Examples of influence of consonants
on adjacent vowel
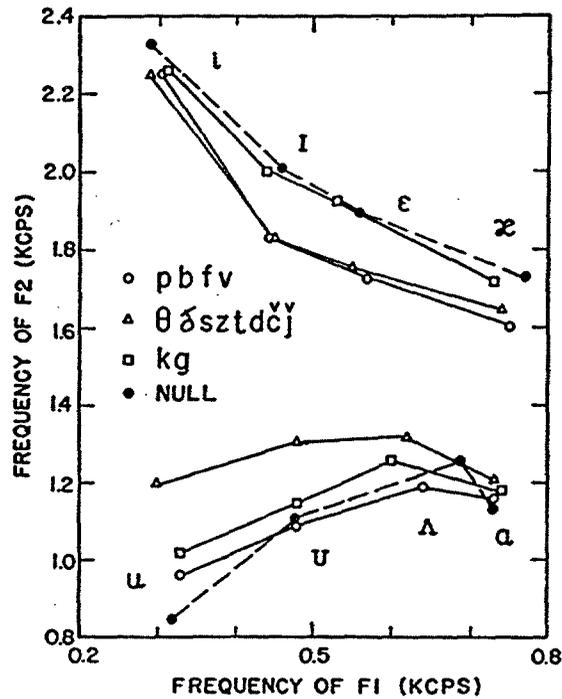
Figure 10.8 Values of *F1* and *F2* at the midpoint of the vowel for eight vowels, plotted to demonstrate the effect of place of articulation of the consonantal context. The contexs are divided into three groups: velars (open squares); postdentals (open triangles); labials (open circles). Values for vowels in the null environment (averages of formant frequencies for vowels in isolation and in context /h-d/) are included for comparison (black dots). Points represent average values for three talkers. (From K. N. Stevens and House, 1963.)

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"Quantal Nature Of Speech": Some Examples

Schematization of a relation showing a change in a relevant acoustic parameter as an articulatory parameter specifying some aspect of the state or configuration of the speech-production system is manipulated.
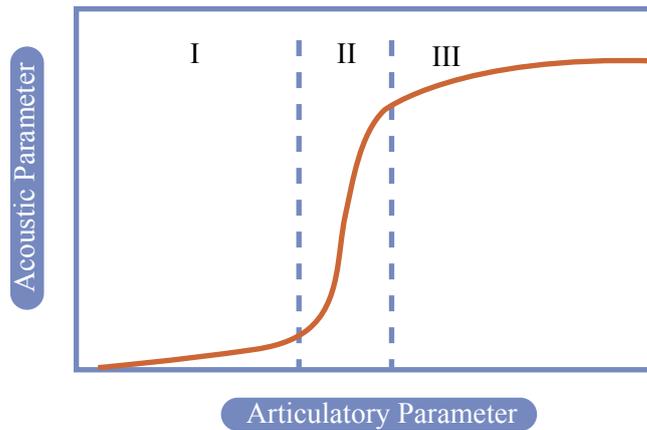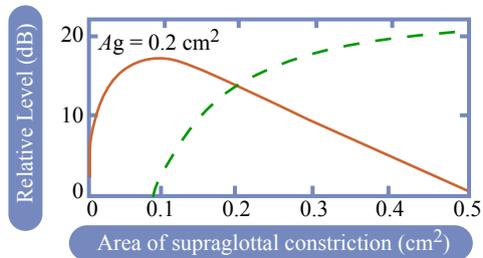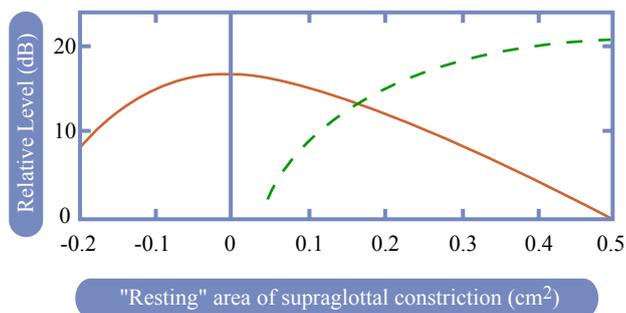
Constriction for Fricatives

(a) Calculated levels of the turbulence noise sources at the supraglottal and glottal (dashed line) constrictions as a function of the area of the supraglottal constriction. The area of the glottal constriction is fixed at 0.2 cm^2.

