

Segment sequences and reduction

s p t

s c o t

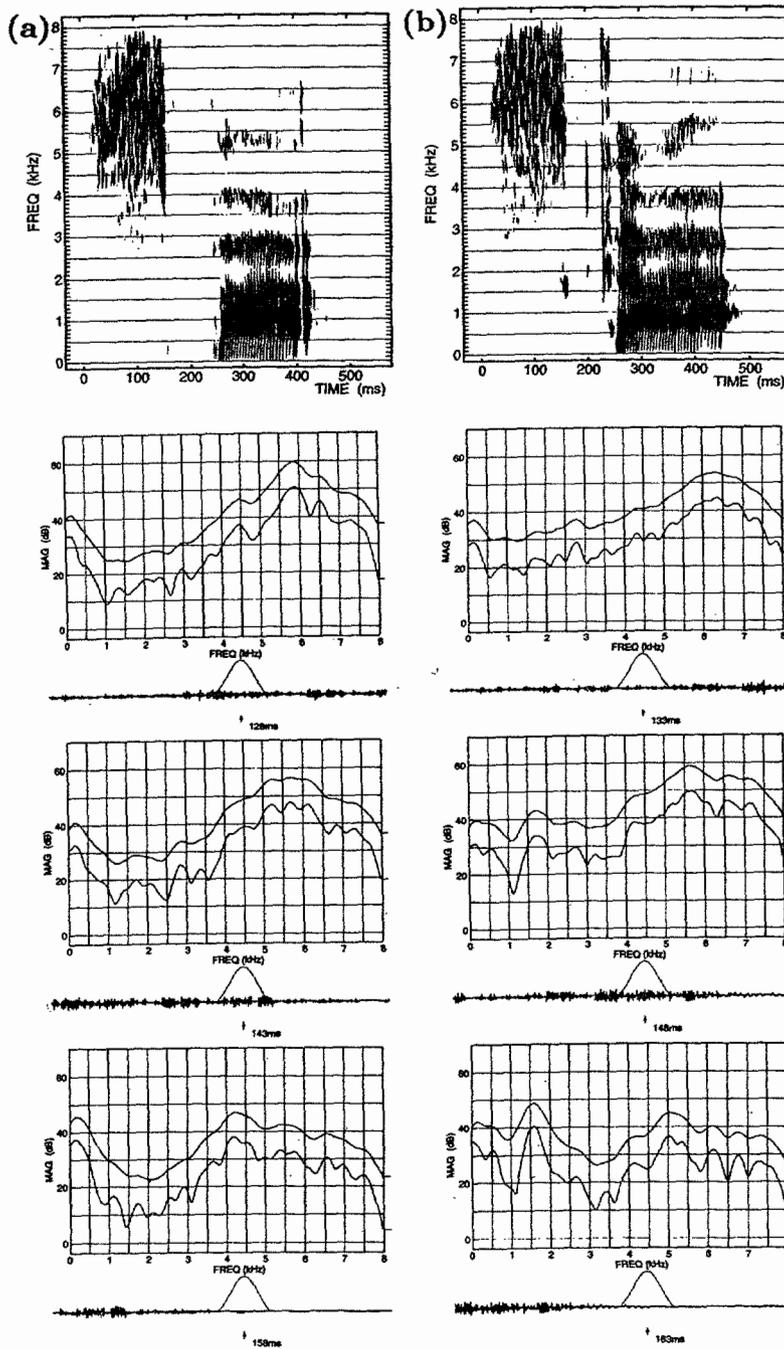


Figure 10.1 The top panels are spectrograms of the words *spot* (left) and *scot* (right) spoken by a female talker. The spectra below each spectrogram are sampled at three times 15 ms apart near the end of the frication noise for /s/, and show the changes in the spectrum as the closure is made for the /p/ or /k/. The spectra are obtained by averaging a sequence of 6.4-ms spectra over a 10-ms time interval. The upper curve in each panel is a smoothed version of the measured spectrum.

