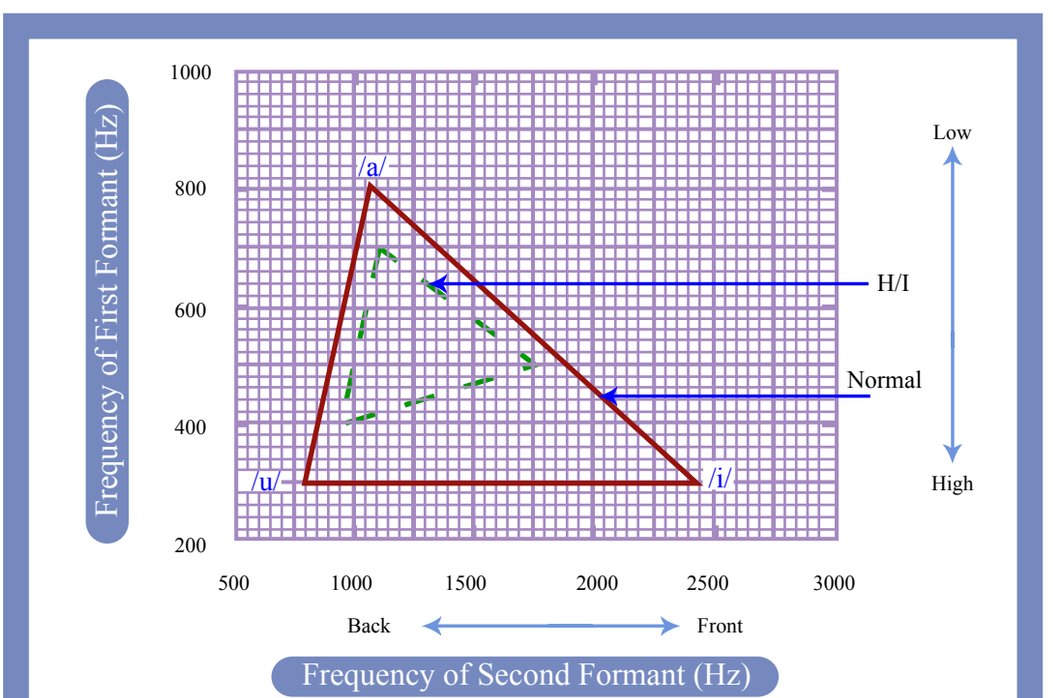
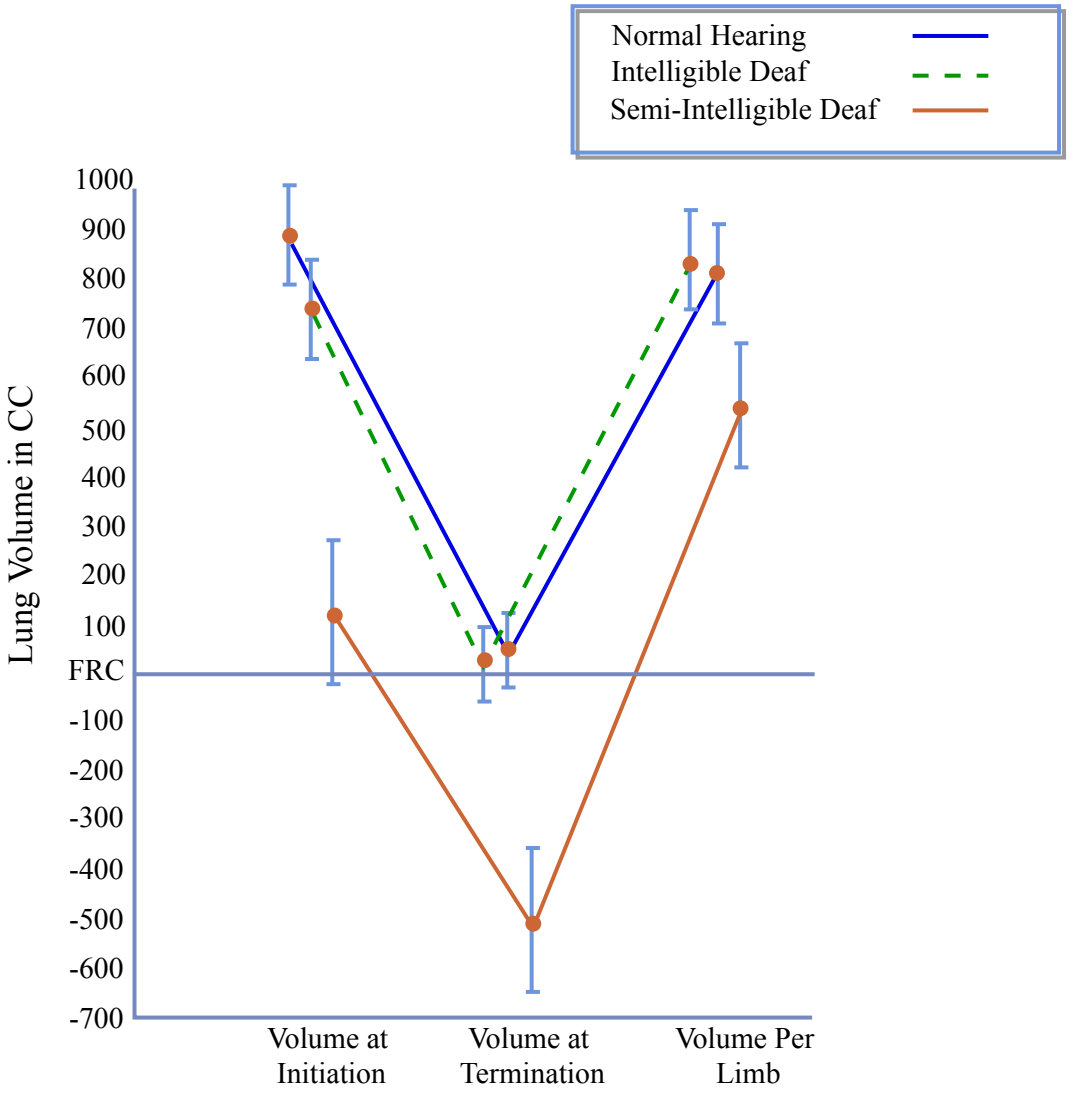
Speech of the deaf

Some difficulties experienced by deaf children in learning to talk:

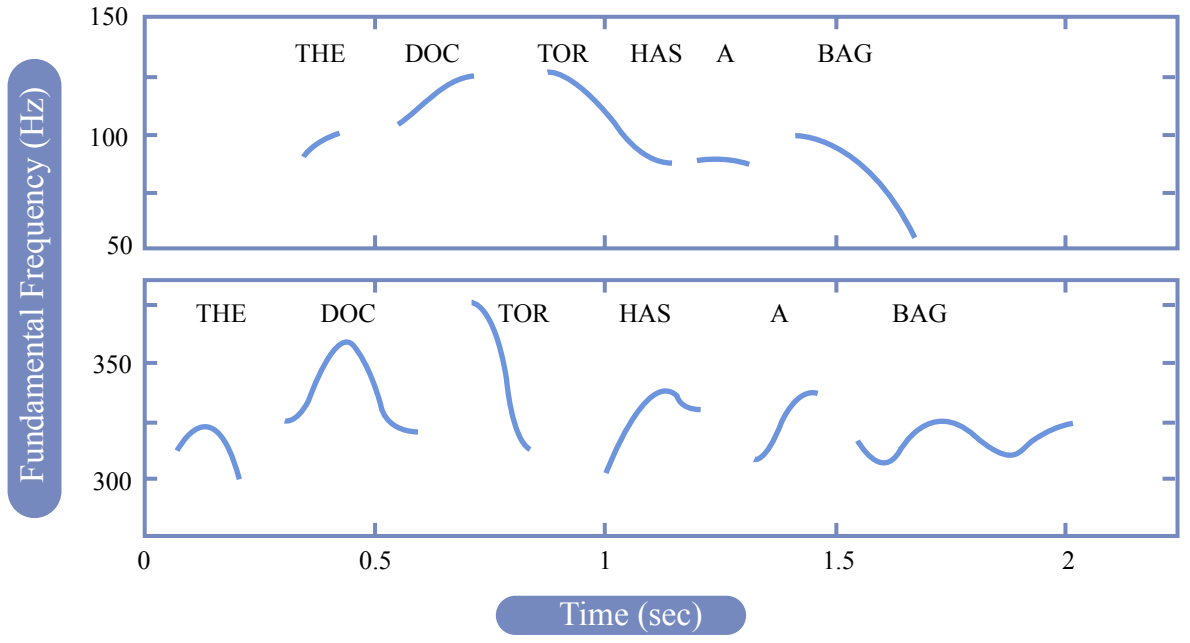
- Rhythm and timing
- Fricative consonants (s, š)
- Nasalisation
- Place of articulation for vowels
- Control of fundamental frequency
- Lack of synchrony between articulation and phonation
- Breathiness



