

Supplemental information

Table S1: Demographic data of dog subjects.

subject ID	age (years)	sex	breed
1	4.5	female	cocker spaniel
2	9.4	male	golden retriever
3	4.1	female	mix
4	8.5	male	wirehaired dachshund
5	10.8	male	mix
6	4.2	female	mix
7	8.6	hermaphrodite	Hungarian greyhound
8	8.8	female	pointer
9	4.2	male	mix
10	10.1	male	German shepherd
11	2.3	female	wirehaired vizsla
12	4.7	female	wirehaired vizsla
13	10.7	female	wirehaired vizsla
14	10.5	female	white Swiss shepherd
15	11.7	female	mix
16	11.0	male	mix
17	8.3	female	akita inu
18	12.8	male	cocker spaniel
19	6.0	male	rottweiler
20	3.5	male	labrador retriever
21	3.3	female	labrador retriever

Note: The dogs that showed a significant entrainment to the base frequency in the condition average are highlighted with green.

Table S2: Demographic data of human subjects.

subject ID	age (years)	sex	ownership
1	33.1	female	past
2	52.1	male	now
3	43.1	male	now
4	60.9	female	now
5	34.6	male	past
6	41.8	male	past
7	55.4	female	never
8	29.0	female	now

10	36.7	male	now
11	27.2	male	never
12	49.0	male	never
13	31.0	female	now
14	52.0	female	never
15	49.3	male	never
16	47.9	female	past
17	37.2	male	never
18	55.7	male	now
19	39.2	female	past
20	61.2	female	past
21	45.3	male	never
22	61.6	male	now
23	26.2	female	past

Note: The human subjects that showed a significant entrainment to the base frequency in the condition average are highlighted with green. Meaning of the ownership variables: now: currently have a dog; past: have had a dog in the past; never: never owned a dog.

Table S3: Base frequency responses in dogs for the different conditions.

A: Dog regular condition

frequency	Z-score - Fz	p-value - Fz	Z-score - FCz	p-value - FCz	Z-score - Cz	p-value - Cz
4 Hz	81.63	<0.001	77.19	<0.001	44.59	<0.001
8 Hz	12.40	<0.001	15.14	<0.001	35.12	<0.001

B: Dog random condition

frequency	Z-score - Fz	p-value - Fz	Z-score - FCz	p-value - FCz	Z-score - Cz	p-value - Cz
4 Hz	49.78	<0.001	26.14	<0.001	27.22	<0.001
8 Hz	4.49	<0.001	3.92	<0.001	21.56	<0.001

C: Human regular condition

frequency	Z-score - Fz	p-value - Fz	Z-score - FCz	p-value - FCz	Z-score - Cz	p-value - Cz
4 Hz	71.76	<0.001	51.60	<0.001	50.15	<0.001
8 Hz	13.97	<0.001	14.80	<0.001	52.11	<0.001

D: Human regular condition

frequency	Z-score - Fz	p-value - Fz	Z-score - FCz	p-value - FCz	Z-score - Cz	p-value - Cz
4 Hz	44.24	<0.001	51.24	<0.001	41.21	<0.001
8 Hz	5.04	<0.001	4.98	<0.001	14.95	<0.001

Table S4: The results of the likelihood ratio test at each channel comparing the linear mixed-effect models in dogs.

Channel	Condition model χ^2_1	Condition model p-value	Condition-species interaction model χ^2_1	Condition-species interaction model p-value
A1	0	0.999	1.61	0.204
Cz	1.45	0.229	0.49	0.484
F7	2.29	0.13	0.36	0.547
F8	0.15	0.697	1.91	0.167
FCz	0.25	0.617	0.97	0.324
Fz	0.47	0.492	4.47	0.035

