Supplementary Information for

An EEG dataset for structured auditory sequence processing with Morse code sounds

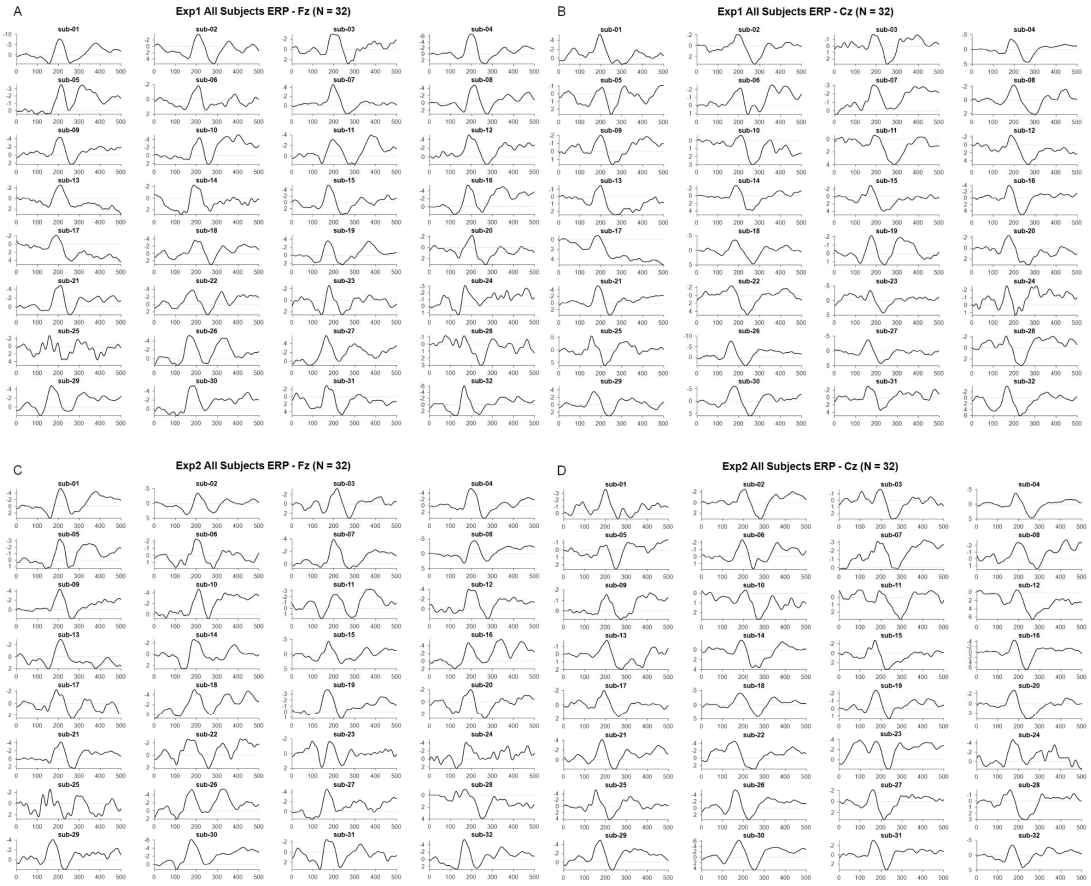
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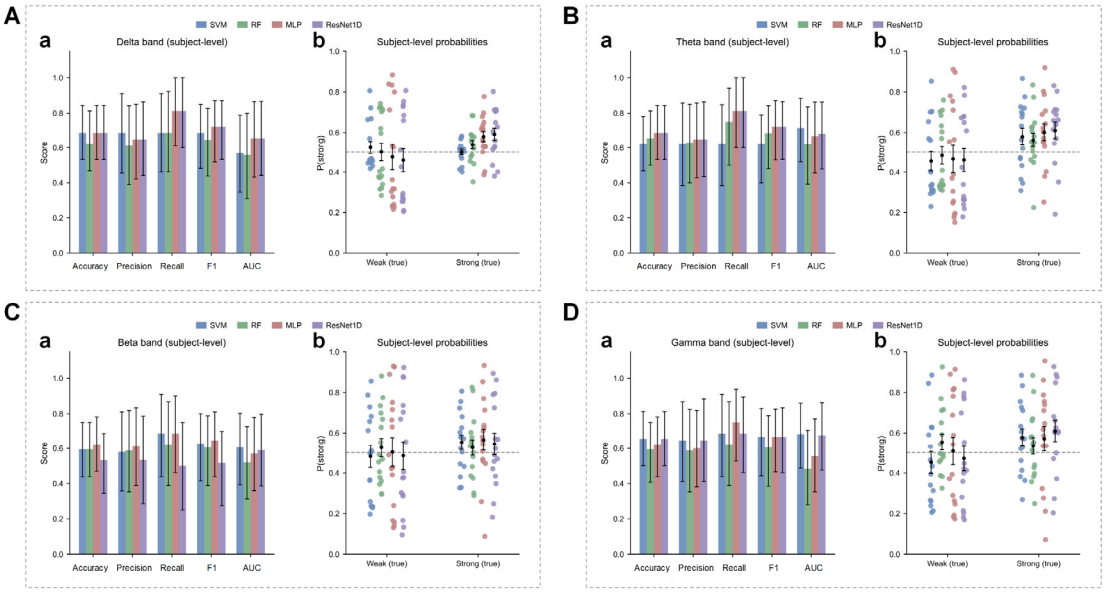
Supplementary Table 1. Participant- and block-level trial retention in the baseline-preprocessed EEG derivatives. Values indicate retained trials relative to the 156 formal trials available per participant and task, with 52 trials in each nominal CPM block; percentages are shown in parentheses.