drip

plot

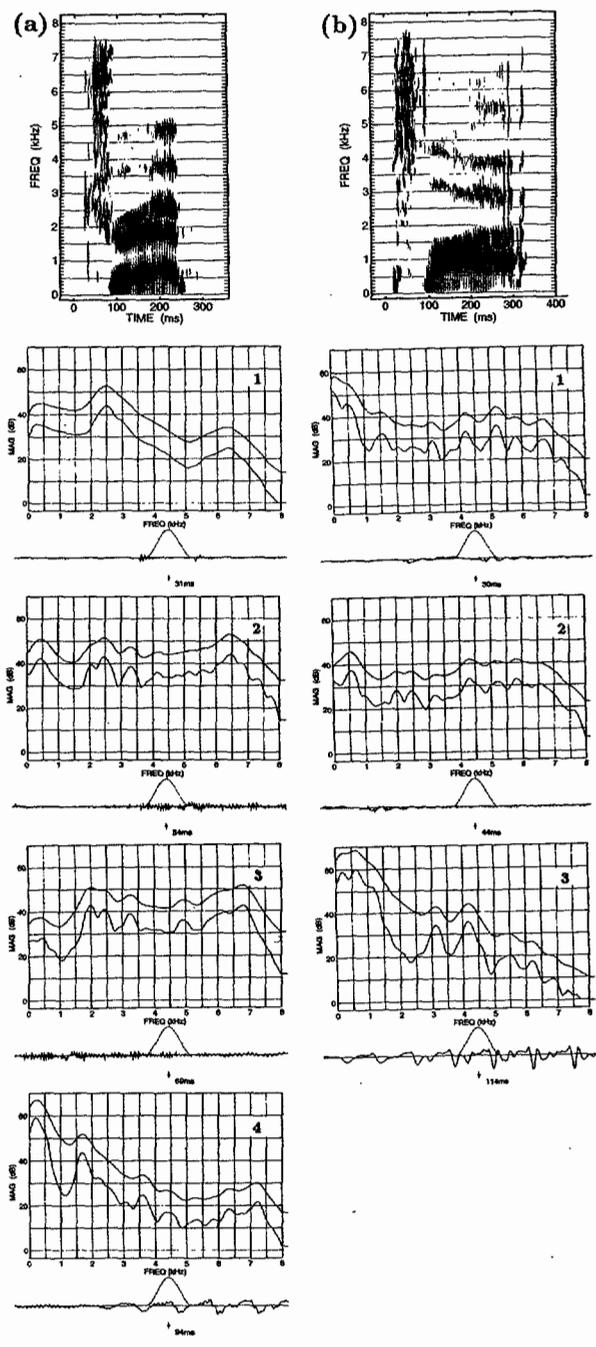
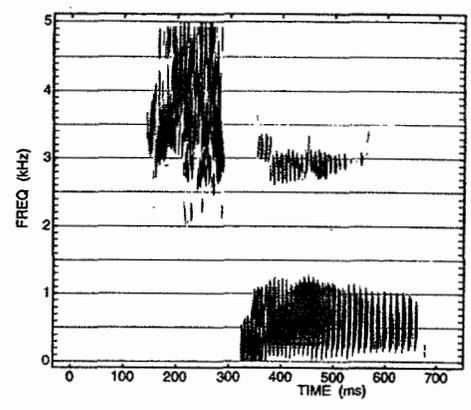
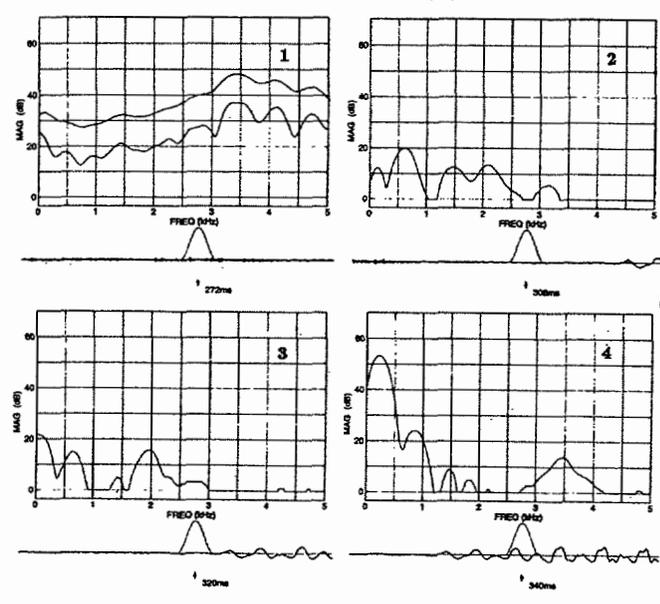


Figure 10.2 The top panels are spectrograms of the words *drip* (left) and *plot* (right) produced by a female talker. The spectra below each spectrogram are sampled near the consonant release (top spectra), just after onset of glottal vibration (bottom spectra), and at intermediate points. Spectra are measured as in figure 10.1.

