

CONTRIBUTION OF HEAD SHADOW AND PINNA CUES TO CHRONIC MONAURAL SOUND LOCALIZATION

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Localization capabilities of the unilateral deaf in the *intensity* paradigm were poor, as becomes evident from the poor correlation between stimulus and response azimuth (r^2 less than 0.3), the low response gains, b , and the high biases, a , in the linear regression analysis, and the large mean unsigned errors, E , typically above 30 deg (Table II).

To quantify the relative contributions of actual target azimuth and either perceived stimulus level (for monaural patients) or absolute free-field intensity (for binaural subjects), a standardized multiple linear regression analysis was performed (Table III).

To quantify the influence of the target elevation, target azimuth, and perceived intensity for all unilaterally deaf patients and binaural control subjects, we performed multiple regression on the elevation response data (*Eqn. 5*). The results are summarized in Table IV.

TABLE II.

Parameters from linear fits of the response azimuths according to *Eqn. 1*. Stimuli are from the *intensity*-paradigm with levels ranging from 30 to 60 dBA SPL (all pooled). Column 1: monaural patient or binaural subject. Columns 2-3: fit parameters and estimated error: $b(\alpha_T)$ is target azimuth gain, a

is azimuth bias. Column 4: R^2 -between the fitted responses and the actual data. Column 5: number of responses. Column 6: mean unsigned error and standard deviation.

TABLE II: Results of linear regression on azimuth responses.

Monaural	$b(\alpha_T)$	a	R^2	N	E
BN	0.67±0.06	20.44±2.31	0.20	364	39.1±28.7
CD	0.35±0.04	13.35±1.02	0.25	374	20.8±23.2
GK	0.77±0.07	0.09±2.11	0.28	348	31.0±24.6
IE	0.34±0.09	4.48±2.73	0.06	234	35.8±27.8
JP	0.42±0.07	21.11±2.24	0.10	304	39.5±28.2
LD	0.64±0.07	10.98±2.01	0.22	393	30.8±29.0
PO	0.42±0.10	-4.96±3.41	0.04	263	53.8±30.5
RH	0.33±0.04	7.59±0.97	0.30	374	19.6±15.2
SB	0.23±0.04	29.73±1.33	0.09	363	31.9±30.4
Binaural	$b(\alpha_T)$	a	R^2	N	E
HV	1.21±0.02	2.14±0.49	0.94	399	9.8±7.3
JV	1.09±0.01	-0.54±0.41	0.95	399	6.2±5.8
MW	1.01±0.01	7.70±0.24	0.98	399	7.8±3.9
MT	1.23±0.02	-1.49±0.61	0.91	392	11.0±9.4
SW	1.10±0.02	-4.37±0.57	0.91	359	8.9±8.0
TE	1.12±0.02	1.88±0.51	0.93	394	8.4±7.0

TABLE III.

Parameters from multiple linear regression on the response azimuths according to *Eqn. 3*. Stimuli are from the *intensity*-paradigm with levels ranging from 30 to 60 dBA SPL (all pooled). Column 1: monaural patient or binaural subject. Columns 2-3: model parameters and estimated error (determined by bootstrapping): $k(\alpha_T)$ is target azimuth gain, $m(I_f)$ is free-field intensity gain (for binaural subjects), $m(I_p)$ is perceived intensity gain (for monaural patients). Column 4: R^2 between fit and actual data. Column 5: number of responses.

TABLE III: Results of multiple linear regression on azimuth responses.

Monaural	$k(\alpha_T)$	$m(I_p)$	R^2	N
BN	0.11±0.04	0.75±0.03	0.65	364
CD	0.37±0.06	0.30±0.05	0.32	374
GK	0.16±0.05	0.73±0.04	0.68	348
IE	-0.09±0.04	0.88±0.03	0.72	234
JP	-0.04±0.05	0.79±0.05	0.59	304
LD	0.20±0.06	0.57±0.04	0.48	393
PO	-0.18±0.05	0.72±0.06	0.66	263
RH	0.28±0.05	0.61±0.05	0.60	374
SB	0.15±0.05	0.35±0.06	0.19	363
Binaural	$k(\alpha_T)$	$m(I_f)$	R^2	N
HV	0.97±0.01	0.01±0.01	0.94	399
JV	0.98±0.01	0.00±0.01	0.95	399
MW	0.99±0.01	-0.01±0.01	0.98	399
MT	0.96±0.01	0.01±0.02	0.92	392
SW	0.96±0.02	0.00±0.01	0.91	359
TE	0.97±0.02	-0.03±0.01	0.93	394

TABLE IV.

Parameters from fits of the response elevations with *Eqn. 5*. Stimuli are from the *intensity*-paradigm with levels ranging from 30 to 60 dBA SPL (all pooled). See Table III for details, parameters are $n(\epsilon_T)$, elevation gain, $o(\alpha_T)$, azimuth gain and $q(I_{pf})$, intensity gain.

TABLE IV: Results of multiple linear regression on elevation responses.

Monaural	$n(\epsilon_T)$	$o(\alpha_T)$	$q(I_p)$	R^2	N
GK	0.56±0.05	-0.06±0.05	0.03±0.04	0.26	348
RH	0.83±0.05	0.06±0.06	0.05±0.06	0.69	374
SB	0.54±0.05	0.00±0.04	0.06±0.04	0.29	363
BN	0.40±0.05	-0.32±0.06	0.14±0.05	0.23	364
CD	0.67±0.05	-0.05±0.05	0.10±0.04	0.44	374
IE	0.56±0.05	0.27±0.06	-0.10±0.05	0.36	234
JP	0.20±0.05	-0.19±0.05	0.58±0.05	0.30	304
LD	0.71±0.04	0.16±0.03	0.20±0.03	0.57	393
PO	0.08±0.06	-0.14±0.07	0.34±0.06	0.09	263
Binaural	$n(\epsilon_T)$	$o(\alpha_T)$	$q(I_f)$	R^2	N
HV	0.93±0.02	-0.07±0.01	0.02±0.02	0.89	399

JV	0.93±0.02	-0.03±0.02	0.04±0.02	0.87	399
MW	0.96±0.02	0.01±0.02	-0.03±0.02	0.92	399
MT	0.78±0.04	-0.08±0.02	0.02±0.03	0.62	392
SW	0.73±0.05	0.03±0.02	0.07±0.04	0.53	359
TE	0.86±0.05	-0.01±0.02	0.03±0.03	0.65	394