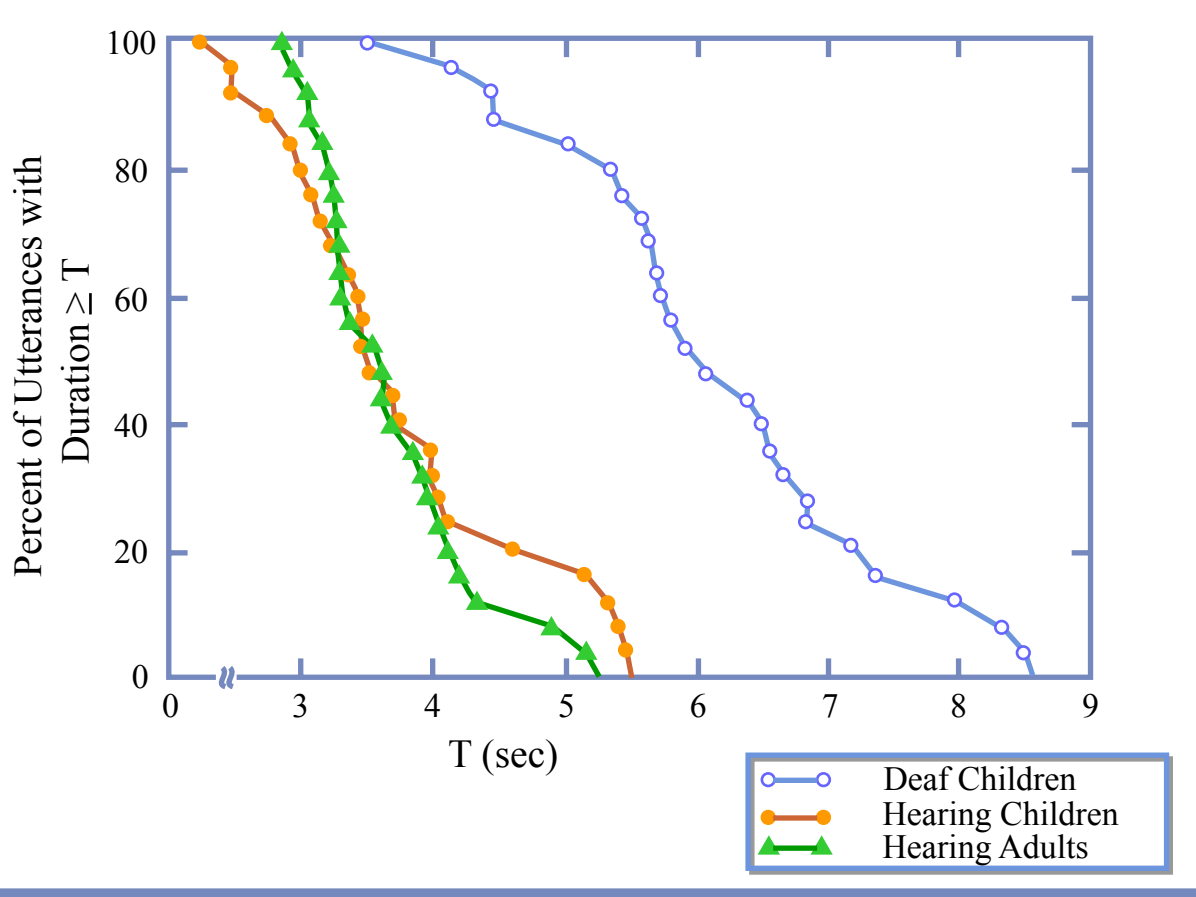
Comparison of first and second formant frequencies for the vowels /u/, /a/, and /i/ in two subjects. AB is an adult male with normal hearing. RG is an adult male with a hearing loss of 105 dB, acquired at age 22 months. These data were obtained from broad band spectrograms.



The means and standard deviations of the averages of lung volume at initiation of respiratory limbs, lung volume at termination of respiratory limbs and lung volume per limb, during the reading task for normally hearing intelligible hearing-impaired and semi-intelligible hearing-impaired speakers.

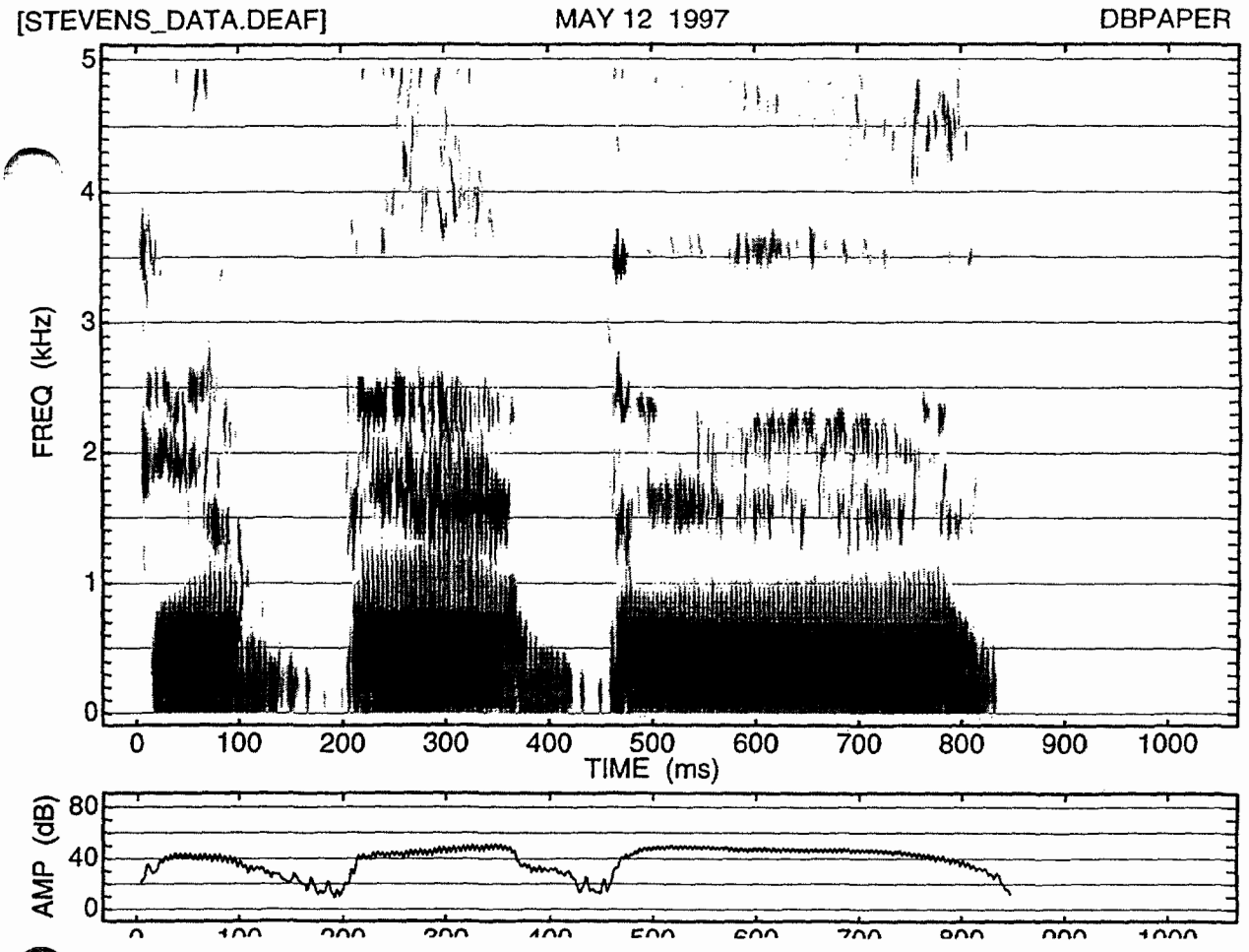


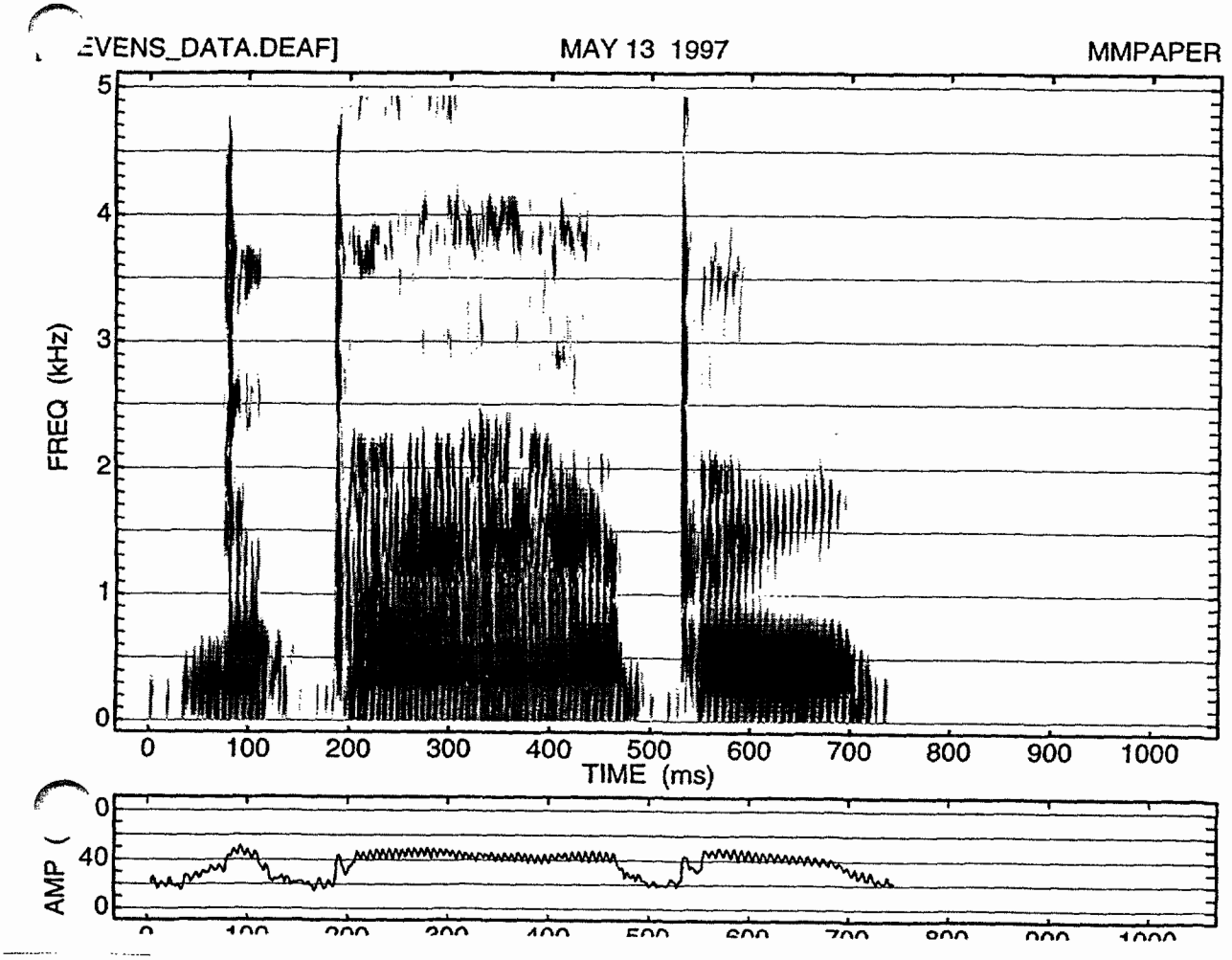
Top: Contour of fundamental frequency (F_0) versus time for a normal-hearing adult male producing the sentence indicated. Bottom: Example of fundamental-frequency contour for a deaf child producing the same sentence.