Participant	Exp1 overall	Exp1 15 CPM	Exp1 30 CPM	Exp1 40 CPM	Exp2 overall	Exp2 15 CPM	Exp2 30 CPM	Exp2 40 CPM
sub-01	150/156 (96.15%)	49/52 (94.23%)	52/52 (100.00%)	49/52 (94.23%)	154/156 (98.72%)	52/52 (100.00%)	50/52 (96.15%)	52/52 (100.00%)
sub-02	125/156 (80.13%)	35/52 (67.31%)	44/52 (84.62%)	46/52 (88.46%)	152/156 (97.44%)	51/52 (98.08%)	50/52 (96.15%)	51/52 (98.08%)
sub-03	145/156 (92.95%)	44/52 (84.62%)	51/52 (98.08%)	50/52 (96.15%)	155/156 (99.36%)	51/52 (98.08%)	52/52 (100.00%)	52/52 (100.00%)
sub-04	156/156 (100.00%)	52/52 (100.00%)	52/52 (100.00%)	52/52 (100.00%)	156/156 (100.00%)	52/52 (100.00%)	52/52 (100.00%)	52/52 (100.00%)
sub-05	152/156 (97.44%)	51/52 (98.08%)	49/52 (94.23%)	52/52 (100.00%)	150/156 (96.15%)	50/52 (96.15%)	50/52 (96.15%)	50/52 (96.15%)
sub-06	120/156 (76.92%)	35/52 (67.31%)	35/52 (67.31%)	50/52 (96.15%)	154/156 (98.72%)	50/52 (96.15%)	52/52 (100.00%)	52/52 (100.00%)
sub-07	119/156 (76.28%)	21/52 (40.38%)	49/52 (94.23%)	49/52 (94.23%)	145/156 (92.95%)	44/52 (84.62%)	49/52 (94.23%)	52/52 (100.00%)
sub-08	123/156 (78.85%)	27/52 (51.92%)	49/52 (94.23%)	47/52 (90.38%)	141/156 (90.38%)	48/52 (92.31%)	47/52 (90.38%)	46/52 (88.46%)
sub-09	155/156 (99.36%)	51/52 (98.08%)	52/52 (100.00%)	52/52 (100.00%)	156/156 (100.00%)	52/52 (100.00%)	52/52 (100.00%)	52/52 (100.00%)
sub-10	147/156 (94.23%)	52/52 (100.00%)	52/52 (100.00%)	43/52 (82.69%)	154/156 (98.72%)	52/52 (100.00%)	50/52 (96.15%)	52/52 (100.00%)
sub-11	152/156 (97.44%)	48/52 (92.31%)	52/52 (100.00%)	52/52 (100.00%)	150/156 (96.15%)	50/52 (96.15%)	52/52 (100.00%)	48/52 (92.31%)
sub-12	52/156 (33.33%)	12/52 (23.08%)	17/52 (32.69%)	23/52 (44.23%)	84/156 (53.85%)	23/52 (44.23%)	28/52 (53.85%)	33/52 (63.46%)
sub-13	61/156 (39.10%)	13/52 (25.00%)	22/52 (42.31%)	26/52 (50.00%)	59/156 (37.82%)	10/52 (19.23%)	9/52 (17.31%)	40/52 (76.92%)
sub-14	133/156 (85.26%)	34/52 (65.38%)	50/52 (96.15%)	49/52 (94.23%)	124/156 (79.49%)	49/52 (94.23%)	37/52 (71.15%)	38/52 (73.08%)
sub-15	145/156 (92.95%)	46/52 (88.46%)	49/52 (94.23%)	50/52 (96.15%)	152/156 (97.44%)	50/52 (96.15%)	51/52 (98.08%)	51/52 (98.08%)
sub-16	125/156 (80.13%)	51/52 (98.08%)	43/52 (82.69%)	31/52 (59.62%)	122/156 (78.21%)	39/52 (75.00%)	42/52 (80.77%)	41/52 (78.85%)
sub-17	107/156 (68.59%)	39/52 (75.00%)	38/52 (73.08%)	30/52 (57.69%)	119/156 (76.28%)	45/52 (86.54%)	31/52 (59.62%)	43/52 (82.69%)
sub-18	155/156 (99.36%)	52/52 (100.00%)	51/52 (98.08%)	52/52 (100.00%)	148/156 (94.87%)	50/52 (96.15%)	46/52 (88.46%)	52/52 (100.00%)
sub-19	156/156 (100.00%)	52/52 (100.00%)	52/52 (100.00%)	52/52 (100.00%)	156/156 (100.00%)	52/52 (100.00%)	52/52 (100.00%)	52/52 (100.00%)
sub-20	141/156 (90.38%)	45/52 (86.54%)	46/52 (88.46%)	50/52 (96.15%)	142/156 (91.03%)	44/52 (84.62%)	48/52 (92.31%)	50/52 (96.15%)
sub-21	144/156 (92.31%)	49/52 (94.23%)	50/52 (96.15%)	45/52 (86.54%)	148/156 (94.87%)	51/52 (98.08%)	51/52 (98.08%)	46/52 (88.46%)
sub-22	77/156 (49.36%)	13/52 (25.00%)	24/52 (46.15%)	40/52 (76.92%)	96/156 (61.54%)	39/52 (75.00%)	33/52 (63.46%)	24/52 (46.15%)
sub-23	97/156 (62.18%)	33/52 (63.46%)	35/52 (67.31%)	29/52 (55.77%)	138/156 (88.46%)	49/52 (94.23%)	44/52 (84.62%)	45/52 (86.54%)
sub-24	44/156 (28.21%)	16/52 (30.77%)	17/52 (32.69%)	11/52 (21.15%)	12/156 (7.69%)	4/52 (7.69%)	5/52 (9.62%)	3/52 (5.77%)
sub-25	119/156 (76.28%)	35/52 (67.31%)	40/52 (76.92%)	44/52 (84.62%)	138/156 (88.46%)	50/52 (96.15%)	46/52 (88.46%)	42/52 (80.77%)
sub-26	130/156 (83.33%)	40/52 (76.92%)	48/52 (92.31%)	42/52 (80.77%)	148/156 (94.87%)	51/52 (98.08%)	49/52 (94.23%)	48/52 (92.31%)
sub-27	112/156 (71.79%)	22/52 (42.31%)	46/52 (88.46%)	44/52 (84.62%)	121/156 (77.56%)	33/52 (63.46%)	44/52 (84.62%)	44/52 (84.62%)
sub-28	107/156 (68.59%)	19/52 (36.54%)	42/52 (80.77%)	46/52 (88.46%)	143/156 (91.67%)	44/52 (84.62%)	51/52 (98.08%)	48/52 (92.31%)
sub-29	111/156 (71.15%)	28/52 (53.85%)	33/52 (63.46%)	50/52 (96.15%)	112/156 (71.79%)	37/52 (71.15%)	27/52 (51.92%)	48/52 (92.31%)
sub-30	76/156 (48.72%)	27/52 (51.92%)	35/52 (67.31%)	14/52 (26.92%)	134/156 (85.90%)	48/52 (92.31%)	38/52 (73.08%)	48/52 (92.31%)
sub-31	62/156 (39.74%)	16/52 (30.77%)	7/52 (13.46%)	39/52 (75.00%)	149/156 (95.51%)	46/52 (88.46%)	51/52 (98.08%)	52/52 (100.00%)

