**Supplemental Material S1.** Screening Test for Aphasia and Dysarthria (STAD) item difficulties.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **STAD**  **Section** |  |  | **Correct frequency** | |
| **Item** | **Instruction** | **n** | **%** |
| Verbal  section  (16 items) | Patient name | Please tell me your name. | 285 | 90.8 |
| Obey the command 1 | Please do what I say. Close your eyes. | 298 | 94.9 |
| Obey the command 2 | Touch your ear. | 285 | 90.8 |
| Obey the command 3 | Close and open your hand. | 276 | 87.9 |
| Word repetition 1 | Please repeat after me. *Umi* (sea)a. | 295 | 93.9 |
| Word repetition 2 | *Tamago* (egg) a. | 286 | 91.1 |
| Word repetition 3 | *Tebukuro* (globe) a. | 279 | 88.9 |
| Automatic speech | Please count to 10. | 279 | 88.9 |
| Object naming 1 | What is this? *Pen* (pen) a | 269 | 85.7 |
| Object naming 2 | *Haburashi* (tooth brush) a | 258 | 82.2 |
| Object naming 3 | *Taionkei* (thermometer) a | 248 | 79.0 |
| Name writing 1 | Please spell your name in Kanji. | 260 | 82.8 |
| Name writing 2 | Please spell your name in Kana. | 246 | 78.3 |
| Dictation 1 | Please write down what I say. *Tōmorokoshi* (corn)a | 212 | 67.5 |
| Dictation 2 | *Kurisumasutsurī* (christmas tree) a | 191 | 60.8 |
| Dictation 3 | *Inu mo arukeba bō ni ataru*b | 163 | 51.9 |
| Articulation  section  (7 items) | Oral Movement 1 | Lick your upper lip. | 250 | 79.6 |
| Oral Movement 2 | Wiggle your tongue outside your mouth. | 254 | 80.9 |
| Oral Movement 3 | Move your tongue in and out. | 245 | 78.0 |
| Oral Movement 4 | Puff out your cheeks. | 258 | 82.2 |
| Diadochokinesis 1 | Please copy me, papapa…(pʌ pʌ pʌ…) | 222 | 70.7 |
| Diadochokinesis 2 | tatata…(tʌ tʌ tʌ…) | 206 | 65.6 |
| Diadochokinesis 3 | kakaka…(kʌ kʌ kʌ…) | 174 | 55.4 |
| Non-Verbal  Section  (6 items) | Eye contact | Check based on the patient’s response. | 300 | 95.5 |
| Orientation | What is today's date? | 242 | 77.1 |
| Imitation 1 | Do as I do, please (make a "peace sign": I, IV V ring). | 292 | 93.0 |
| Imitation 2 | (stand index/little finger " I, III, IV ring) | 223 | 71.0 |
| Visual construction 1 | Please copy this figure. (凹) | 234 | 74.5 |
| Visual construction 2 | (cube) | 167 | 53.2 |
| Note. aThe initial capital letter represents Japanese. A lowercase letter in parentheses indicates the authors' direct translation from the original Japanese. bJapanese proverb. | | | | |