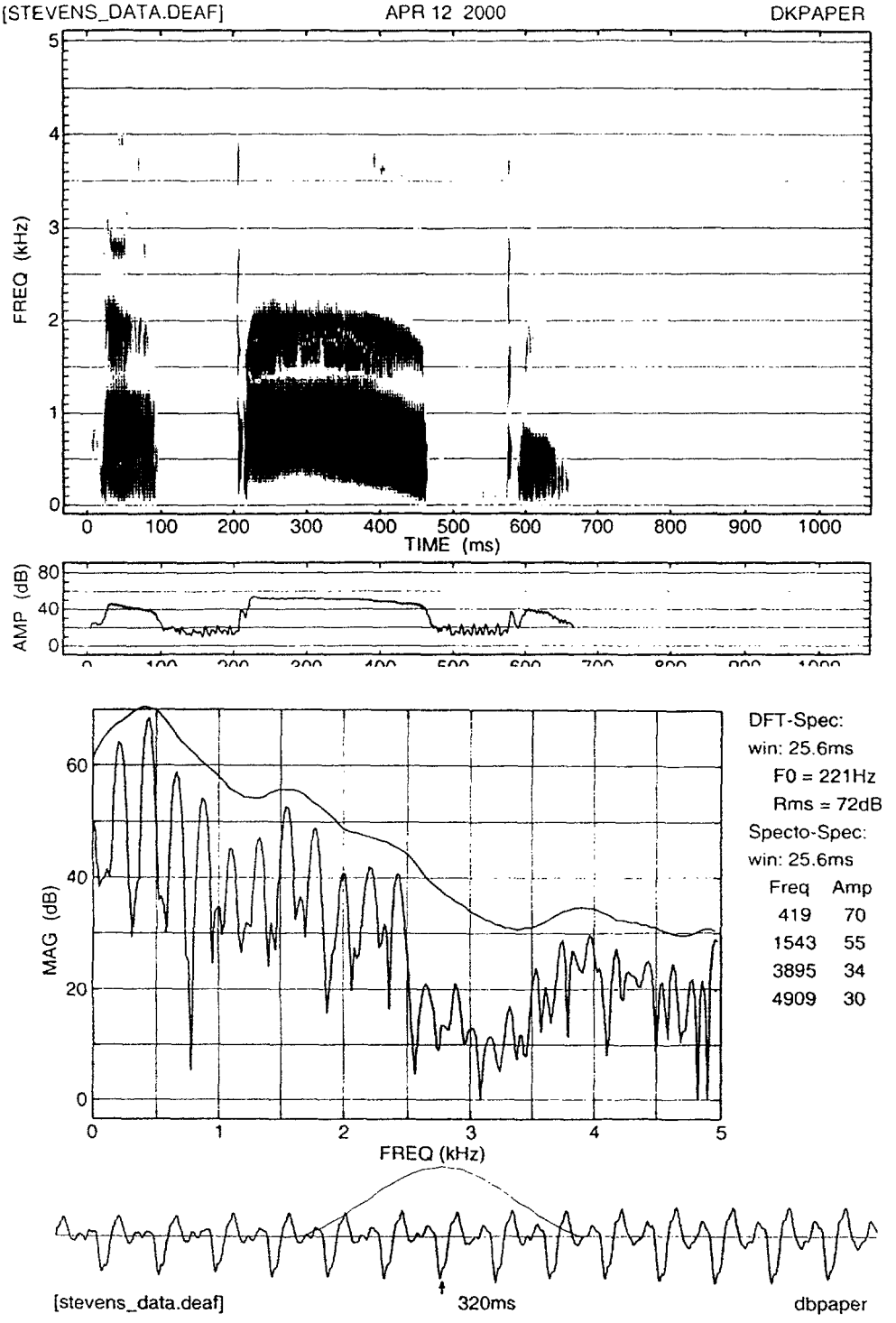


Cumulative distribution of total duration for the utterance "My sister has a fish. She keeps it in a tank."

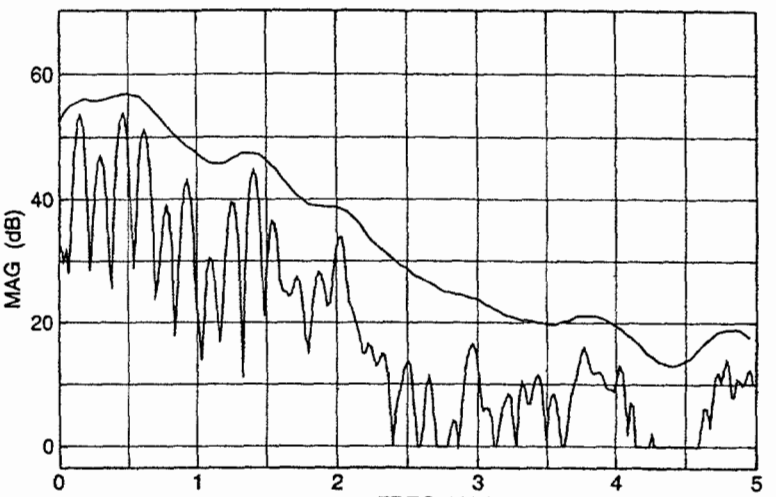
LSPECTO: 256-pt DFT, smart AGC 6.4-ms Hamming window every 1 ms





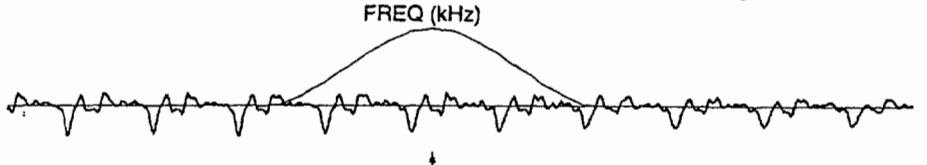

[STEVENS_DATA.DEAF]
APR 12 2000
DKPAPER
FREQ (kHz)
TIME (ms)
AMP (dB)
MAG (dB)
FREQ (kHz)
DFT-Spec:
win: 25.6ms
F0 = 221Hz
Rms = 72dB
Specto-Spec:
win: 25.6ms
Freq Amp
419 70
1543 55
3895 34
4909 30
[stevens_data.deaf]
320ms
dbpaper

KLSPEC93: MAY 4 1999



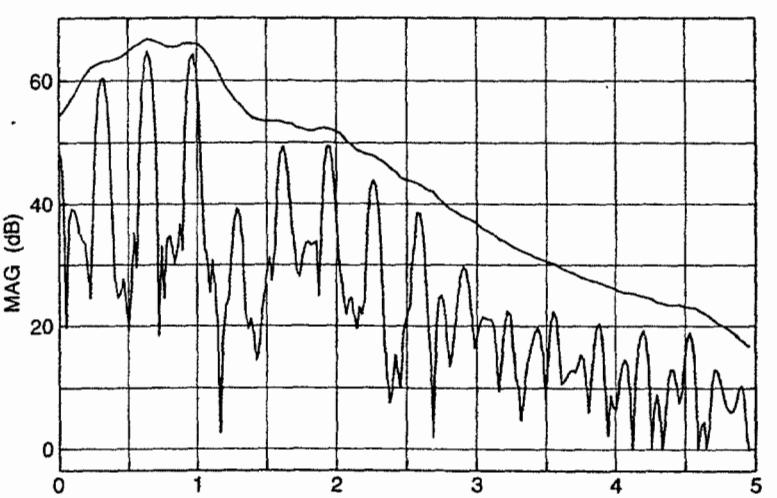
DFT-Spec:
win: 25.6ms
F0 = 155Hz
Rms = 60dB
Specto-Spec:
win: 25.6ms