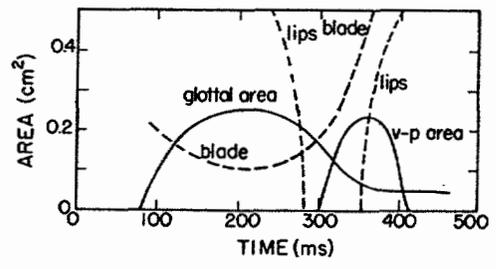
small



(a)



(b)



(c)

Figure 10.4 (a) Spectrogram of the word *small* (male speaker). (b) Spectra sampled at several times between the end of /s/ (spectrum 1) and the onset of glottal vibration (spectrum 4). Spectra are measured as in figure 10.1. (c) Schematized estimates of the time course of the cross-sectional areas of four orifices as this utterance is produced: area of constriction formed by the tongue blade; area of the glottal opening; area of constriction formed by the lips; and area of the velopharyngeal port (v-p area).

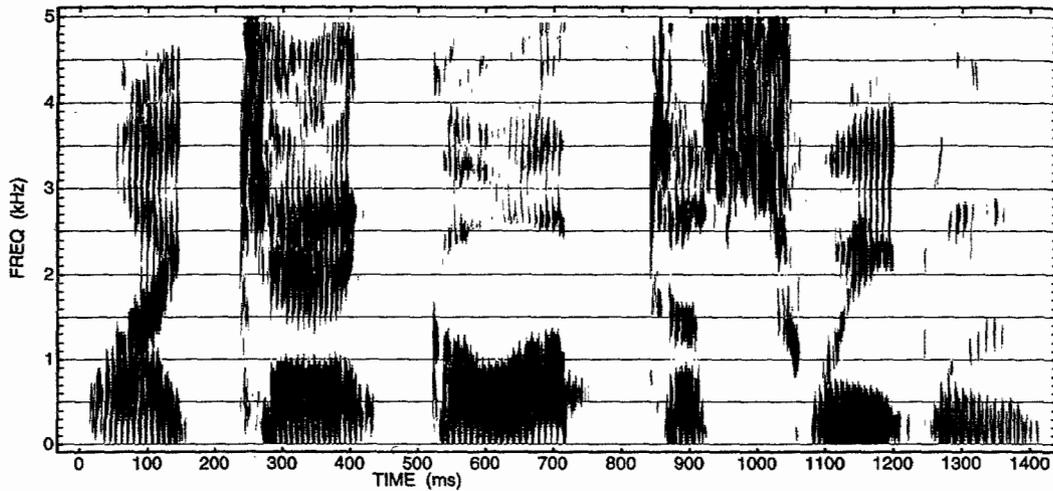
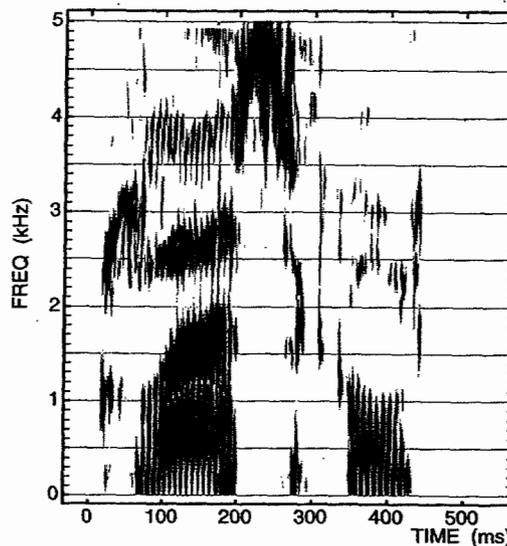
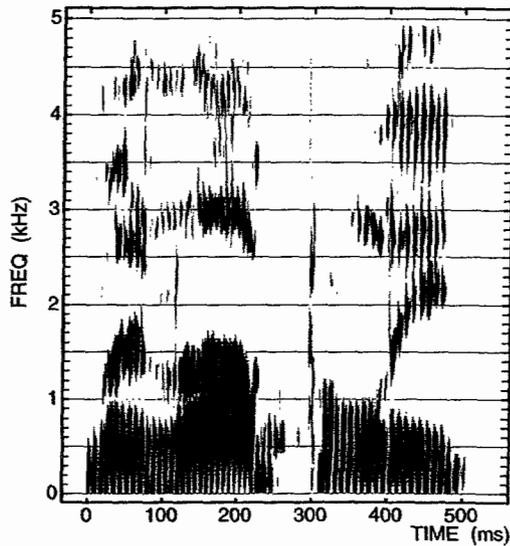


