

Supplementary Materials

Table S1. Tau-U results for Mean Intensity

Participant	Phase	Sustained vowel	Standardized sentences	Personalized sentences	Conversation	Picture description
LSVT01	Pre-Post	Tau-U = 0.50, $p = 0.009$	Tau-U = 0.40, $p < 0.001$	Tau-U = 0.22, $p = 0.014$	Tau-U = 1, $p = 0.030$	Tau-U = 1, $p = 0.032$
	Pre-FU1	Tau-U = 0.50, $p = 0.003$	Tau-U = 0.48, $p < 0.001$	Tau-U = 0.33, $p < 0.001$	Tau-U = 1, $p = 0.018$	Tau-U = 1, $p = 0.015$
	Pre-FU2	Tau-U = 0.50, $p = 0.006$	Tau-U = 0.31, $p < 0.001$	Tau-U = 0.21, $p = 0.019$	Tau-U = 1, $p = 0.018$	Tau-U = 1, $p = 0.018$
	Pre-FU3	Tau-U = 0.50, $p = 0.029$	Tau-U = 0.42, $p < 0.001$	Tau-U = 0.41, $p < 0.001$	Tau-U = 0.83, $p = 0.059$	Tau-U = 0.83, $p = 0.063$
LSVT02	Pre-Post	Tau-U = 0.44, $p = 0.012$	Tau-U = 0.32, $p = 0.001$	n.a.	Tau-U = -0.17, $p = 0.695$	Tau-U = 0.56, $p = 0.157$
	Pre-FU1	Tau-U = 0.44, $p = 0.008$	Tau-U = 0.21, $p = 0.031$	n.a.	Tau-U = 0.17, $p = 0.764$	Tau-U = 0.44, $p = 0.278$
	Pre-FU2	Tau-U = 0.44, $p = 0.010$	Tau-U = 0.21, $p = 0.034$	n.a.	Tau-U = 0.5, $p = 0.224$	Tau-U = 0.78, $p = 0.059$
	Pre-FU3	Tau-U = 0.37, $p = 0.033$	Tau-U = -0.37, $p < 0.001$	n.a.	Tau-U = 0.06, $p = 0.970$	Tau-U = 0.56, $p = 0.156$
LSVT03	Pre-Post	Tau-U = 0.56, $p = 0.001$	Tau-U = 0.12, $p = 0.206$	Tau-U = 0.34, $p < 0.001$	Tau-U = 0.50, $p = 0.320$	Tau-U = 0.50, $p = 0.224$
	Pre-FU1	Tau-U = 0.56, $p = 0.001$	Tau-U = -0.09, $p = 0.331$	Tau-U = 0.24, $p = 0.007$	Tau-U = 0.50, $p = 0.220$	Tau-U = 0.50, $p = 0.219$
	Pre-FU2	Tau-U = 0.56, $p = 0.001$	Tau-U = -0.22, $p = 0.016$	Tau-U = 0.14, $p = 0.127$	Tau-U = 0.50, $p = 0.316$	Tau-U = 0.50, $p = 0.221$
	Pre-FU3	Tau-U = 0.56, $p = 0.001$	Tau-U = 0.17, $p = 0.066$	Tau-U = 0.32, $p < 0.001$	Tau-U = 0.50, $p = 0.223$	Tau-U = 0.50, $p = 0.221$

Note. CoV, coefficient of variation; dB, decibels; ST, semitones; Pre, Pre-treatment; Post, Post-treatment; FU1, follow-up 1 (1 week); FU2, follow-up 2 (4 weeks); FU3, follow-up 3, (8 weeks); n.a., not available. Significant results ($p > 0.05$) shown in bold.