Freq	Amp
204	56
488	57
1373	47
3799	21
4818	19



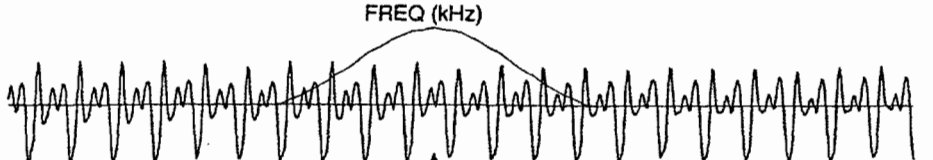
[stevens_data.deaf] 293ms mmpaper

KLSPEC93: MAY 4 1999



DFT-Spec:
win: 25.6ms
F0 = 323Hz
Rms = 70dB
Specto-Spec:
win: 25.6ms

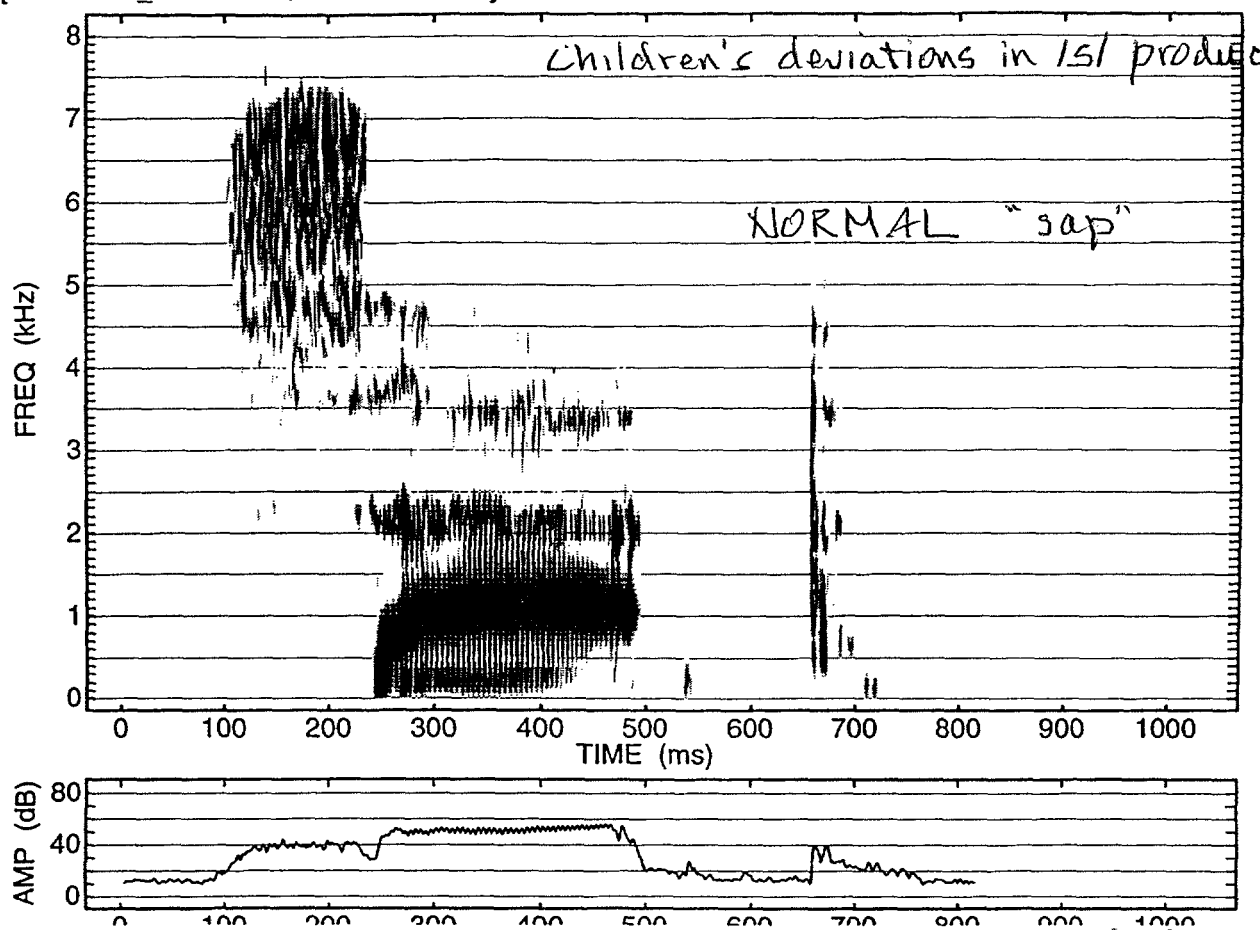
Freq	Amp
367 *	63
655	66
948	66
1563	53
1914	52
2239*	48

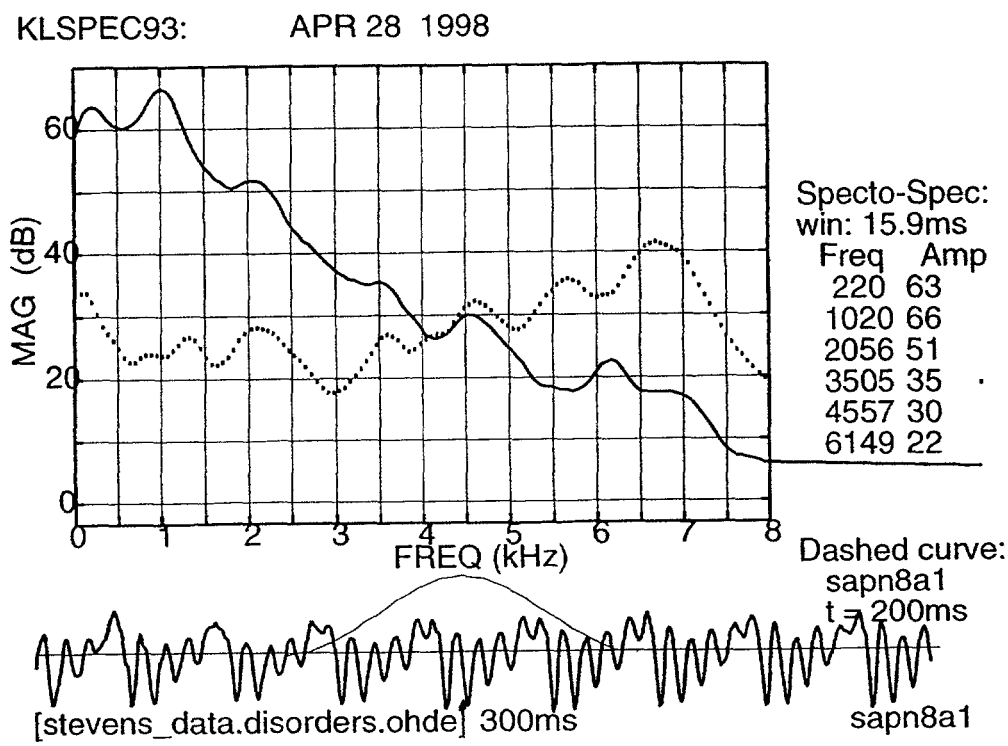


[stevens_data.deaf] 328ms dkpaper

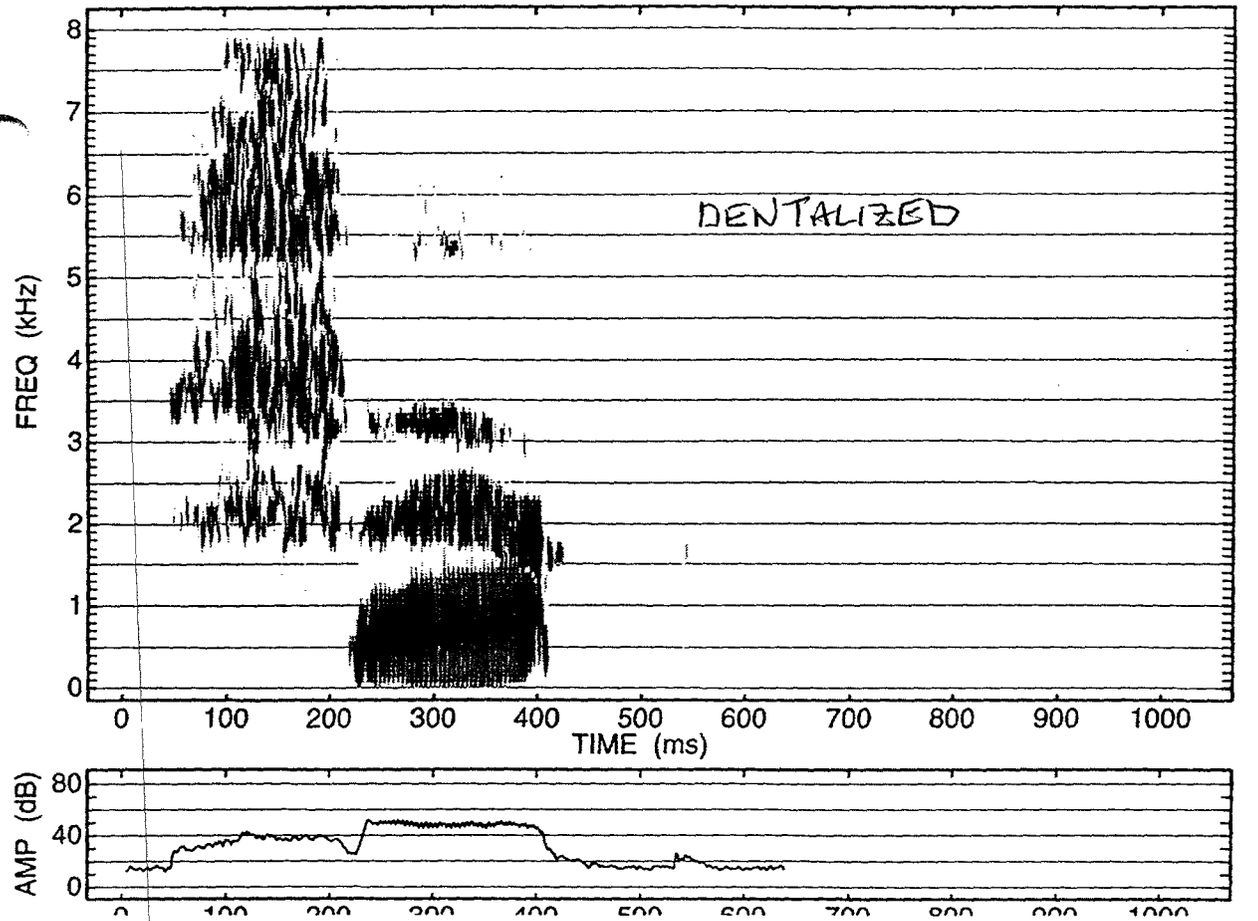
LSPECTO: 256-pt DFT, smart AGC 6.4-ms Hamming window every 1 ms