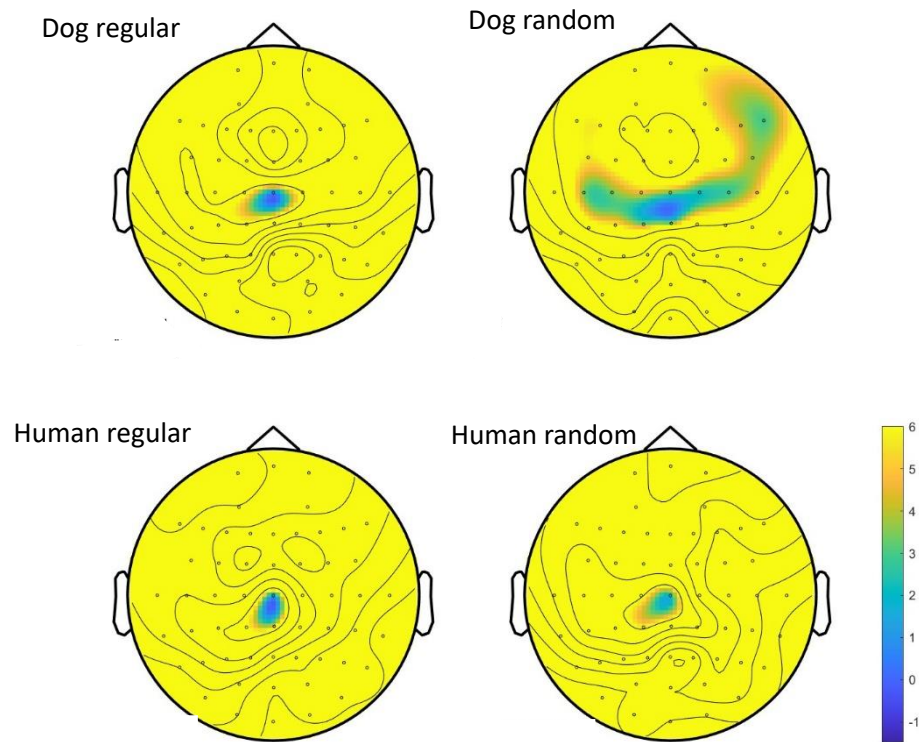


Figure S1. Topographic scalp maps for base frequency responses in humans for each condition. The scale of the plots represents Z-score values for power increase at the base frequency (4 Hz) relative to the surrounding 20 frequency bins, which were considered to be significant above 2.30 ($p < 0.011$, one-tailed, signal > noise).

Table S5: The results of the likelihood ratio test at each channel comparing
the linear mixed-effect models in humans.

Channel	Condition model χ^2_1	Condition model p-value	Condition-species interaction model χ^2_1	Condition-species interaction model p-value
AF3	1.87	0.172	1.86	0.173
AF4	2.48	0.115	2.37	0.124
C1	7.15	0.007	1.62	0.203
C2	4.43	0.035	0.17	0.684
C3	6.93	0.008	2.2	0.138
C4	7.28	0.007	0.56	0.456
C5	5.06	0.024	1.32	0.25
C6	10.52	0.001	0.09	0.77
Cb1	16.64	<0.001	3.07	0.08
Cb2	34.89	<0.001	5.9	0.015
CP1	5.93	0.015	1.71	0.191
CP2	13.56	<0.001	0.03	0.854
CP3	7.47	0.006	2.91	0.088
CP4	9.57	0.002	0.47	0.492
CP5	11.13	0.001	3.53	0.06
CP6	23.3	<0.001	3.61	0.058
CPz	1.47	0.226	0.85	0.356
Cz	5.51	0.019	1.54	0.214
F1	6.26	0.012	6.34	0.012
F11	3.75	0.053	8.88	0.003
F12	8.56	0.003	0.06	0.809
F2	9.09	0.003	3.29	0.07
F3	7.3	0.007	7.86	0.005
F4	9.37	0.002	2.46	0.117
F5	7.84	0.005	8.01	0.005
F6	6.14	0.013	0.01	0.924
F7	4.84	0.028	6.33	0.012
F8	1.89	0.169	0.54	0.464
FC1	13.13	<0.001	2.72	0.099
FC2	8.28	0.004	2.92	0.088
FC3	10.66	0.001	3.58	0.059
FC4	3.85	0.05	1.96	0.162
FC5	9.61	0.002	6.55	0.01
FC6	6.65	0.01	0.12	0.726
FCz	13.51	<0.001	3.44	0.064
Fp1	1.68	0.195	1.82	0.177
Fp2	0.19	0.664	1.63	0.202
Fpz	0.45	0.5	0.87	0.35

