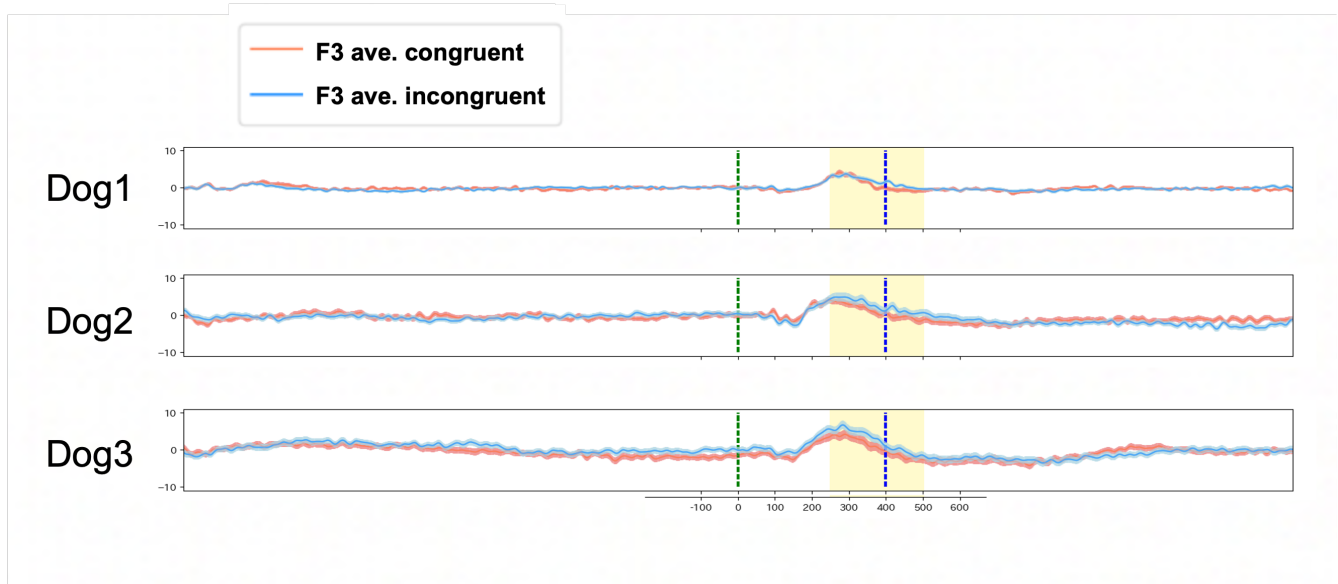




Supplementary Figure 1. Subject-level ERP waveforms at the F3 electrode for congruent and incongruent conditions in each dog. Red line: congruent condition; blue line: incongruent condition. The vocal stimulus occurred at 0 ms. The blue dashed line marks 400 ms after voice onset. The yellow shaded region highlights the analysis window corresponding to the P300 and N400 components (250–500 ms).

ERPtype	Channel	Mean_Mismatch	<i>t</i>	df	<i>p</i> (raw)	95% CI	Cohen's <i>d</i>
N100	F3	-0.949	0.484	2085.31	0.629	[-0.815, 1.348]	0.021
	F4	-1.329	-0.150	2092.00	0.881	[-1.106, 0.948]	-0.007
	Cz	-1.037	-1.789	2052.03	0.0737	[-1.188, 0.054]	-0.078
	T3	-0.934	0.283	2083.18	0.777	[-0.703, 0.940]	0.012
	T4	-0.671	-1.316	1952.35	0.188	[-1.660, 0.327]	-0.058
	P3	-1.616	-0.586	2055.29	0.558	[-0.843, 0.455]	-0.026
	P4	-0.373	0.184	2091.43	0.854	[-0.519, 0.627]	0.008
P200	F3	2.482	1.239	2088.65	0.216	[-0.414, 1.833]	0.054
	F4	1.530	1.744	2065.42	0.0812	[-0.110, 1.889]	0.076
	Cz	0.961	-0.054	2083.05	0.957	[-0.617, 0.584]	-0.002
	T3	0.691	0.969	2051.89	0.333	[-0.431, 1.272]	0.042
	T4	2.078	0.046	1965.78	0.963	[-0.944, 0.990]	0.002
	P3	-0.200	0.684	2080.35	0.494	[-0.409, 0.847]	0.030
	P4	0.962	1.462	2092.00	0.144	[-0.146, 0.999]	0.064
P300	F3	5.524	2.886	2090.97	0.00395**	[0.660, 3.461]	0.126
	F4	3.277	0.963	2085.34	0.336	[-0.662, 1.940]	0.042
	Cz	1.531	0.580	2068.66	0.562	[-0.500, 0.920]	0.025
	T3	0.077	-0.532	2085.96	0.595	[-1.235, 0.708]	-0.023
	T4	3.830	1.963	2090.49	0.0498*	[0.001, 2.336]	0.086
	P3	-0.100	0.426	2091.76	0.670	[-0.515, 0.800]	0.019
	P4	1.464	2.069	2070.23	0.0387*	[0.035, 1.310]	0.090
N400	F3	1.345	3.073	2077.65	0.00215**	[0.780, 3.530]	0.134
	F4	-0.240	1.395	2085.31	0.163	[-0.367, 2.179]	0.061
	Cz	0.004	1.506	2091.21	0.132	[-0.165, 1.257]	0.066
	T3	-1.257	0.083	2088.79	0.934	[-0.921, 1.002]	0.004
	T4	1.404	2.139	2091.92	0.0326*	[0.108, 2.504]	0.093
	P3	-0.674	1.021	2079.12	0.307	[-0.303, 0.962]	0.045
	P4	0.727	2.422	2018.37	0.0155*	[0.150, 1.432]	0.106