Table S2. Tau-U results for Pitch Control during Pitch Glides

Participant	Phases	Max F0	Range upwards	Min F0	Range downwards
LSVT01	Pre-Post	Tau-U = 0.116, $p = 0.536$	Tau-U = -0.401, $p = 0.027$	Tau-U = -0.657, $p < 0.000$	Tau-U = -0.234, $p = 0.075$
	Pre-FU1	Tau-U = 0.286, $p = 0.112$	Tau-U = -0.3, $p = 0.090$	Tau-U = -0.713, $p < 0.000$	Tau-U = -0.27, $p = 0.026$
	Pre-FU2	Tau-U = 0.301, $p = 0.100$	Tau-U = -0.352, $p = 0.051$	Tau-U = -0.75, $p < 0.000$	Tau-U = -0.29, $p = 0.021$
	Pre-Fu3	Tau-U = 0.343, $p = 0.070$	Tau-U = -0.357, $p = 0.052$	Tau-U = -0.75, $p < 0.000$	Tau-U = -0.461, $p = 0.003$
LSVT02	Pre-Post	Tau-U = 0.161, $p = 0.320$	Tau-U = -0.036, $p = 0.841$	Tau-U = 0.278, $p = 0.140$	Tau-U = -0.544, $p = 0.003$
	Pre-FU1	Tau-U = 0.177, $p = 0.284$	Tau-U = 0.034, $p = 0.858$	Tau-U = -0.142, $p = 0.445$	Tau-U = -0.355, $p = 0.048$
	Pre-FU2	Tau-U = 0.355, $p = 0.030$	Tau-U = 0.164, $p = 0.335$	Tau-U = 0.13, $p = 0.486$	Tau-U = -0.515, $p = 0.003$
	Pre-Fu3	Tau-U = 0.194, $p = 0.240$	Tau-U = -0.036, $p = 0.838$	Tau-U = 0.5, $p = 0.005$	Tau-U = 0.357, $p = 0.003$
LSVT03	Pre-Post	Tau-U = 0.154, $p = 0.409$	Tau-U = 0.401, $p = 0.028$	Tau-U = 0.625, $p = 0.001$	Tau-U = 0.005, $p = 0.999$
	Pre-FU1	Tau-U = 0.500, $p = 0.006$	Tau-U = 0.463, $p = 0.009$	Tau-U = 0.625, $p < 0.000$	Tau-U = -0.02, $p = 0.912$
	Pre-FU2	Tau-U = 0.333, $p = 0.070$	Tau-U = 0.486, $p = 0.008$	Tau-U = 0.625, $p < 0.000$	Tau-U = 0.375, $p = 0.036$
	Pre-Fu3	Tau-U = 0.500, $p = 0.005$	Tau-U = 0.488, $p = 0.008$	Tau-U = 0.625, $p < 0.000$	Tau-U = 0.526, $p < 0.000$

Note. Max F0, maximum fundamental frequency; Min F0, minimum fundamental frequency; Pre, Pre-treatment; Post, Post-treatment; FU1, follow-up 1 (1 week); FU2, follow-up 2 (4 weeks); FU3, follow-up 3, (8 weeks). Statistically significant results ($p > 0.05$) shown in bold.

Table S3. Tau-U statistics for voice quality measures.