FT11	5.84	0.016	9.15	0.002
FT12	10.42	0.001	0.04	0.846
Fz	7.57	0.006	3.86	0.049
M1	19.84	<0.001	7.19	0.007
M2	24.99	<0.001	3.93	0.047
O1	28.57	<0.001	6.8	0.009
O2	30.17	<0.001	10.33	0.001
Oz	33.06	<0.001	7.83	0.005
P1	22.52	<0.001	4.62	0.032
P2	35.36	<0.001	6.66	0.01
P3	19.92	<0.001	8.6	0.003
P4	33	<0.001	5.09	0.024
P5	22.31	<0.001	5.78	0.016
P6	32.63	<0.001	4.67	0.031
P7	24.49	<0.001	5.38	0.02
P8	31.61	<0.001	5.63	0.018
PO3	25.19	<0.001	6.9	0.009
PO4	31.03	<0.001	9.1	0.003
PO7	23.05	<0.001	6.05	0.014
PO8	29.18	<0.001	7.14	0.008
POz	18	<0.001	11.06	0.001
Pz	23.47	<0.001	5.05	0.025
T7	9.82	0.002	2.18	0.14
T8	13.92	<0.001	1.44	0.23
TP7	19.24	<0.001	2.43	0.119
TP8	19.16	<0.001	1.5	0.221

Table S6: Summary of the condition-species interaction model for those channels where the response was better modeled by including the interaction to the model based on the LRT, see Table S5.

Channel	(Intercept)	Species effect p-value	Condition effect p-value	Condition-species interaction p-value
Cb2	0	0.001	0.001	0.018
F1	0	0.016	0.947	0.015
F11	0	0.001	0.523	0.004
F3	0	0.006	0.974	0.007
F5	0	0.001	0.895	0.006
F7	0	0.005	0.903	0.014
FC5	0	0.002	0.592	0.013
FT11	0	0.001	0.76	0.004
Fz	0	0.099	0.539	0.057
M1	0	<0.001	0.092	0.009

M2	0	<0.001	0.011	0.054
O1	0	<0.001	0.005	0.011
O2	0	<0.001	0.014	0.002
Oz	0	<0.001	0.002	0.007
P1	0	0.002	0.025	0.037
P2	0	0.009	0.002	0.012
P3	0	<0.001	0.137	0.005
P4	0	0.011	0.002	0.028
P5	0	0.001	0.038	0.019
P6	0	0.015	0.002	0.036
P7	0	0.001	0.019	0.024
P8	0	0.007	0.004	0.021
PO3	0	<0.001	0.014	0.011
PO4	0	0.001	0.01	0.003
PO7	0	<0.001	0.019	0.017
PO8	0	0.003	0.01	0.009
POz	0	<0.001	0.236	0.001
Pz	0	0.038	0.027	0.029

Table S7: Results of the post-hoc test for the condition-species interaction model.

A: The results for the **human regular vs human random** comparison.

Channel	β	SE	df	t-value	p-value
Cb2	0.19	0.03	60	6.91	< 0.001
Oz	0.17	0.02	60	7.18	< 0.001
P2	0.11	0.02	60	6.89	< 0.001
P4	0.12	0.02	60	6.4	< 0.001
P6	0.14	0.02	60	6.27	< 0.001
P8	0.14	0.02	60	6.38	< 0.001
O1	0.14	0.02	60	6.61	< 0.001
PO4	0.15	0.02	60	6.97	< 0.001
PO8	0.15	0.02	60	6.44	< 0.001
O2	0.17	0.02	60	7.16	< 0.001
PO3	0.1	0.02	60	6.25	< 0.001
P7	0.17	0.03	60	5.69	< 0.001
PO7	0.12	0.02	60	5.9	< 0.001
P1	0.09	0.02	60	5.31	< 0.001
Pz	0.11	0.02	60	5.43	< 0.001
P5	0.14	0.03	60	5.52	< 0.001
M1	0.18	0.03	60	5.52	< 0.001
P3	0.12	0.02	60	5.66	< 0.001
POz	0.11	0.02	60	6	< 0.001

F11	0.14	0.04	60	3.62	0.001
FC5	0.06	0.01	60	4.14	< 0.001
FT11	0.17	0.04	60	3.99	< 0.001
F5	0.1	0.02	60	4.13	< 0.001
F7	0.1	0.03	60	3.44	0.001
F1	0.06	0.02	60	3.61	0.001
F3	0.07	0.02	60	4	< 0.001

B: The results for the **dog regular vs dog random** comparison.