[STEVENS_DATA.DISORDERS.OHDE] MAY 13 1997 SAPN8A1

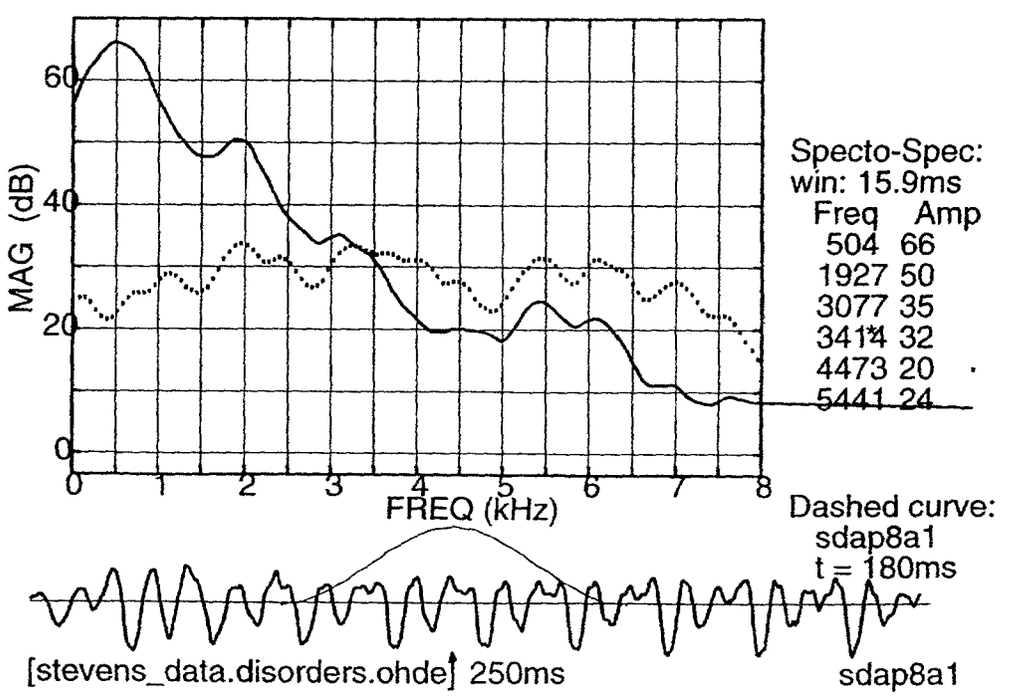




[STEVENS_DATA.DISORDERS.OHDE] MAY 15 1997 SDAP8A1

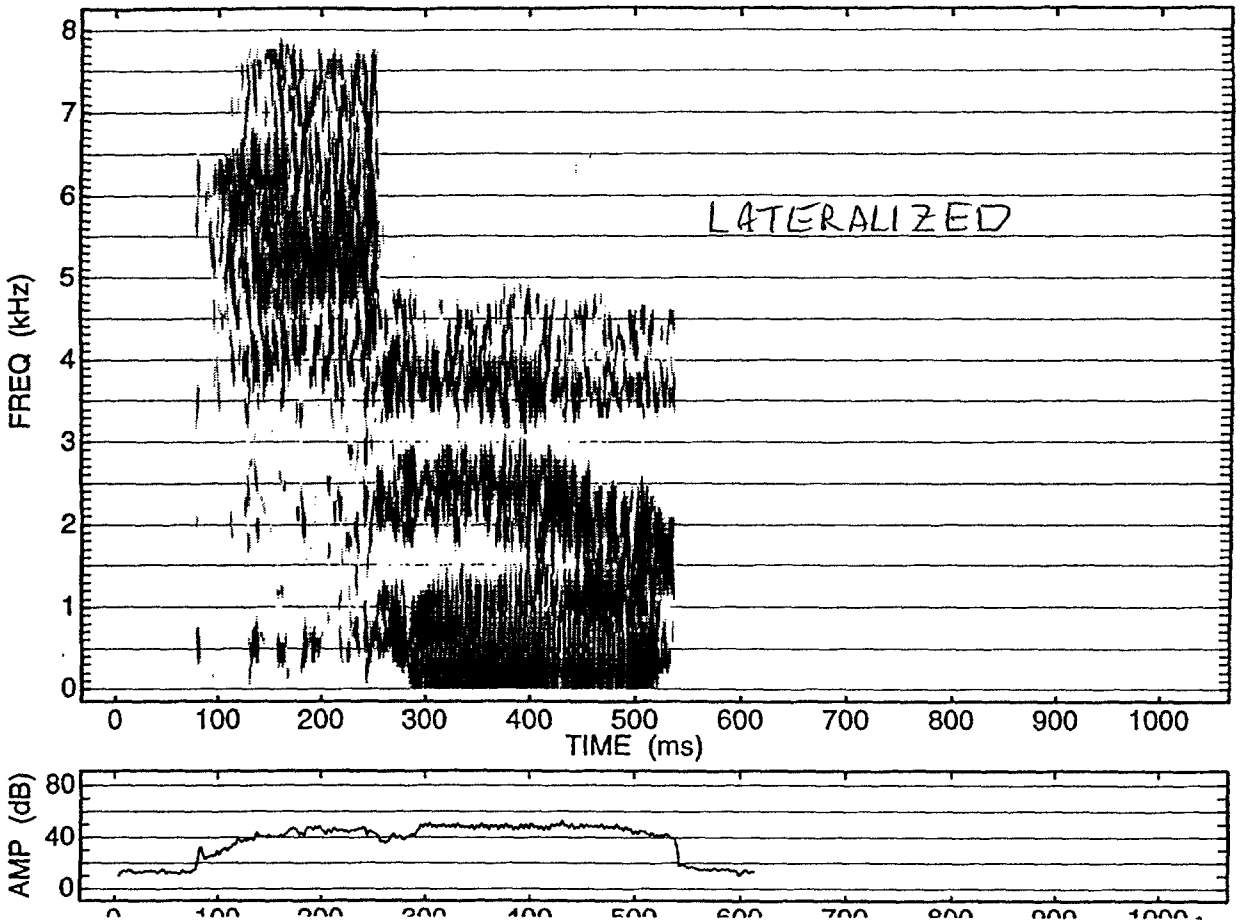


KLSPEC93: APR 28 1998

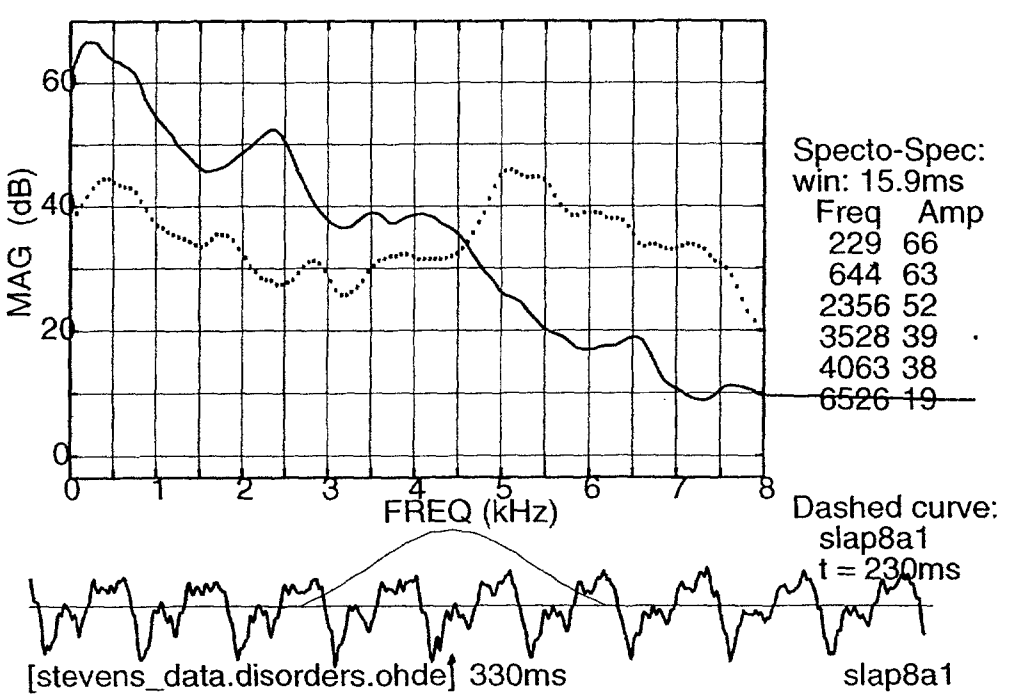


LSPECTO: 256-pt DFT, smart AGC 6.4-ms Hamming window every 1 ms

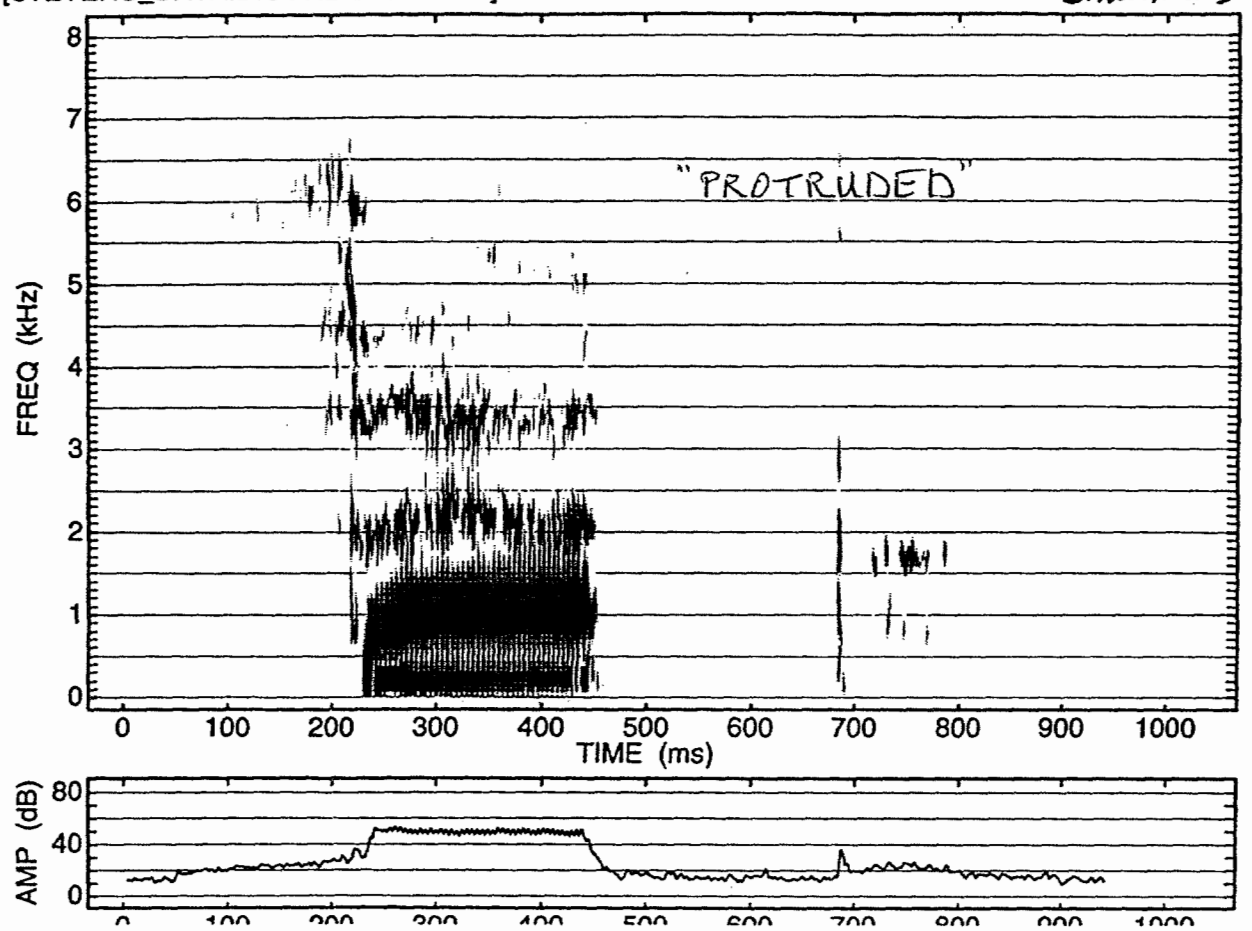
[STEVENS_DATA.DISORDERS.OHDE] MAY 13 1997 SLAP8A1



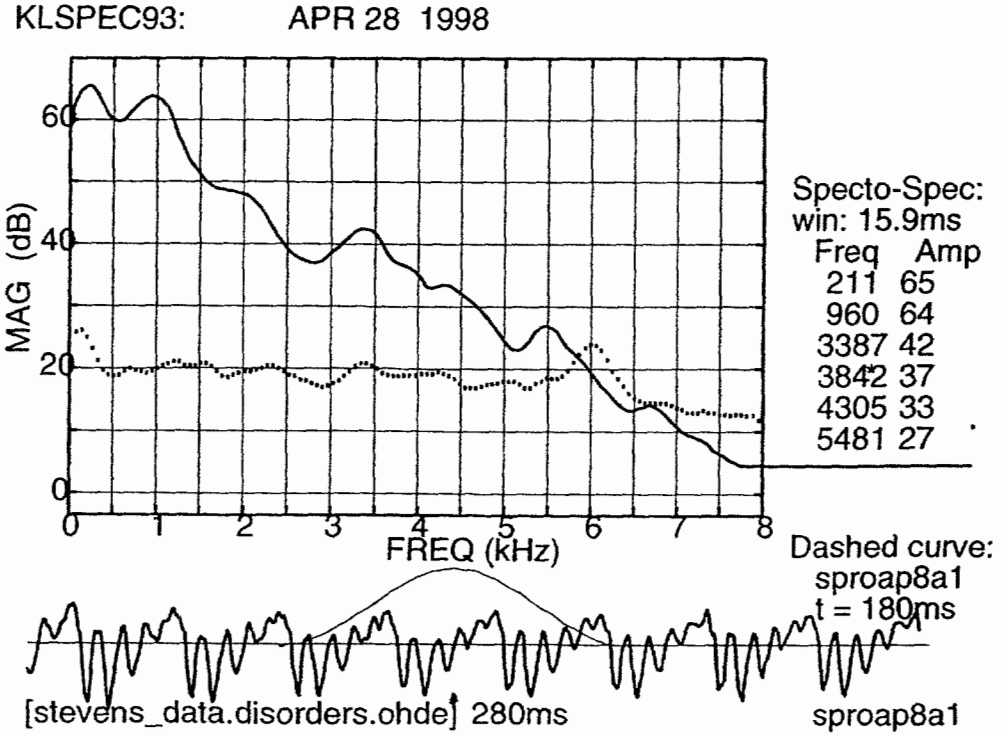
KLSPEC93: APR 28 1998

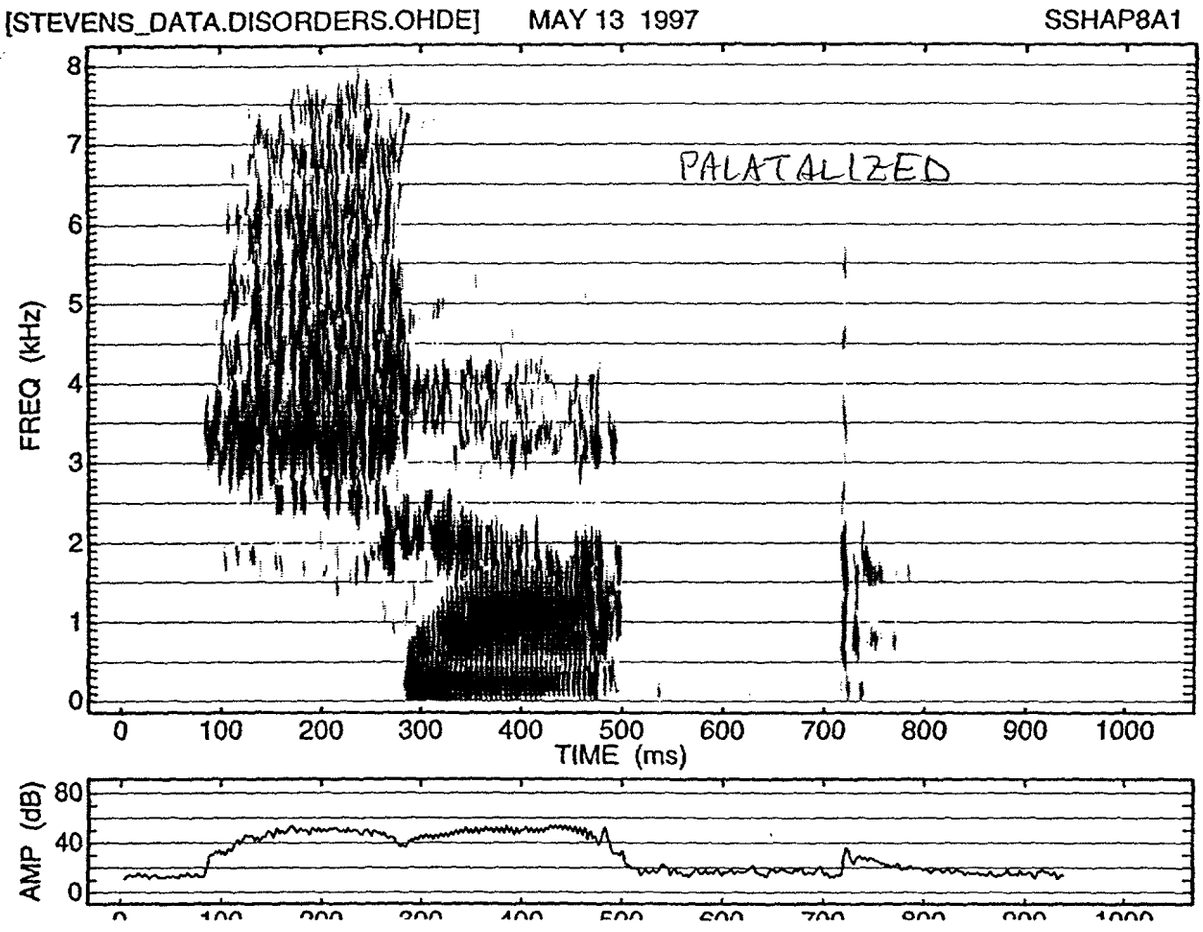