Supplementary Table 1. Detailed results of Welch's two-sample t-tests across all recorded electrodes. Two-tailed tests were used. Significant effects based on raw *p*-values are highlighted in bold, with significance levels indicated by asterisks (* $p < .05$, ** $p < .01$).

ERPtype	Channel	Condition	Congruency	EMM	95% CI
N100	Cz	angry_face_angry_voice	Congruent	-0.795	[-1.430, -0.160]
		happy_face_happy_voice	Congruent	-0.165	[-0.781, 0.452]
		happy_face_angry_voice	Incongruent	-1.031	[-1.647, -0.416]
		angry_face_happy_voice	Incongruent	-1.043	[-1.664, -0.422]
P200	F3	angry_face_angry_voice	Congruent	1.479	[0.332, 2.627]
		happy_face_happy_voice	Congruent	2.048	[0.935, 3.162]
		happy_face_angry_voice	Incongruent	2.185	[1.073, 3.298]
		angry_face_happy_voice	Incongruent	2.783	[1.661, 3.905]
P200	F4	angry_face_angry_voice	Congruent	0.723	[-0.295, 1.742]
		happy_face_happy_voice	Congruent	0.562	[-0.426, 1.550]
		happy_face_angry_voice	Incongruent	0.766	[-0.221, 1.753]
		angry_face_happy_voice	Incongruent	2.306	[1.311, 3.302]
P300	F3	angry_face_angry_voice	Congruent	4.072	[2.643, 5.502]
		happy_face_happy_voice	Congruent	2.889	[1.502, 4.276]
		happy_face_angry_voice	Incongruent	4.896	[3.510, 6.281]
		angry_face_happy_voice	Incongruent	6.163	[4.766, 7.561]
N400	F3	angry_face_angry_voice	Congruent	-0.274	[-1.676, 1.128]
		happy_face_happy_voice	Congruent	-1.315	[-2.675, 0.046]
		happy_face_angry_voice	Incongruent	0.913	[-0.446, 2.273]
		angry_face_happy_voice	Incongruent	1.784	[0.413, 3.155]
N400	F4	angry_face_angry_voice	Congruent	-0.051	[-2.683, 2.581]
		happy_face_happy_voice	Congruent	-1.843	[-4.458, 0.771]
		happy_face_angry_voice	Incongruent	-0.427	[-3.041, 2.187]
		angry_face_happy_voice	Incongruent	0.293	[-2.327, 2.912]

Supplementary Table 2. Estimated marginal means (EMMs) and 95% confidence intervals (CIs) for the four Face $\times$ Voice combinations in each electrode–component combination showing a significant Face $\times$ Voice interaction in the linear mixed-effects model analyses.