Channel	β	SE	df	t-value	p-value
Cb2	0.09	0.03	60	3.47	0.001
Oz	0.07	0.02	60	3.2	0.002
P2	0.05	0.02	60	3.24	0.002
P4	0.06	0.02	60	3.22	0.002
P6	0.07	0.02	60	3.23	0.002
P8	0.07	0.02	60	3.03	0.004
O1	0.06	0.02	60	2.91	0.005
PO4	0.06	0.02	60	2.65	0.01
PO8	0.06	0.02	60	2.65	0.01
O2	0.06	0.02	60	2.54	0.014
PO3	0.04	0.02	60	2.52	0.014
P7	0.07	0.03	60	2.42	0.019
PO7	0.05	0.02	60	2.42	0.019
P1	0.04	0.02	60	2.29	0.025
Pz	0.05	0.02	60	2.27	0.027
P5	0.05	0.03	60	2.12	0.038
M1	0.06	0.03	60	1.71	0.092
P3	0.03	0.02	60	1.51	0.137
POz	0.02	0.02	60	1.2	0.236
F11	-0.02	0.04	60	-0.64	0.523
FC5	0.01	0.01	60	0.54	0.592
FT11	-0.01	0.04	60	-0.31	0.76
F5	0	0.02	60	0.13	0.895
F7	0	0.03	60	-0.12	0.903
F1	0	0.02	60	0.07	0.947
F3	0	0.02	60	0.03	0.974

C: The results for the **dog regular vs human regular** comparison.

Channel	β	SE	df	t-value	p-value
Cb2	-0.1	0.03	60	-3.6	0.001
Oz	-0.1	0.02	60	-4.25	< 0.001

P2	-0.04	0.02	60	-2.68	0.009
P4	-0.05	0.02	60	-2.61	0.011
P6	-0.05	0.02	60	-2.5	0.015
P8	-0.06	0.02	60	-2.78	0.007
O1	-0.09	0.02	60	-4.36	< 0.001
PO4	-0.07	0.02	60	-3.47	0.001
PO8	-0.07	0.02	60	-3.11	0.003
O2	-0.09	0.02	60	-4.02	< 0.001
PO3	-0.07	0.02	60	-4.25	< 0.001
P7	-0.1	0.03	60	-3.37	0.001
PO7	-0.08	0.02	60	-4.22	< 0.001
P1	-0.05	0.02	60	-3.21	0.002
Pz	-0.04	0.02	60	-2.12	0.038
P5	-0.09	0.03	60	-3.52	0.001
M1	-0.12	0.03	60	-3.79	< 0.001
P3	-0.09	0.02	60	-4	< 0.001
POz	-0.08	0.02	60	-4.23	< 0.001
F11	-0.13	0.04	60	-3.39	0.001
FC5	-0.05	0.01	60	-3.19	0.002
FT11	-0.15	0.04	60	-3.67	0.001
F5	-0.08	0.02	60	-3.59	0.001
F7	-0.09	0.03	60	-2.92	0.005
F1	-0.04	0.02	60	-2.48	0.016
F3	-0.05	0.02	60	-2.86	0.006

D: The results for the **dog random vs human random** comparison.

Channel	β	SE	df	t-value	p-value
Cb2	0	0.03	60	-0.17	0.864
Oz	-0.01	0.02	60	-0.26	0.794
P2	0.02	0.02	60	0.97	0.334
P4	0.01	0.02	60	0.56	0.575
P6	0.01	0.02	60	0.54	0.593
P8	0.01	0.02	60	0.57	0.569
O1	-0.01	0.02	60	-0.66	0.511
PO4	0.02	0.02	60	0.84	0.402
PO8	0.02	0.02	60	0.68	0.498
O2	0.01	0.02	60	0.61	0.547
PO3	-0.01	0.02	60	-0.52	0.604
P7	0	0.03	60	-0.1	0.922
PO7	-0.01	0.02	60	-0.74	0.462
P1	0	0.02	60	-0.19	0.85
Pz	0.02	0.02	60	1.04	0.302

P5	0	0.03	60	-0.13	0.899
M1	0	0.03	60	0.02	0.982
P3	0	0.02	60	0.15	0.88
POz	0.01	0.02	60	0.57	0.571
F11	0.03	0.04	60	0.87	0.387
FC5	0.01	0.01	60	0.41	0.681
FT11	0.03	0.04	60	0.63	0.532
F5	0.01	0.02	60	0.41	0.681
F7	0.02	0.03	60	0.64	0.522
F1	0.02	0.02	60	1.06	0.293
F3	0.02	0.02	60	1.11	0.273

Table S8: Summary of the condition model for those channels where main condition effect was found, but no condition by species interaction, see Table S5.

