |
| **Cognitive** | **Dual Task Performance (#n)** | SS Correct Answers (#n) | MS (33) | 11.6 (5.3) | 12.5 (5.9) | ns | .639 (.387-.803)$ | 3.36 | 9.32 |
|  | HC (30) | 17.1 (8.2) | 20.9 (8.2) | <0.000$ | .774 (.296-.913)$ | 3.89 | 10.79 |
| **Dual task cost (%)** | SS Correct Answers (%) | MS (33) | 0.8 (30.3) | 15.7 (27.1) | a ns | *r*: .158 |  |  |
| HC (30) | 4.2 (29.7) | 5.9 (19.1) | ns | .489 (.158-.720)\*\* | 17.87 | 49.53 |
| **Vigilance Walk Condition** |
| **Motor** | **Dual Task Performance (m/s)** | Gait Speed (m/s) | MS (33) | 1.2 (0.2) | 1.2 (0.2) | ns | .923 (.850-.961)$ | 0.06 | 0.16 |
|  | HC (29) | 1.3 (0.2) | 1.3 (0.2) | ns | .888 (.777-.946)$ | 0.05 | 0.15 |
| **Dual task cost (%)** | Gait Speed (%) | MS (33) | 7.7 (7.6) | 8.6 (6.2) | a ns | *r:* .768$ |  |  |
|  | HC (29) | 7.9 (6.1) | 9.0 (6.3) | a ns | *r:* .781$ |  |  |
| **Cognitive** | **Dual Task Performance (#n)** | AV Correct Answers (#n) | MS (33) | 23.4 (0.8) | 23.6 (0.7) | a ns | *r:* .312 |  |  |
| HC (29) | 23.5 (0.9) | 23.9 (0.4) | a 0.035\* | *r:* .088 |  |  |
| **Dual task cost (%)** | AV Correct Answers (%) | MS (33) | 1.5 (3.3) | 0.3 (4.2) | a ns | *r:* .261 |  |  |
| HC (29) | 2.0 (3.8) | -0.01 (1.2) | a 0.016\* | *r:* .214 |  |  |

Abbreviations: DS: Digit Span; SS: Serial Subtraction; AV: Auditory Vigilance, T: test-moment; RT: retest-moment. Tests are significant at <0.05 (\*), <0.01 (\*\*), <0.001 ($) (2-tailed). a Wilcoxon Signed Rank Test. Single measure ICCs and Spearman’s correlation coefficients (r:) were given for normally and non-normally distributed data, respectively (*r*:).