**Supplementary Materials**

**Supplement 1****: Blinded listener ratings of speech at the different assessment time points A1 to A3**

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| Time point | | Related samples Friedman’s ANOVA A1-A3 (χ2, *p*) | Wilcoxon’s Signed Rank Test  A1 vs A2 (Z, *p*) | Wilcoxon’s Signed Rank Test A1 vs A3 (Z, *p*) | Wilcoxon’s Signed Rank Test A2 vs A3 (Z, *p*) |
| Vocal control | Pitch breaks | χ2=.364, p=.834 | - | - | - |
| Prosody | Reduced rate | χ2=4.67, p=.097 | - | - | - |
| Short phrases | χ2=2.0, p=.368 | - | - | - |
| Prolonged intervals | χ2=3.5, p=.17 | - | - | - |
| Equal and excess stress | χ2=1.6, p=.449 | - | - | - |
| Articulation | Imprecise consonants | χ2=5.059, p=.08 | - | - | - |
| Vowel distortion | **χ2=6.533, p=.038** | Z=-1.841, p=.066 | Z=-1.841, p=.066 | Z=0.0, p=1.0 |
| Intelligibility a | Monologue | **χ2=****8.67, p=.013** | Z=4.0, p=.71 | **Z=13.0, p=.039** | **Z=21.0, p=.024** |
| Reading | **χ2=11.06, p=.003** | Z=-.378, p=.705 | **Z=-2.392, p=.017** | **Z=-2.401, p=.016** |
| Naturalness a | Monologue | **χ2=6.08, p=.048** | Z=0.0, p=1.0 | Z=1.913, p=.056 | **Z=-2.232, p=.026** |
| Reading | χ2=3.583, p=.167 | - | - | - |

\*Wilcoxon Signed Rank Test converted to standardized Z statistic; Paired comparison only completed when significant difference reported in k-samples Friedman’s ANOVA; *p=* 2 sided; a Derived from direct magnitude estimation

**Supplement 2: Raw data (mean ± SD) of blinded listener ratings of speech at different assessment time points A1 to A3**

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| Time point | | A1 (Mean ± SD) | A2 (Mean ± SD) | A3 (Mean ± SD) |
| Vocal control | Pitch breaks | 2.43 ± 1.52 | 2.43 ± .93 | 2.87 ± .91 |
| Prosody | Reduced rate | -0.714 ± .76 | -1.43 ± .69 | -.86 ± .69 |
| Short phrases | .857 ± 1.22 | 1.0 ± 1.0 | .714 ± .95 |
| Prolonged intervals | 1.43 ± 1.33 | 1.71 ± 1.25 | 1.14 ± .9 |
| Equal and excess stress | 2.0 ± 1.55 | 1.79 ± .81 | 1.79 ± .91 |
| Articulation | Imprecise consonants | 2.0 ± .76 | 2.21 ± .49 | 2.79 ± .49 |
| Vowel distortion | 2.21 ± 1.14 | 1.64 ± .85 | 1.64 ± .85 |
| Intelligibility a | Monologue | 118.57 ± 22.68 | 117.14 ± 18.9 | 130.0 ± 14.14 |
| Reading | 114.27 ± 15.12 | 112.86 ± 13.8 | 132.86 ± 9.5 |
| Naturalness a | Monologue | 117.14 ± 39.04 | 117.14 ± 26.99 | 131.43 ± 29.11 |
| Reading | 115.71 ± 37.35 | 114.29 ± 32.0 | 121.43 ± 28.54 |

Listener based measures rated on scale of 0-4 where 0=unremarkable, 1=subclinical, 2=mild, 3=moderate, 4=severe; a Derived from direct magnitude estimation (see main text for description). Expert raters had >5 years’ experience working with dysarthria in their caseload. German raters evaluated the six German speaking samples and Australian raters evaluated the Australian participant samples.

**Supplement 3: Acoustic data across three different timepoints A1-A3**

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| Time point | | A1 (Mean ± SD) | A2 (Mean ± SD) | A3 (Mean ± SD) | Related Samples Friedman’s Two-way ANOVA by Ranks A1-A3 (T, *p*) |
| Vocal control: (vowel) | Fundamental Frequency variation (*f*0 CoV) | 0.06 ± .05 | 0.08 ± .11 | 0.04 ± .4 | χ2=6.0, p=.05 |
| Vocal control: (monologue) | Fundamental Frequency variation (*f*0 CoV) | 0.17 ± .05 | 0.19 ± .08 | 0.20 ± .8 | χ2=3.421, p=.18 |
| Voice quality: (vowel) | Harmonics to noise ratio | 25.79 ± 2.57 | 27.25 ± 2.35 | 27.11 ± 1.53 | χ2=3.714, p=.156 |
| Voice quality: (monologue) | Alpha ratio | 0.03 ± .02 | 0.03 ± .2 | 0.04 ± .02 | χ2=2.0, p=.368 |
| Prosody: automated task (days of the week) | Mean pause length (ms) | 0.22 ± .1 | 0.20 ± .1 | 0.24 ± .09 | χ2=1.143, p=.565 |
| Pause length variability | 0.32 ± .18 | 0.21 ± .1 | 0.23 ± .11 | χ2=2.0, p=.368 |
| Percent pause | 36.49 ± 12.55 | 39.22 ± 10.72 | 37.20 ± 6.53 | χ2=.851, p=.651 |
| Speech rate | 2.69 ± .85 | 2.69 ± .98 | 2.21 ± .77 | χ2=2.0, p=.368 |
| Prosody: reading | Mean pause length | 0.29 ± .19 | 0.25 ± .08 | 0.28 ± .17 | χ2=1.143, p=.565 |
| Pause length variability | 0.34 ± .18 | 0.32 ± .8 | 0.34 ± .19 | χ2=1.143, p=.565 |
| Percent pause | 30.89 ± 8.81 | 31.88 ± 8.36 | 32.44 ± 8.3 | χ2=1.143, p=.565 |
| Speech rate | 2.64 ± .61 | 2.53 ± .52 | 2.57 ± .62 | χ2=.286, p=.867 |
| Prosody: monologue | Mean pause length | 0.29 ± .06 | 0.28 ± .15 | 0.27 ± .08 | χ2=.286, p=.867 |
| Pause length variability | 0.40 ± .12 | 0.38 ± .29 | 0.38 ± .12 | χ2=.851, p=.651 |
| Percent pause | 34.54 ± 9.8 | 34.31 ± 14.62 | 32.91 ± 6.05 | χ2=1.143, p=.565 |

\* *f*0 = Fundamental Frequency (Hz); CoV= coefficient of variation; ms= milliseconds; *p=* 2 sided. Acoustic variables included in this analysis represent isolated speech components and do not encompass whole speech metrics such as intelligibility or naturalness.