ERPtype	DogID	Condition	Mean	SE	95% CI low	95% CI high	N
N100	Dog1	angry_face_angry_voice	-0.592	0.675	-1.932	0.747	99
		happy_face_happy_voice	-0.966	0.609	-2.173	0.241	102
		happy_face_angry_voice	-0.103	0.784	-1.658	1.451	101
		angry_face_happy_voice	-0.428	0.435	-1.292	0.436	98
	Dog2	angry_face_angry_voice	-2.060	0.759	-3.557	-0.562	197
		happy_face_happy_voice	2.437	0.716	1.026	3.847	211
		happy_face_angry_voice	-0.490	0.680	-1.830	0.850	207
		angry_face_happy_voice	-1.880	0.808	-3.473	-0.287	211
	Dog3	angry_face_angry_voice	-4.522	0.993	-6.479	-2.565	206
		happy_face_happy_voice	-1.265	1.034	-3.304	0.773	220
		happy_face_angry_voice	-2.425	0.950	-4.297	-0.553	226
		angry_face_happy_voice	0.431	1.297	-2.125	2.988	216
P200	Dog1	angry_face_angry_voice	1.097	0.682	-0.257	2.452	99
		happy_face_happy_voice	0.046	0.522	-0.990	1.081	102
		happy_face_angry_voice	1.065	0.615	-0.155	2.284	101
		angry_face_happy_voice	0.298	0.532	-0.759	1.354	98
	Dog2	angry_face_angry_voice	1.489	0.886	-0.259	3.237	197
		happy_face_happy_voice	3.318	0.738	1.863	4.774	211
		happy_face_angry_voice	1.707	0.797	0.136	3.278	207
		angry_face_happy_voice	1.223	0.965	-0.679	3.126	211
	Dog3	angry_face_angry_voice	1.653	1.074	-0.464	3.770	206
		happy_face_happy_voice	1.759	1.071	-0.353	3.870	220
		happy_face_angry_voice	3.124	1.012	1.131	5.118	226
		angry_face_happy_voice	5.435	1.168	3.132	7.738	216
P300	Dog1	angry_face_angry_voice	3.270	0.993	1.300	5.241	99
		happy_face_happy_voice	1.677	0.640	0.408	2.946	102
		happy_face_angry_voice	3.296	0.684	1.938	4.654	101
		angry_face_happy_voice	2.582	0.690	1.212	3.952	98
	Dog2	angry_face_angry_voice	2.205	0.745	0.736	3.674	197
		happy_face_happy_voice	3.914	1.002	1.939	5.889	211
		happy_face_angry_voice	3.840	1.008	1.853	5.828	207
		angry_face_happy_voice	4.974	1.297	2.417	7.530	211
	Dog3	angry_face_angry_voice	6.243	1.361	3.560	8.927	206
		happy_face_happy_voice	2.469	1.465	-0.418	5.355	220
		happy_face_angry_voice	6.577	1.293	4.030	9.124	226
		angry_face_happy_voice	8.950	1.300	6.388	11.512	216
N400	Dog1	angry_face_angry_voice	0.235	0.842	-1.435	1.906	99
		happy_face_happy_voice	-1.030	0.623	-2.265	0.205	102
		happy_face_angry_voice	1.196	0.612	-0.017	2.410	101
		angry_face_happy_voice	0.674	0.555	-0.427	1.776	98
	Dog2	angry_face_angry_voice	-1.883	0.768	-3.397	-0.368	197
		happy_face_happy_voice	1.844	1.152	-0.427	4.114	211
		happy_face_angry_voice	1.887	0.952	0.010	3.764	207
		angry_face_happy_voice	1.899	1.083	-0.237	4.035	211
	Dog3	angry_face_angry_voice	1.019	1.488	-1.916	3.955	206
		happy_face_happy_voice	-4.476	1.370	-7.177	-1.775	220
		happy_face_angry_voice	-0.105	1.232	-2.533	2.323	226
		angry_face_happy_voice	2.175	1.316	-0.418	4.769	216

Supplementary Table 3. Subject-level descriptive mean ERP amplitudes for each of the four Face $\times$ Voice combinations. Values are presented as means with 95% confidence intervals for each dog.

ERPtype	DogID	Condition	Mean	SD	SE	95% CI low	95% CI high	N
N100	AllDogs	angry_face_angry_voice	-2.781	11.777	0.526	-3.813	-1.748	502
		happy_face_happy_voice	0.257	12.240	0.530	-0.784	1.299	533
		happy_face_angry_voice	-1.236	11.652	0.504	-2.226	-0.245	534
		angry_face_happy_voice	-0.658	14.451	0.631	-1.897	0.581	525
P200	AllDogs	angry_face_angry_voice	1.479	12.914	0.576	0.347	2.612	502
		happy_face_happy_voice	2.048	12.491	0.541	0.985	3.111	533
		happy_face_angry_voice	2.185	12.503	0.541	1.123	3.248	534
		angry_face_happy_voice	2.783	14.489	0.632	1.541	4.026	525
P300	AllDogs	angry_face_angry_voice	4.072	14.880	0.664	2.768	5.377	502
		happy_face_happy_voice	2.889	16.928	0.733	1.449	4.330	533
		happy_face_angry_voice	4.896	15.865	0.687	3.547	6.244	534
		angry_face_happy_voice	6.163	17.515	0.764	4.662	7.665	525
N400	AllDogs	angry_face_angry_voice	-0.274	15.741	0.703	-1.654	1.106	502
		happy_face_happy_voice	-1.315	17.209	0.745	-2.779	0.150	533
		happy_face_angry_voice	0.913	15.007	0.649	-0.362	2.189	534
		angry_face_happy_voice	1.784	16.081	0.702	0.405	3.163	525

Supplementary Table 4. Pooled descriptive mean ERP amplitudes across the three dogs at the F3 electrode for each of the four Face $\times$ Voice combinations. Values are presented as means with 95% confidence intervals across all analyzed trials.