

Phonobabble: A crash course in acoustic & auditory phonetics

for more, see: http://www.kul.lublin.pl/art_8288.html

(1) Acoustic properties of vocal tract

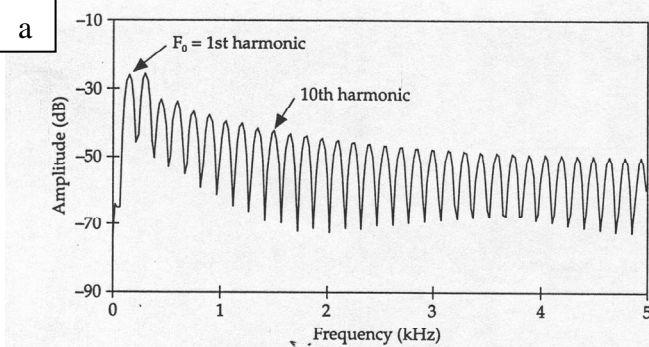


Figure 4.2 A power spectrum of the vocal cord vibration shown in figure 4.1. The first harmonic (which has the same frequency as the fundamental frequency of voicing) occurs at 150 Hz; therefore the tenth harmonic occurs at 1,500 Hz.

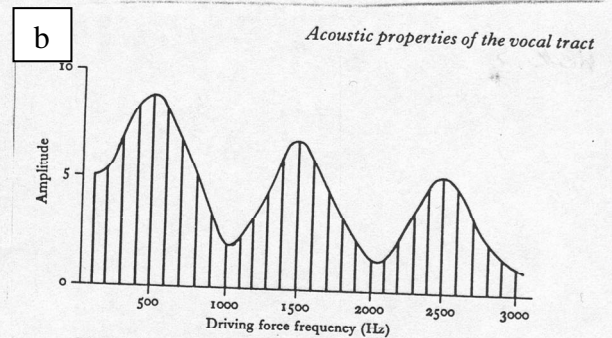


Fig. 30. Response curve of the vocal tract.

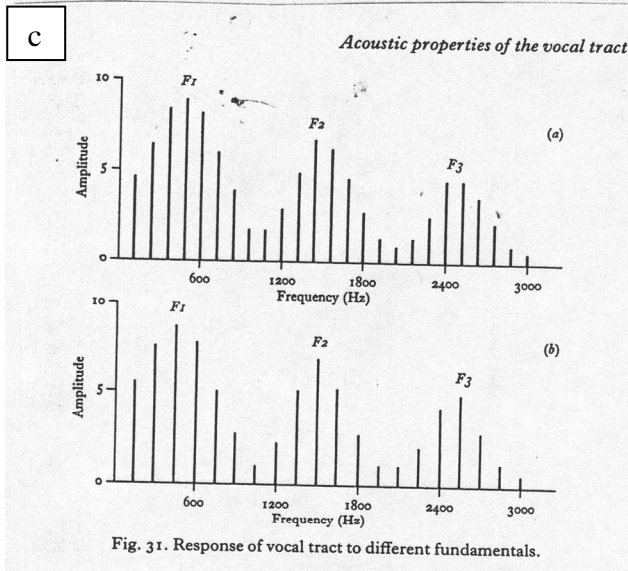


Fig. 31. Response of vocal tract to different fundamentals.

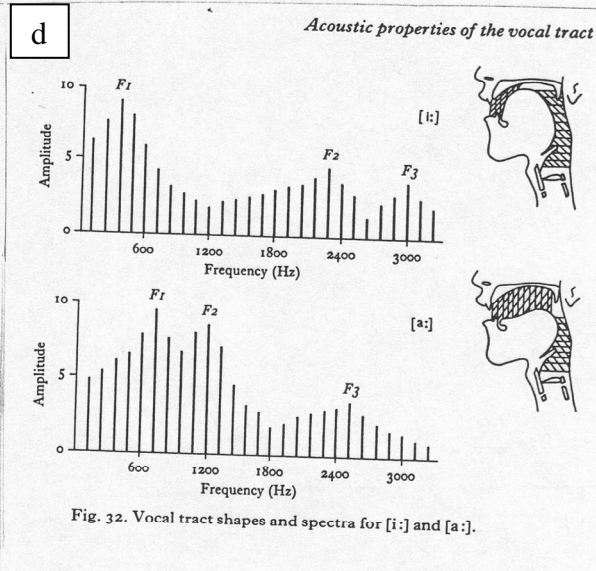
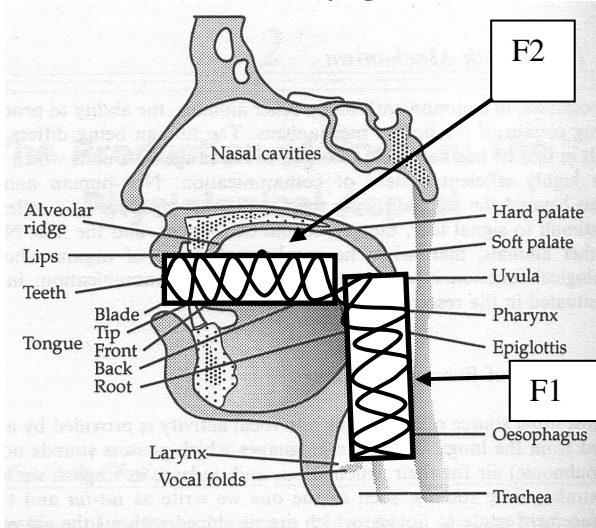


Fig. 32. Vocal tract shapes and spectra for [i:] and [a:].

(2) The role of the Pharyngeal and Oral 'tubes' in vowel production



Every tube has its natural resonance, i.e. it boosts energy at some frequencies and dampens vibrations at other frequencies.

Such boosted energy (a bundle of harmonics close to a particular 'favoured' frequency) is called a FORMANT. F1 is the first formant and can be associated with the frequencies boosted by the pharyngeal tube. F2 is the second formant and can be associated with the frequencies boosted by the oral tube. Longer tube = lower formant frequency. Shorter tube = higher formant frequency. F0 (fundamental frequency) = pitch = 1st harmonic. F1 and F2 may sometimes suffice to define and distinguish all vowels in a given system.