**Supplemental Material S2.** Impact of aphasia on the effectiveness of each STAD item

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Aphasia** | | | | |  | **Evaluated value** | | |
|  |  | **Present (n = 92)** | |  | **Absent (n = 222)** | |  | **Odds**  **ratio** | **Effect**  **Size** | ***p*** |
| **STAD**  **Section** | **Items** | **Correct**  **(n)** | **Wrong**  **(n)** |  | **Correct**  **(n)** | **Wrong**  **(n)** |  |
| Verbal  Section  (16 items) | Patient name | 65 | 27 |  | 220 | 2 |  | 45.7 | 0.45 | <0.0001 |
| Obey command 1 | 80 | 12 |  | 218 | 4 |  | 8.2 | 0.23 | 0.0001 |
| Obey command 2 | 69 | 23 |  | 216 | 6 |  | 12.0 | 0.35 | <0.0001 |
| Obey command 3 | 63 | 29 |  | 213 | 9 |  | 10.9 | 0.38 | <0.0001 |
| Repetition 1 | 75 | 17 |  | 220 | 2 |  | 24.9 | 0.34 | <0.0001 |
| Repetition 2 | 66 | 26 |  | 220 | 2 |  | 43.3 | 0.44 | <0.0001 |
| Repetition 3 | 63 | 29 |  | 216 | 6 |  | 16.6 | 0.42 | <0.0001 |
| Automatic speech | 65 | 27 |  | 214 | 8 |  | 11.1 | 0.37 | <0.0001 |
| Object naming 1 | 55 | 37 |  | 214 | 8 |  | 18.0 | 0.48 | <0.0001 |
| Object naming 2 | 41 | 51 |  | 217 | 5 |  | 54.0 | 0.63 | <0.0001 |
| Object naming 3 | 38 | 54 |  | 210 | 12 |  | 24.9 | 0.60 | <0.0001 |
| Name writing 1 | 55 | 37 |  | 205 | 17 |  | 8.1 | 0.39 | <0.0001 |
| Name writing 2 | 41 | 51 |  | 205 | 17 |  | 15.0 | 0.53 | <0.0001 |
| Dictation 1 | 25 | 67 |  | 187 | 35 |  | 14.3 | 0.55 | <0.0001 |
| Dictation 2 | 15 | 77 |  | 176 | 46 |  | 19.6 | 0.59 | <0.0001 |
| Dictation 3 | 12 | 80 |  | 151 | 71 |  | 14.2 | 0.50 | <0.0001 |
| Articulation  Section  (7 items) | Oral movement 1 | 67 | 25 |  | 183 | 39 |  | 1.8 | 0.11 | 0.0648 |
| Oral movement 2 | 65 | 27 |  | 189 | 33 |  | 2.4 | 0.17 | 0.0043 |
| Oral movement 3 | 68 | 24 |  | 177 | 45 |  | 1.4 | 0.06 | 0.2948 |
| Oral movement 4 | 68 | 24 |  | 190 | 32 |  | 2.1 | 0.14 | 0.0225 |
| Diadochokinesis 1 | 62 | 30 |  | 160 | 62 |  | 1.2 | 0.05 | 0.4164 |
| Diadochokinesis 2 | 56 | 36 |  | 150 | 72 |  | 1.3 | 0.06 | 0.2965 |
| Diadochokinesis 3 | 49 | 43 |  | 125 | 97 |  | 1.1 | 0.03 | 0.6207 |
| Non-Verbal  Section  (6 items) | Eye contact | 83 | 9 |  | 217 | 5 |  | 4.7 | 0.17 | 0.0059 |
| Orientation | 59 | 33 |  | 183 | 39 |  | 2.6 | 0.20 | 0.0007 |
| Imitation 1 | 77 | 15 |  | 215 | 7 |  | 6.0 | 0.23 | 0.0001 |
| Imitation 2 | 50 | 42 |  | 173 | 49 |  | 3.0 | 0.24 | 0.0001 |
| Construction 1 | 63 | 29 |  | 171 | 51 |  | 1.5 | 0.09 | 0.1196 |
| Construction 2 | 41 | 51 |  | 126 | 96 |  | 1.6 | 0.11 | 0.0621 |
| Note. The table represents the number of patients from binary data of item that are either correct or wrong with 2 aphasia factors of either present or absent. Effect size and *p*-value for each STAD items were calculated using *phi* coefficient and Fisher's Exact Test of Count Data. The effect size value is used in Figure 2. | | | | | | | | | | |