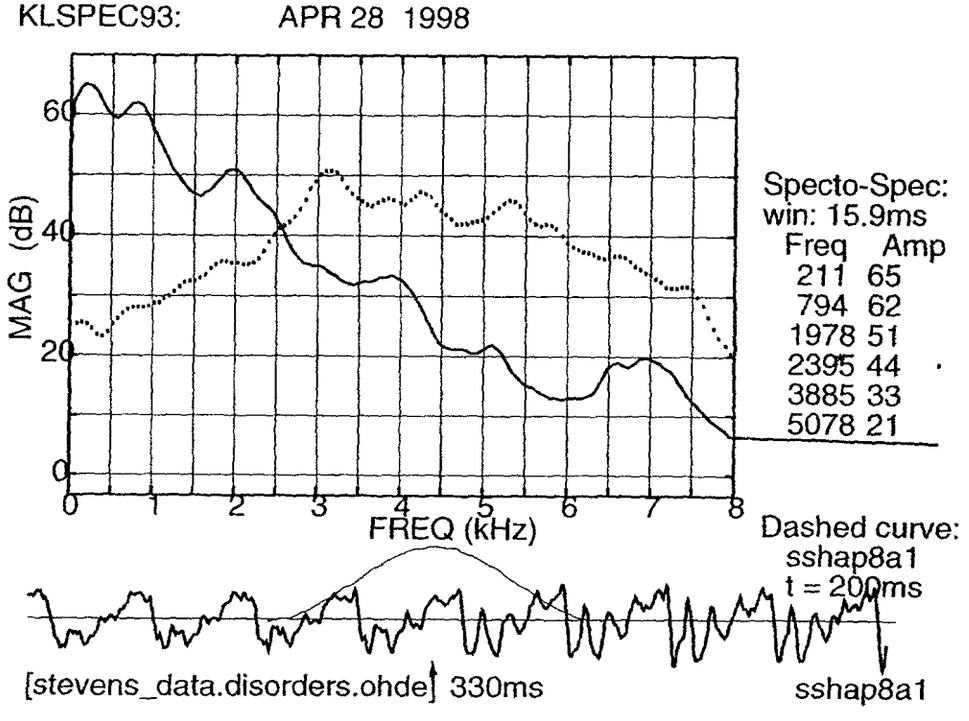
[STEVENS_DATA.DISORDERS.OHDE] MAY 10 1997 SPROAP8A1

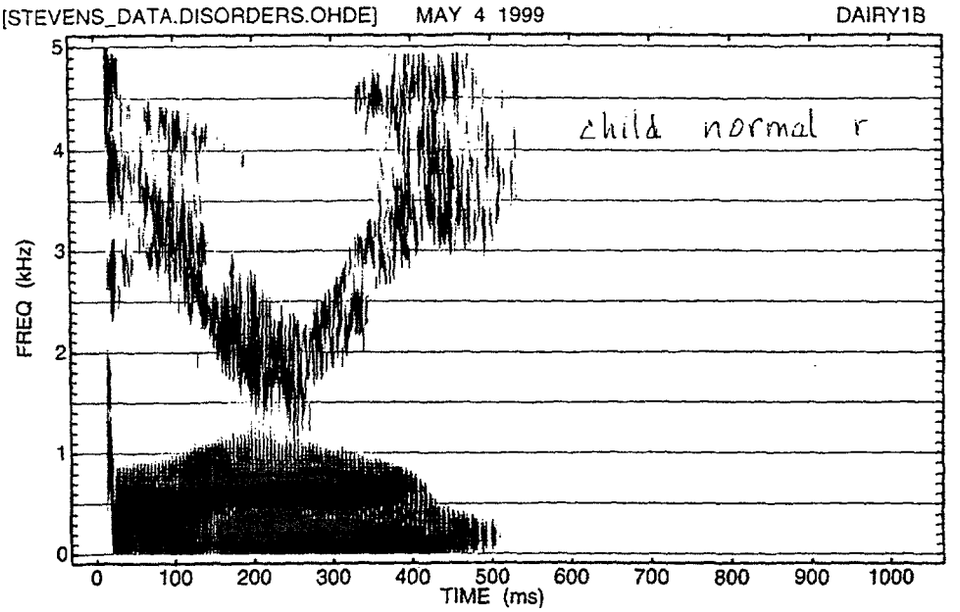


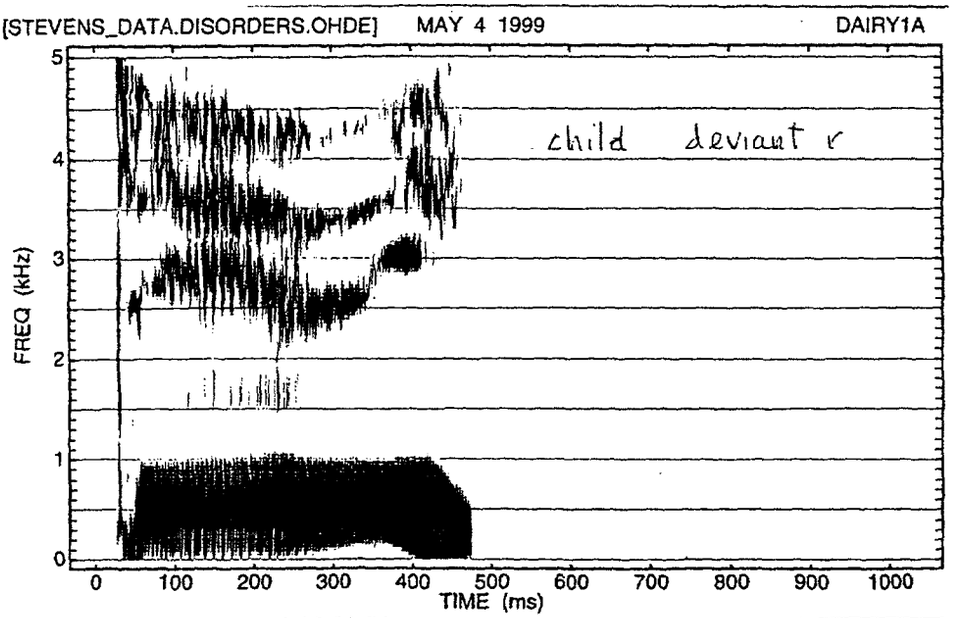
KLSPEC93: APR 28 1998

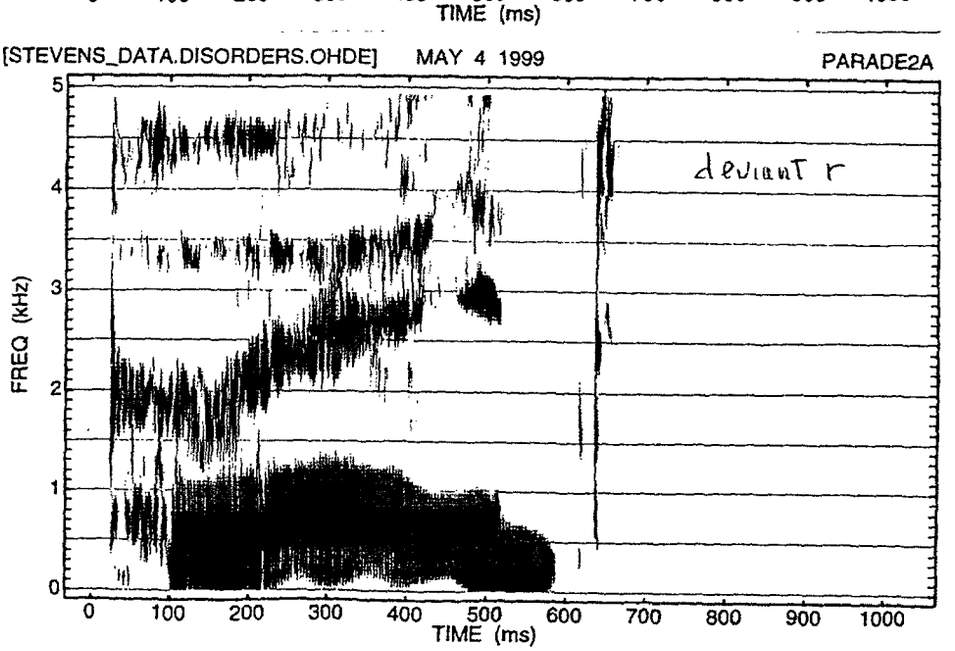



LSPECTO: 256-pt DFT, smart AGC
6.4-ms Hamming window every 1 ms
[STEVENS_DATA.DISORDERS.OHDE]
MAY 13 1997
SSHAP8A1
PALATALIZED
FREQ (kHz)
TIME (ms)
AMP (dB)


KLSPEC93:
APR 28 1998
MAG (dB)
FREQ (kHz)
Specto-Spec:
win: 15.9ms
Freq Amp
211 65
794 62
1978 51
2395 44
3885 33
5078 21
Dashed curve:
sshap8a1
t = 200ms
[stevens_data.disorders.ohde] 330ms
sshap8a1


[STEVENS_DATA.DISORDERS.OHDE] MAY 4 1999 DAIRY1B
child normal r
FREQ (kHz)
TIME (ms)


[STEVENS_DATA.DISORDERS.OHDE] MAY 4 1999 DAIRY1A
child deviant r
FREQ (kHz)
TIME (ms)


[STEVENS_DATA.DISORDERS.OHDE] MAY 4 1999 PARADE2A
deviant r
FREQ (kHz)
TIME (ms)

Glottal characteristics of children (compared with adults)

Data for adult speakers were collected by Hanson (1997) and Hanson and Chuang (1999). The tables below compare mean, minimum, maximum, and range values for the children and adults.