Participant	Exp1 overall	Exp1 15 CPM	Exp1 30 CPM	Exp1 40 CPM	Exp2 overall	Exp2 15 CPM	Exp2 30 CPM	Exp2 40 CPM
sub-32	33/156 (21.15%)	0/52 (0.00%)	0/52 (0.00%)	33/52 (63.46%)	113/156 (72.44%)	29/52 (55.77%)	45/52 (86.54%)	39/52 (75.00%)



Supplementary Fig. 1. Participant-level stimulus-marker-locked event-related EEG waveforms at Fz and Cz in Exp1 and Exp2. Individual participant waveforms at Fz and Cz are shown for Exp1 (dot-count task) and Exp2 (first–last matching task). A negative deflection at Fz around 200 ms after the software event marker and a subsequent positive deflection at Cz were observable to varying degrees across participants, broadly consistent with the temporal patterns in the grand-average responses (Fig. 5). Substantial inter-individual variability was evident in response amplitude and waveform morphology. All waveforms were time-locked to the E-Prime software event marker associated with initiation of playback of the complete Morse-code character. Because the latency between this marker and the physical acoustic onset at the loudspeaker was not independently measured, all reported latencies are referenced to the software event marker rather than to the physical acoustic onset.



Supplementary Fig. 2 Cross-participant classification of auditory discrimination across additional tested frequency bands using band-specific PSD features. Panels A–D correspond to the Delta, Theta, Beta, and Gamma bands, respectively. Within each frequency band, subpanel a shows subject-level classification performance of four classifiers (SVM, RF, MLP, and ResNet1D) evaluated with accuracy, precision, recall, F1 score, and AUC under leave-one-subject-out cross-validation. Error bars indicate 95% bootstrap confidence intervals across 32 participants. Subpanel b shows the distribution of subject-level P(strong) values averaged across trials and grouped by true labels (weak vs. strong discrimination). Colored dots represent individual participants. Black dots and error bars indicate group mean ± SEM. The dashed line marks the 0.5 classification threshold.