**Supplemental Material S3.** Impact of dysarthria on the effectiveness of each STAD item

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Dysarthria** | | | | |  | **Evaluated value** | | |
|  |  | **Present (n = 154)** | |  | **Absent (n = 160)** | |  | **Odds**  **Ratio** | **Effect**  **Size** | ***p*** |
| **STAD**  **Section** | **Items** | **Correct**  **(n)** | **Wrong**  **(n)** |  | **Correct**  **(n)** | **Wrong**  **(n)** |  |
| Verbal  Section  (16 items) | Patient name | 141 | 13 |  | 144 | 16 |  | 0.8 | 0.03 | 0.3896 |
| Obey command 1 | 146 | 8 |  | 152 | 8 |  | 1.0 | 0.00 | 0.9375 |
| Obey command 2 | 140 | 14 |  | 145 | 15 |  | 1.0 | 0.00 | 0.9307 |
| Obey command 3 | 137 | 17 |  | 139 | 21 |  | 0.8 | 0.03 | 0.6070 |
| Repetition 1 | 145 | 9 |  | 150 | 10 |  | 0.9 | 0.01 | 0.8801 |
| Repetition 2 | 141 | 13 |  | 145 | 15 |  | 0.9 | 0.02 | 0.8443 |
| Repetition 3 | 138 | 16 |  | 141 | 19 |  | 0.9 | 0.02 | 0.7223 |
| Automatic speech | 135 | 19 |  | 144 | 16 |  | 1.3 | 0.04 | 0.5917 |
| Object naming 1 | 135 | 19 |  | 134 | 26 |  | 0.7 | 0.06 | 0.3386 |
| Object naming 2 | 129 | 25 |  | 128 | 32 |  | 0.8 | 0.05 | 0.4643 |
| Object naming 3 | 124 | 30 |  | 124 | 36 |  | 0.8 | 0.04 | 0.5800 |
| Name writing 1 | 122 | 32 |  | 138 | 22 |  | 1.6 | 0.09 | 0.1028 |
| Name writing 2 | 119 | 35 |  | 127 | 33 |  | 1.1 | 0.03 | 0.6825 |
| Dictation 1 | 98 | 56 |  | 114 | 46 |  | 1.4 | 0.08 | 0.1848 |
| Dictation 2 | 90 | 64 |  | 101 | 59 |  | 1.2 | 0.05 | 0.4196 |
| Dictation 3 | 81 | 73 |  | 82 | 78 |  | 0.9 | 0.01 | 0.8222 |
| Articulation  Section  (7 items) | Oral movement 1 | 105 | 49 |  | 145 | 15 |  | 4.5 | 0.28 | <0.0001 |
| Oral movement 2 | 107 | 47 |  | 147 | 13 |  | 5.0 | 0.28 | <0.0001 |
| Oral movement 3 | 97 | 57 |  | 148 | 12 |  | 7.2 | 0.36 | <0.0001 |
| Oral movement 4 | 114 | 40 |  | 144 | 16 |  | 3.2 | 0.21 | 0.0002 |
| Diadochokinesis 1 | 76 | 78 |  | 146 | 14 |  | 10.7 | 0.46 | <0.0001 |
| Diadochokinesis 2 | 63 | 91 |  | 143 | 17 |  | 12.2 | 0.51 | <0.0001 |
| Diadochokinesis 3 | 35 | 119 |  | 139 | 21 |  | 22.5 | 0.65 | <0.0001 |
| Non-Verbal  Section  (6 items) | Eye contact | 149 | 5 |  | 151 | 9 |  | 0.6 | 0.06 | 0.4144 |
| Orientation | 122 | 32 |  | 120 | 40 |  | 0.8 | 0.05 | 0.4212 |
| Imitation 1 | 144 | 10 |  | 148 | 12 |  | 0.9 | 0.02 | 0.8263 |
| Imitation 2 | 104 | 50 |  | 119 | 41 |  | 1.4 | 0.08 | 0.2136 |
| Construction 1 | 102 | 52 |  | 132 | 28 |  | 2.4 | 0.19 | 0.0011 |
| Construction 2 | 74 | 80 |  | 93 | 67 |  | 1.5 | 0.10 | 0.0897 |
| Note. The table represents the number of patients from binary data of item that either correct or wrong with 2 dysarthria factors of either present or absent. Effect size and *p*-value for each STAD items were calculated using *phi* coefficient and Fisher's Exact Test of Count Data. The effect size value is used in Figure 2. | | | | | | | | | | |