Participant	Phase	AVQI	CPPS	HNR	Shimmer%	Shimmer dB	Jitter	Median pitch
LSVT01	Pre-Post	Tau-U = -0.50, $p = 0.010$	Tau-U = 0.50, $p = 0.005$	Tau-U = 0.50, $p = 0.005$	Tau-U = -0.49, $p = 0.006$	Tau-U = -0.50, $p = 0.006$	Tau-U = -0.46, $p = 0.009$	Tau-U = 0.56, $p = 0.001$
	Pre-FU1	Tau-U = -0.50, $p = 0.004$	Tau-U = 0.50, $p = 0.006$	Tau-U = 0.50, $p = 0.005$	Tau-U = -0.50, $p = 0.005$	Tau-U = -0.50, $p = 0.005$	Tau-U = -0.46, $p = 0.0092$	Tau-U = 0.60, $p < 0.001$
	Pre-FU2	Tau-U = -0.50, $p = 0.030$	Tau-U = 0.50, $p = 0.004$	Tau-U = 0.50, $p = 0.006$	Tau-U = -0.41, $p = 0.0211$	Tau-U = -0.40, $p = 0.025$	Tau-U = -0.45, $p = 0.0133$	Tau-U = 0.61, $p < 0.001$
	Pre-FU3	Tau-U = -0.17, $p = 0.706$	Tau-U = 0.50, $p = 0.029$	Tau-U = 0.17, $p = 0.502$	Tau-U = -0.17, $p = 0.481$	Tau-U = -0.17, $p = 0.490$	Tau-U = -0.07, $p = 0.716$	Tau-U = 0.50, $p = 0.009$
LSVT02	Pre-Post	Tau-U = -0.75, $p < 0.001$	Tau-U = 0.63, $p < 0.002$	Tau-U = 0.61, $p < 0.001$	Tau-U = -0.61, $p < 0.001$	Tau-U = -0.61, $p < 0.001$	Tau-U = -0.50, $p = 0.007$	Tau-U = 0.63, $p < 0.001$
	Pre-FU1	Tau-U = -0.75, $p < 0.001$	Tau-U = 0.63, $p < 0.001$	Tau-U = 0.60, $p < 0.001$	Tau-U = -0.61, $p < 0.001$	Tau-U = -0.61, $p < 0.001$	Tau-U = -0.50, $p = 0.005$	Tau-U = 0.46, $p = 0.009$
	Pre-FU2	Tau-U = -0.75, $p < 0.001$	Tau-U = 0.64, $p < 0.001$	Tau-U = 0.58, $p = 0.001$	Tau-U = -0.50, $p = 0.005$	Tau-U = -0.49, $p < 0.007$	Tau-U = -0.50, $p = 0.006$	Tau-U = 0.53, $p = 0.003$
	Pre-FU3	Tau-U = -0.75, $p < 0.001$	Tau-U = 0.63, $p < 0.001$	Tau-U = 0.600, $p < 0.001$	Tau-U = -0.61, $p < 0.001$	Tau-U = -0.61, $p < 0.001$	Tau-U = -0.50, $p = 0.005$	Tau-U = 0.625, $p < 0.001$
LSVT03	Pre-Post	Tau-U = -0.39, $p = 0.025$	Tau-U = 0.24, $p = 0.193$	Tau-U = 0.36, $p = 0.043$	Tau-U = -0.45, $p = 0.013$	Tau-U = -0.45, $p = 0.013$	Tau-U = -0.50, $p = 0.005$	Tau-U = 0.24, $p = 0.185$
	Pre-FU1	Tau-U = -0.39, $p = 0.025$	Tau-U = 0.23, $p = 0.215$	Tau-U = 0.338, $p = 0.067$	Tau-U = -0.40, $p = 0.027$	Tau-U = -0.44, $p = 0.014$	Tau-U = -0.50, $p = 0.005$	Tau-U = 0.30, $p = 0.098$
	Pre-FU2	Tau-U = -0.37, $p = 0.030$	Tau-U = 0.38, $p = 0.034$	Tau-U = -0.50, $p = 0.007$	Tau-U = -0.50, $p = 0.007$	Tau-U = 0.13, $p = 0.501$	Tau-U = 0.48, $p = 0.008$	Tau-U = -0.50, $p = 0.006$
	Pre-FU3	Tau-U = -0.36, $p = 0.031$	Tau-U = 0.36, $p = 0.044$	Tau-U = -0.40, $p = 0.029$	Tau-U = -0.48, $p = 0.007$	Tau-U = 0.04, $p = 0.832$	Tau-U = 0.28, $p = 0.132$	Tau-U = -0.50, $p = 0.005$

Note. AVQI, Acoustic Voice Quality Index; CPPS, Cepstral Peak Prominence Smoothed; HNR, Harmonic to Noise Ratio; dB, decibels; Pre, Pre-treatment; Post, Post-treatment; FU1, follow-up 1 (1 week); FU2, follow-up 2 (4 weeks); FU3, follow-up 3, (8 weeks). Statistically significant results ($p > 0.05$) shown in bold