Figure 10.5 Spectrogram of the sentence *I can't go up to Sweden* (male speaker), illustrating modifications of consonants when they occur in a sequence of two or more consonants. The text discusses the sequences /nt#g/ (400 to 550 ms), /p#t/ (700 to 850 ms), /sw/ (1000 to 1150 ms), and /dn/ (1200 to 1270 ms).



vowel
reduction

Figure 10.10 Spectrograms of the words *monopoly* (left) and *classical* (right) extracted from sentences produced by a male talker, giving examples of brief reduced vowels. In *monopoly* the reduced vowels are at 50 and 320 ms; in *classical* it is at 280 ms.

voicing assimilation

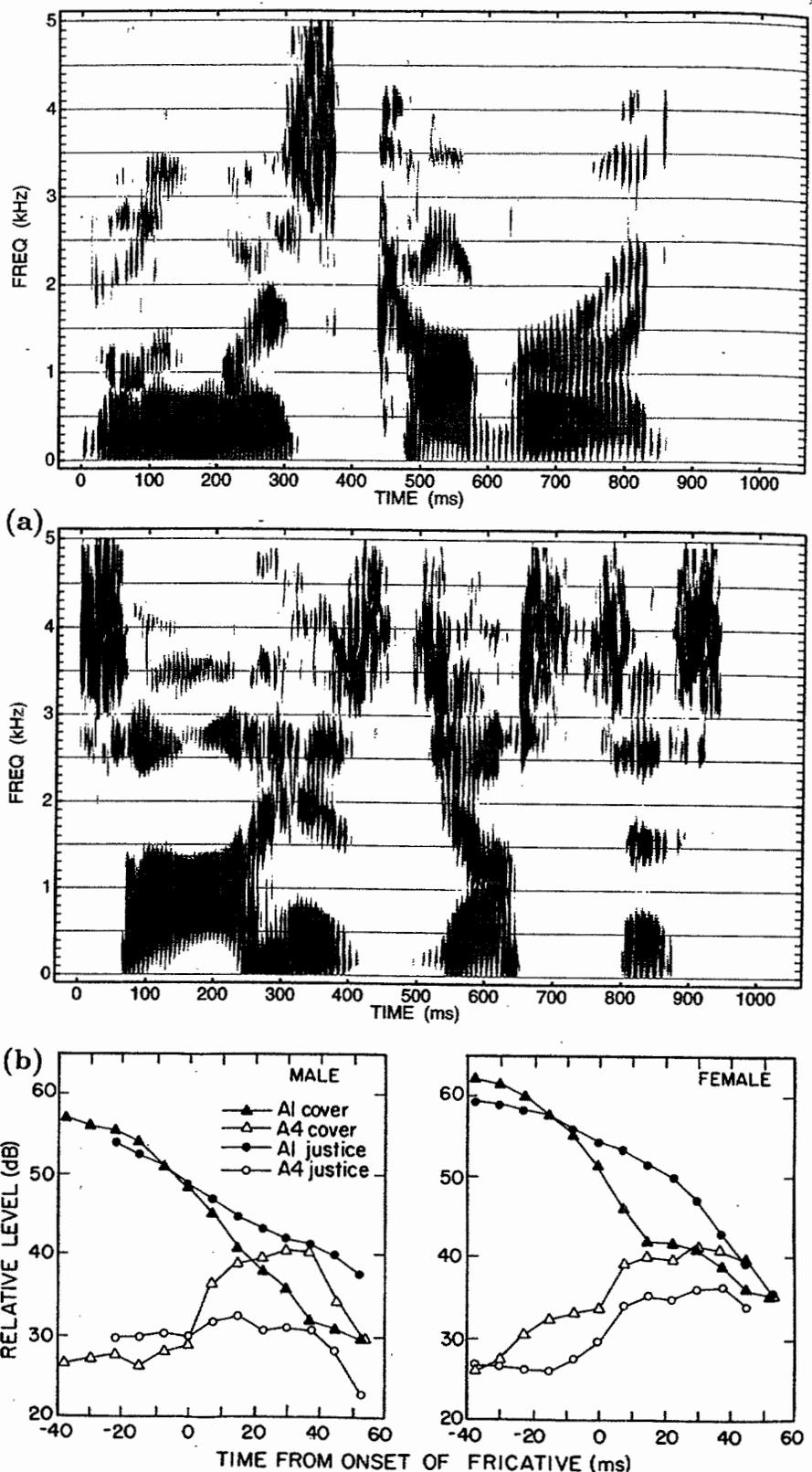
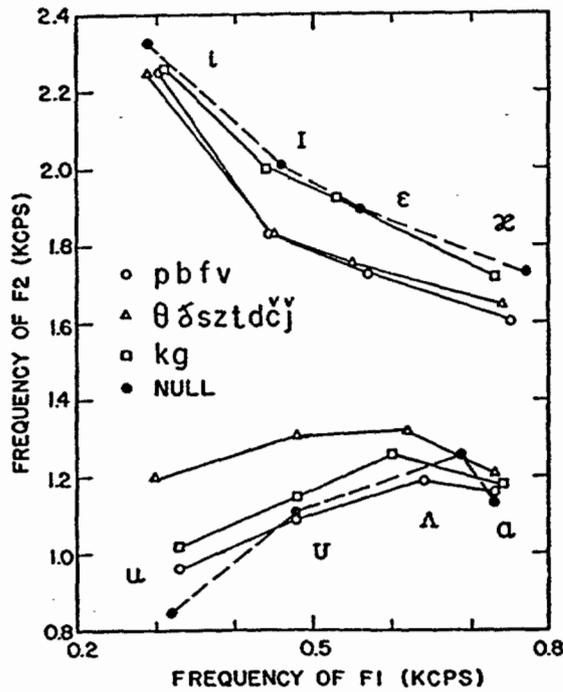