**Supplemental Material S4.** Impact of cognitive dysfunction on the effectiveness of each STAD item

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Cognitive dysfunction** | | | | |  | **Evaluated value** | | |
|  |  | **Present (n = 179)** | |  | **Absent (n = 135)** | |  | **Odds**  **Ratio** | **Effect**  **Size** | ***P*** |
| **STAD**  **Section** | **Items** | **Correct**  **(n)** | **Wrong**  **(n)** |  | **Correct**  **(n)** | **Wrong**  **(n)** |  |
| Verbal  Section  (16 items) | Patient name | 156 | 23 |  | 129 | 6 |  | 3.2 | 0.14 | 0.0107 |
| Obey command 1 | 163 | 16 |  | 135 | 0 |  | Infinite | 0.20 | 0.0001 |
| Obey command 2 | 154 | 25 |  | 131 | 4 |  | 5.3 | 0.19 | 0.0007 |
| Obey command 3 | 146 | 33 |  | 130 | 5 |  | 5.9 | 0.22 | <0.0001 |
| Repetition 1 | 164 | 15 |  | 131 | 4 |  | 3.0 | 0.11 | 0.0560 |
| Repetition 2 | 158 | 21 |  | 128 | 7 |  | 2.4 | 0.11 | 0.0473 |
| Repetition 3 | 156 | 23 |  | 123 | 12 |  | 1.5 | 0.06 | 0.2844 |
| Automatic speech | 148 | 31 |  | 131 | 4 |  | 6.9 | 0.23 | <0.0001 |
| Object naming 1 | 147 | 32 |  | 122 | 13 |  | 2.0 | 0.12 | 0.0502 |
| Object naming 2 | 139 | 40 |  | 119 | 16 |  | 2.1 | 0.14 | 0.0174 |
| Object naming 3 | 128 | 51 |  | 120 | 15 |  | 3.2 | 0.21 | 0.0002 |
| Name writing 1 | 132 | 47 |  | 128 | 7 |  | 6.5 | 0.28 | <0.0001 |
| Name writing 2 | 123 | 56 |  | 123 | 12 |  | 4.7 | 0.27 | <0.0001 |
| Dictation 1 | 98 | 81 |  | 114 | 21 |  | 4.5 | 0.31 | <0.0001 |
| Dictation 2 | 81 | 98 |  | 110 | 25 |  | 5.3 | 0.37 | <0.0001 |
| Dictation 3 | 66 | 113 |  | 97 | 38 |  | 4.4 | 0.35 | <0.0001 |
| Articulation  Section  (7 items) | Oral movement 1 | 133 | 46 |  | 117 | 18 |  | 2.2 | 0.15 | 0.0073 |
| Oral movement 2 | 137 | 42 |  | 117 | 18 |  | 2.0 | 0.13 | 0.0293 |
| Oral movement 3 | 131 | 48 |  | 114 | 21 |  | 2.0 | 0.13 | 0.0193 |
| Oral movement 4 | 137 | 42 |  | 121 | 14 |  | 2.6 | 0.17 | 0.0025 |
| Diadochokinesis 1 | 121 | 58 |  | 101 | 34 |  | 1.4 | 0.08 | 0.1709 |
| Diadochokinesis 2 | 108 | 71 |  | 98 | 37 |  | 1.7 | 0.13 | 0.0306 |
| Diadochokinesis 3 | 86 | 93 |  | 88 | 47 |  | 2.0 | 0.17 | 0.0029 |
| Non-Verbal  Section  (6 items) | Eye contact | 165 | 14 |  | 135 | 0 |  | Infinite | 0.19 | 0.0004 |
| Orientation | 110 | 69 |  | 132 | 3 |  | 27.6 | 0.43 | <0.0001 |
| Imitation 1 | 157 | 22 |  | 135 | 0 |  | Infinite | 0.24 | <0.0001 |
| Imitation 2 | 94 | 85 |  | 129 | 6 |  | 19.4 | 0.47 | <0.0001 |
| Construction 1 | 104 | 75 |  | 130 | 5 |  | 18.8 | 0.43 | <0.0001 |
| Construction 2 | 54 | 125 |  | 113 | 22 |  | 11.9 | 0.53 | <0.0001 |
| Note. The table counts the number of patients from binary data of item correct or wrong with 2 factors of Cognitive dysfunction present or absent. Effect size and *p*-value for each STAD items were calculated by *phi* coefficient and Fisher's Exact Test of Count Data. The effect size value is being used in Figure 2. of the manuscript. | | | | | | | | | | |

**Supplemental Material S5.** Means (and standard deviations) for reference measures.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Reference**  **measure** | ***n*** | **Max**  **possible**  **score** | **Male** | **Female** | **Total** | **Range** |
|  |  |  |  |  |  |  |
| WAB AQ | 57 | 100 | 56.37 | 55.86 | 57.09 | 0–99.8 |
|  |  |  | (29.74) | (31.81) | (30.33) |  |
|  |  |  |  |  |  |  |
| AMSD | 84 | 29 | 17.98 | 18.21 | 18.09 | 0–28 |
|  |  |  | (7.61) | (7.48) | (7.51) |  |
|  |  |  |  |  |  |  |
| WAB NLS | 71 | 10 | 6.57 | 5.48 | 6.19 | 0–9.75 |
|  |  |  | (2.50) | (2.70) | (2.61) |  |
|  |  |  |  |  |  |  |
| ***Note.*** WAB AQ = Western Aphasia Battery Aphasia quotient (Kertesz 1982; Sugishita 1986); AMSD = Assessment of Motor Speech for dysarthria (Nishio 2004); WAB NLS = Western Aphasia Battery Non-Linguistic Skills (Kertesz 1982; Sugishita 1986). | | | | | | |

**References**

Kertesz, A. (1982). *Western Aphasia Battery Test Manual.* New York: Grune and Stratton. ISBN-13: 978-0808914549.

Nishio M. (2004). *Assessment of motor speech disorders (AMSD).* Tokyo, Interuna Publishers Inc. ISBN-13: 978-4900637177. (in Japanese).

Sugishita M. (1986). *Western Aphasia Battery (WAB).* Tokyo: Igaku-Shoin. ISBN-13: 978-34260243100. (in Japanese).