Channel	β	SE	df	t-value	p-value
C1	-0.01	0	62	-2.7	0.009
C2	0	0	62	-2.12	0.038
C3	-0.01	0	62	-2.67	0.01
C4	0	0	62	-2.72	0.008
C5	-0.02	0.01	62	-2.27	0.027
C6	-0.02	0.01	62	-3.31	0.002
Cb1	-0.08	0.02	62	-4.31	< 0.001
CP1	-0.01	0	62	-2.46	0.017
CP2	-0.03	0.01	62	-3.84	< 0.001
CP3	-0.01	0	62	-2.78	0.007
CP4	-0.02	0.01	62	-3.17	0.002
CP5	-0.04	0.01	62	-3.45	0.001
CP6	-0.07	0.01	62	-5.25	< 0.001
Cz	-0.01	0	62	-2.36	0.022
F12	-0.08	0.03	62	-2.97	0.004
F2	-0.04	0.01	62	-3.06	0.003
F4	-0.04	0.01	62	-3.14	0.003
F6	-0.05	0.02	62	-2.51	0.015
FC1	-0.04	0.01	62	-3.72	< 0.001
FC2	-0.03	0.01	62	-2.92	0.005
FC3	-0.03	0.01	62	-3.33	0.001
FC6	-0.03	0.01	62	-2.6	0.012
FCz	-0.04	0.01	62	-3.8	< 0.001
FT12	-0.09	0.03	62	-3.29	0.002
M2	-0.07	0.03	60	-2.62	0.011

T7	-0.05	0.01	62	-3.22	0.002
T8	-0.05	0.01	62	-3.85	< 0.001
TP7	-0.09	0.02	62	-4.69	< 0.001
TP8	-0.08	0.02	62	-4.66	< 0.001

Table S9: The results of the likelihood ratio test at each channel comparing the condition and condition-ownership interaction models.

Channel	Condition model χ^2_1	Condition model p-value	Condition-ownership interaction model χ^2_1	Condition-ownership interaction model p-value
C6	7.21	0.007	8.89	0.012
Cb1	5.95	0.015	0.14	0.931
Cb2	10.87	0.001	0.58	0.747
CP1	0.52	0.47	3	0.223
CP2	10.22	0.001	1.65	0.439
CP4	9.53	0.002	1.9	0.388
CP6	7.7	0.006	1.24	0.537
F12	5.18	0.023	0.93	0.629
FC2	1.19	0.275	4.57	0.102
FCz	2.28	0.131	3.31	0.191
FT12	4.76	0.029	0.28	0.867
O1	8.52	0.004	0.59	0.744
O2	10.5	0.001	0.73	0.694
Oz	9.12	0.003	0.59	0.743
P1	4.82	0.028	6.63	0.036
P2	15.02	< 0.001	2.17	0.338
P4	14.2	< 0.001	1.82	0.403
P5	4.33	0.037	2.93	0.231
P6	12.46	< 0.001	1.41	0.495
P7	5	0.025	3.35	0.187
P8	12.4	< 0.001	1.57	0.456
PO3	6.3	0.012	0.51	0.776
PO4	11.93	0.001	1.43	0.488
PO7	6.12	0.013	1.1	0.578
PO8	12.93	< 0.001	0.45	0.798
Pz	5.99	0.014	6.39	0.041
T8	5.42	0.02	1.81	0.405
TP7	5.38	0.02	1.02	0.602
TP8	8.92	0.003	1.18	0.556

Table S10: Summary of the condition-ownership interaction model for those channels where the response was better modeled by including the interaction to the model based on the LRT, see Table S9.

Channel	(Intercept)	Ownership-past effect p-value	Ownership-never effect p-value	Condition effect p-value	Ownership-past condition-random interaction p-value	Ownership never condition-random interaction p-value
C6	0	0.185	0.006	0.74	0.171	0.009
P1	0	0.271	0.08	0.631	0.858	0.055
Pz	0	0.231	0.135	0.268	0.429	0.131