Table 5: H1*-H2* (dB)

	Mean	Minimum	Maximum	Range
Children	4.9	2.5	8.2	5.7
Adult females	3.1	-2.6	6.9	9.5
Adult males	0	-3.3	4.2	7.5

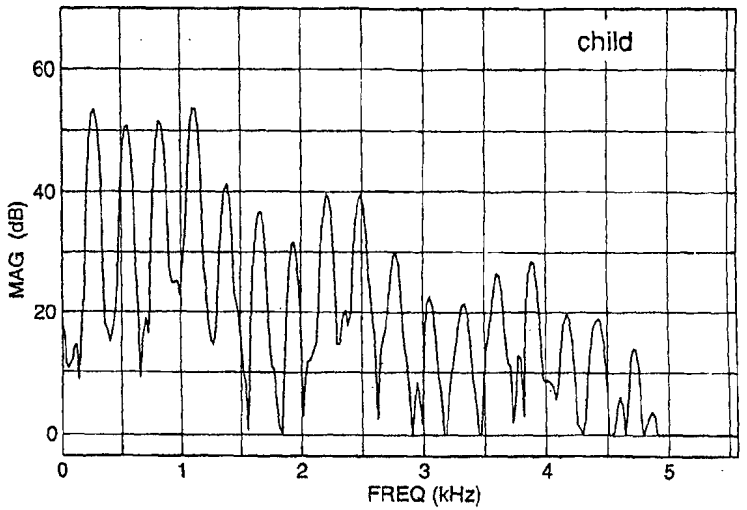
Table 6: H1*-A1 (dB)

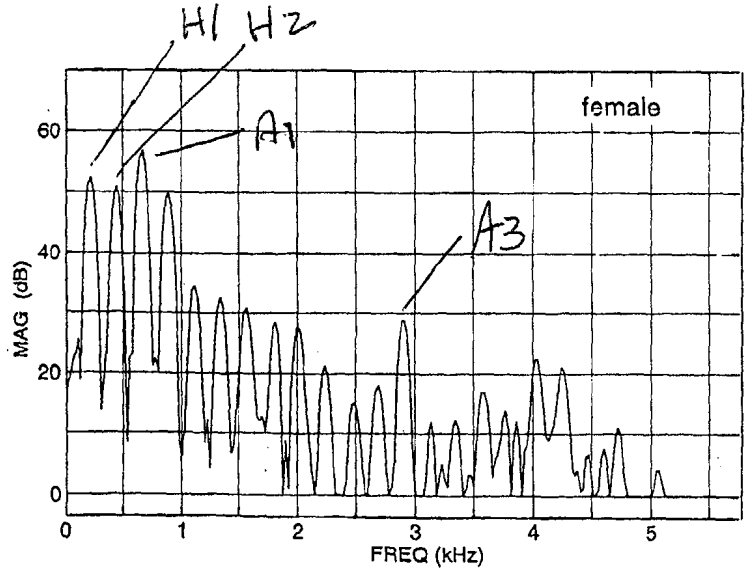
	Mean	Minimum	Maximum	Range
Children	-1.7	-8.5	4.0	12.5
Adult females	-3.9	-12.4	3.9	16.3
Adult males	-6.9	-16.1	0.4	16.5

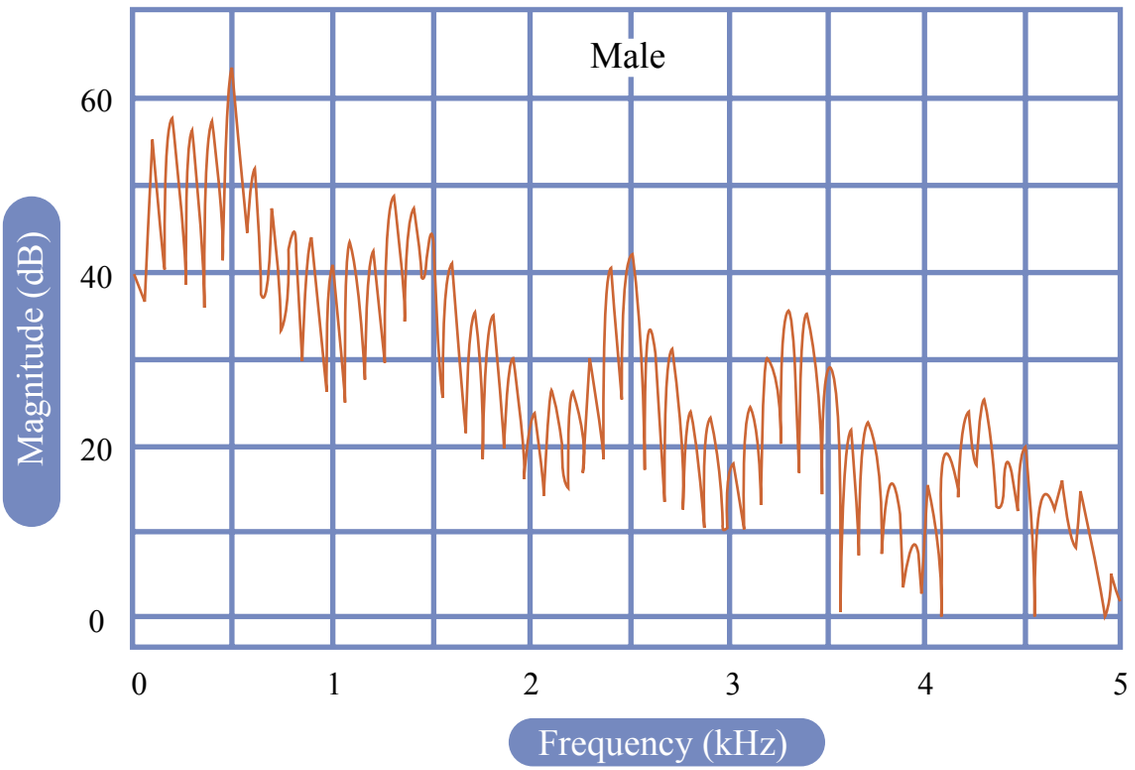
Table 7: H1*-A3* (dB)

	Mean	Minimum	Maximum	Range
Children	33.3	23.0	40.5	17.5
Adult females	23.4	8.6	35.0	26.4
Adult males	13.8	4.8	24.1	19.3

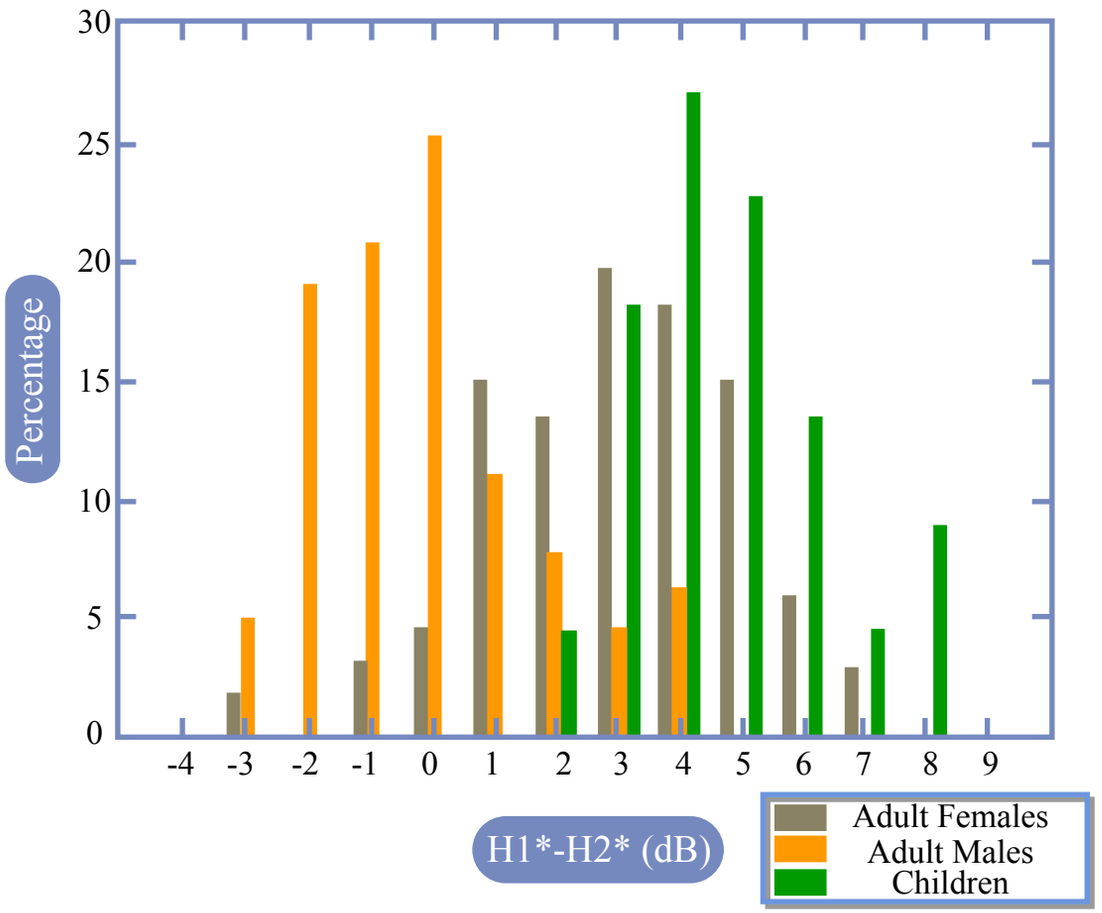
- Mean values are higher for children than for adults
- Ranges tend to be narrower for children than adults.







Comparison of spectra of the vowel /ɛ/ for a child, and the vowel /ʌ/ for average female and male subjects.



Result for H1*-H2* imply that children have larger open quotients than adults.

4-year old child

It's not... It's not a peach