Table S4. Prosody – Speech and Pause measures

Participant	Phase	Percentage of pause	Speech duration	Total duration	Mean pause duration	Mean speech duration
LSVT01	Pre-post	Tau-U = -0.333, $p = 0.459$	Tau-U = -0.166, $p = 0.692$	Tau-U = -0.333, $p = 0.465$	Tau-U = -0.666, $p = 0.081$	Tau-U = 0.166, $p = 0.831$
	Pre-FU1	Tau-U = -0.277, $p = 0.536$	Tau-U = -0.277, $p = 0.535$	Tau-U = -0.500, $p = 0.226$	Tau-U = -0.666, $p = 0.076$	Tau-U = 0.166, $p = 0.763$
	Pre-FU2	Tau-U = -0.500, $p = 0.227$	Tau-U = -0.500, $p = 0.216$	Tau-U = -0.500, $p = 0.227$	Tau-U = -0.888, $p = 0.030$	Tau-U = 0.277, $p = 0.531$
	Pre-FU3	Tau-U = -0.500, $p = 0.319$	Tau-U = -0.500, $p = 0.315$	Tau-U = -0.500, $p = 0.325$	Tau-U = -0.833, $p = 0.061$	Tau-U = 0.166, $p = 0.836$
LSVT02	Pre-post	Tau-U = -0.277, $p = 0.542$	Tau-U = 0.111, $p = 0.781$	Tau-U = 0.111, $p = 0.781$	Tau-U = 0.055, $p = 0.970$	Tau-U = 0.500, $p = 0.225$
	Pre-FU1	Tau-U = -0.277, $p = 0.543$	Tau-U = 0.666, $p = 0.114$	Tau-U = 0.222, $p = 0.579$	Tau-U = 0.388, $p = 0.348$	Tau-U = 0.500, $p = 0.220$
	Pre-FU2	Tau-U = -0.055, $p = 0.968$	Tau-U = 0.000, $p = 0.028$	Tau-U = 0.111, $p = 0.786$	Tau-U = -0.166, $p = 0.684$	Tau-U = 0.388, $p = 0.343$
	Pre-FU3	Tau-U = -0.388, $p = 0.322$	Tau-U = 0.222, $p = 0.573$	Tau-U = 0.111, $p = 0.780$	Tau-U = 0.500, $p = 0.210$	Tau-U = 0.500, $p = 0.217$
LSVT03	Pre-post	Tau-U = -1.00, $p = 0.018$	Tau-U = -0.500, $p = 0.224$	Tau-U = -0.500, $p = 0.218$	Tau-U = -0.500, $p = 0.212$	Tau-U = 1.00, $p = 0.020$
	Pre-FU1	Tau-U = -1.00, $p = 0.016$	Tau-U = -0.500, $p = 0.227$	Tau-U = -0.500, $p = 0.213$	Tau-U = -0.500, $p = 0.210$	Tau-U = 1.00, $p = 0.014$
	Pre-FU2	Tau-U = -1.00, $p = 0.015$	Tau-U = -0.500, $p = 0.220$	Tau-U = -0.500, $p = 0.222$	Tau-U = -0.166, $p = 0.687$	Tau-U = 1.00, $p = 0.017$
	Pre-FU3	Tau-U = -1.00, $p = 0.016$	Tau-U = -0.500, $p = 0.224$	Tau-U = -0.500, $p = 0.227$	Tau-U = -0.500, $p = 0.233$	Tau-U = 1.00, $p = 0.016$

Note. Pre, Pre-treatment; Post, Post-treatment; FU1, follow-up 1 (1 week); FU2, follow-up 2 (4 weeks); FU3, follow-up 3, (8 weeks). Statistically significant results ($p > 0.05$) shown in bold