(b) Same as (a), except that the size of the constriction is modified by the presence of the intraoral pressure. The abscissa is the area that the supraglottal constriction would assume before application of the subglottal pressure.
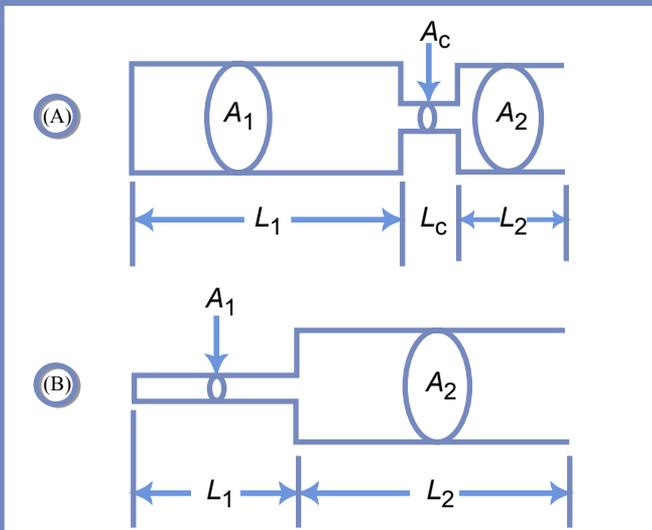
Examples of two configurations of acoustic tubes for which there is relatively little acoustic coupling between the left-hand portion, of length L_1, and the right-hand portion of L_2.
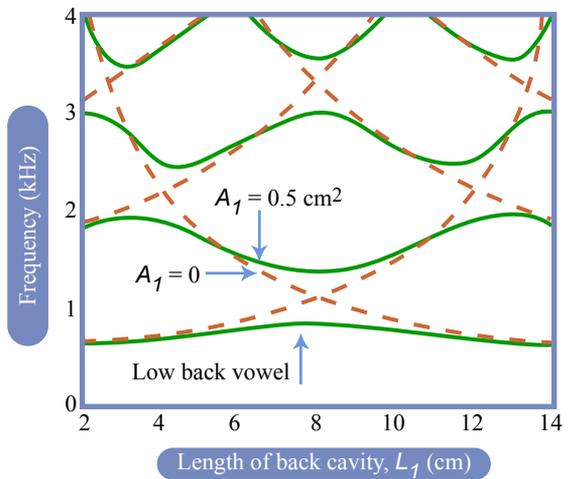
Frequencies of first four natural frequencies for configuration of first figure on left, as the length L_1 of the back cavity is manipulated. The total length $L_1 + L_2 = 16$ cm, and the cross-sectional area $A_2 = 3$ cm^2. The long-dashed line corresponds to the case where $A_1 \ll A_2$, and the solid line is for $A_1 = 0.5$ cm^2. The radiation impedance is assumed to be zero.
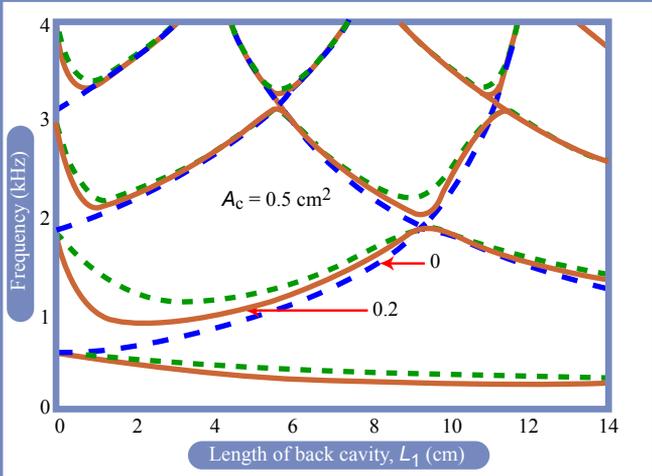
Frequencies of first four natural frequencies for configuration of figure (a) on top left, as the length L_1 of the back cavity is manipulated. The total length $L_1 + L_c + L_2 = 16$ cm, the constriction length $L_c = 2$ cm, and the cross-sectional areas A_1 and A_2 are 3 cm^2. The long-dashed lines (labeled 0) correspond to the case where $A_c \ll A_1$, in which case the lowest natural frequency is zero. The solid and short-dashed lines are for $A_c = 0.2$ and 0.5 cm^2, respectively. The tube is assumed to be hard-walled, and the radiation impedance is assumed to be zero.
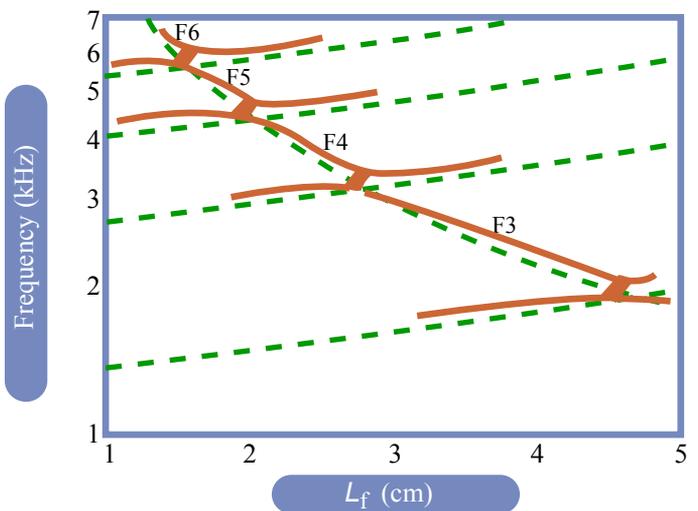
Different Places of Articulation for Obstruents

Calculated natural frequencies for a model of vocal tract with a narrow constriction as the length L_f of the front cavity changes from 1 to 5 cm. The dashed lines give the frequencies of the back- and front-cavity resonances assuming no acoustic coupling between these cavities. The solid lines are the resonances if coupling is taken into account.