Figure 10.6 (a) Spectrograms of utterances (male speaker) "...blew his cover again" (top) and "...saw his justice done" (bottom). The text discusses the sequences *his cover* (200 to 750 ms), and *his justice* (280 to 950 ms). (b) Measurements of spectrum amplitude in the two versions of the word *his* at low frequencies (solid dots) and at high frequencies (open dots) as a function of time. The amplitude measures are A1, the amplitude of the first-formant spectrum prominence, and A4, the amplitude of the largest spectrum prominence in the F4-F6 region. Average data from three repetitions for a male speaker (left) and a female speaker (right). See text.



Effects of context
on vowels

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 contexts 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.)

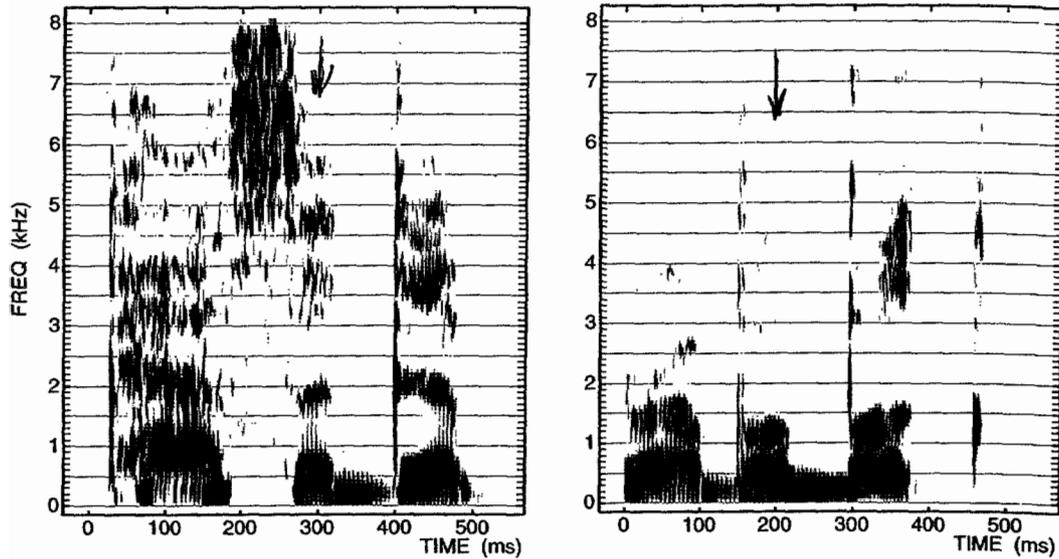


Figure 10.9 Spectrograms of the sequences *pass a dip* (left) and *rub a book* (right) extracted from sentences produced by a female talker, illustrating modification of schwa vowel by context.

Table 10.2 Formant frequencies (in hertz) in the middle of the schwa vowel for the utterances *pass a dip* and *rub a book*, as spoken in a sentence context

	Female			Male		
	F1	F2	F3	F1	F2	F3
<i>pass a dip</i>	494	1785	3513	423	1491	2624
<i>rub a book</i>	410	1071	2908	488	912	2474

Note: Data are averages for three repetitions by a female and a male speaker.