Table S5. Prosody – modulations of intensity and pitch during connected speech

Participant	Task	Phase	CoV Intensity (dB)	CoV pitch (ST)
LSVT01	Standardized sentences	Pre-Post	Tau-U = -0.20, $p = 0.032$	Tau-U = -0.36, $p < 0.001$
		Pre-FU1	Tau-U = -0.24, $p = 0.008$	Tau-U = -0.27, $p = 0.004$
		Pre-FU2	Tau-U = -0.16, $p = 0.083$	Tau-U = -0.33, $p < 0.001$
		Pre-FU3	Tau-U = -0.03, $p = 0.760$	Tau-U = -0.33, $p = 0.001$
	Personalized sentences	Pre-Post	Tau-U = -0.01, $p = 0.884$	Tau-U = 0.03, $p = 0.725$
		Pre-FU1	Tau-U = -0.16, $p = 0.083$	Tau-U = 0.05, $p = 0.593$
		Pre-FU2	Tau-U = 0.06, $p = 0.495$	Tau-U = -0.05, $p = 0.583$
		Pre-FU3	Tau-U = 0.15, $p = 0.133$	Tau-U = -0.08, $p = 0.448$
	Conversation	Pre-Post	Tau-U = -0.17, $p = 0.688$	Tau-U = 0.17, $p = 0.827$
		Pre-FU1	Tau-U = -0.17, $p = 0.681$	Tau-U = 0.06, $p = 0.967$
		Pre-FU2	Tau-U = 0.06, $p = 0.971$	Tau-U = 0.39, $p = 0.347$
		Pre-FU3	Tau-U = 0.33, $p = 0.469$	Tau-U = -0.17, $p = 0.693$
	Picture description	Pre-Post	Tau-U = 1.00, $p = 0.032$	Tau-U = 0.17, $p = 0.829$
		Pre-FU1	Tau-U = 0.89, $p = 0.032$	Tau-U = 0.06, $p = 0.973$
		Pre-FU2	Tau-U = 0.89, $p = 0.032$	Tau-U = 0.39, $p = 0.336$
		Pre-FU3	Tau-U = 0.00, $p = 1.000$	Tau-U = -0.17, $p = 0.688$
LSVT02	Standardized sentences	Pre-Post	Tau-U = -0.06, $p = 0.513$	Tau-U = 0.07, $p = 0.502$
		Pre-FU1	Tau-U = -0.17, $p = 0.089$	Tau-U = 0.12, $p = 0.216$
		Pre-FU2	Tau-U = 0.07, $p = 0.512$	Tau-U = 0.04, $p = 0.682$
		Pre-FU3	Tau-U = 0.03, $p = 0.748$	Tau-U = 0.20, $p = 0.035$
	Personalized sentences	Pre-Post	n.a.	n.a.
		Pre-FU1	n.a.	n.a.
		Pre-FU2	n.a.	n.a.
		Pre-FU3	n.a.	n.a.
	Conversation	Pre-Post	Tau-U = -0.17, $p = 0.695$	Tau-U = -0.5, $p = 0.323$
		Pre-FU1	Tau-U = -0.06, $p = 0.968$	Tau-U = -0.17, $p = 0.683$
		Pre-FU2	Tau-U = 0.17, $p = 0.759$	Tau-U = -0.17, $p = 0.687$
		Pre-FU3	Tau-U = -0.06, $p = 0.971$	Tau-U = 0.06, $p = 0.969$
	Picture description	Pre-Post	Tau-U = 0.17, $p = 0.759$	Tau-U = 0.17, $p = 0.760$
		Pre-FU1	Tau-U = 0.17, $p = 0.763$	Tau-U = 0.17, $p = 0.761$
		Pre-FU2	Tau-U = 0.17, $p = 0.763$	Tau-U = 0.28, $p = 0.537$
		Pre-FU3	Tau-U = 0.17, $p = 0.757$	Tau-U = 0.28, $p = 0.536$
LSVT03	Standardized sentences	Pre-Post	Tau-U = 0.16, $p = 0.087$	Tau-U = 0.21, $p = 0.026$
		Pre-FU1	Tau-U = 0.09, $p = 0.343$	Tau-U = 0.01, $p = 0.961$

Personalized sentences	Pre-FU2	Tau-U = 0.14, $p = 0.142$	Tau-U = -0.08, $p = 0.399$
	Pre-FU3	Tau-U = 0.08, $p = 0.370$	Tau-U = 0.14, $p = 0.129$
	Pre-Post	Tau-U = -0.21, $p = 0.009$	Tau-U = 0.08, $p = 0.368$
	Pre-FU1	Tau-U = -0.30, $p < 0.001$	Tau-U = -0.002, $p = 0.980$
	Pre-FU2	Tau-U = -0.26, $p = 0.001$	Tau-U = -0.04, $p = 0.622$
Conversation	Pre-FU3	Tau-U = -0.14, $p = 0.077$	Tau-U = 0.08, $p = 0.345$
	Pre-Post	Tau-U = 0.50, $p = 0.316$	Tau-U = 0.17, $p = 0.723$
	Pre-FU1	Tau-U = 0.50, $p = 0.218$	Tau-U = 0.56, $p = 0.143$
	Pre-FU2	Tau-U = 0.50, $p = 0.322$	Tau-U = 0.00, $p = 1.000$
	Pre-FU3	Tau-U = 0.50, $p = 0.221$	Tau-U = 0.22, $p = 0.572$
Picture description	Pre-Post	Tau-U = 0.28, $p = 0.546$	Tau-U = 0.39, $p = 0.353$
	Pre-FU1	Tau-U = 0.28, $p = 0.535$	Tau-U = 0.06, $p = 0.969$
	Pre-FU2	Tau-U = -0.17, $p = 0.685$	Tau-U = -0.17, $p = 0.687$
	Pre-FU3	Tau-U = 0.39, $p = 0.343$	Tau-U = 0.50, $p = 0.219$

Note. CoV, coefficient of variation; dB, decibels; ST, semitones; Pre, Pre-treatment; Post, Post-treatment; FU1, follow-up 1 (1 week); FU2, follow-up 2 (4 weeks); FU3, follow-up 3, (8 weeks); n.a., not available. Statistically significant results ($p > 0.05$) shown in bold.