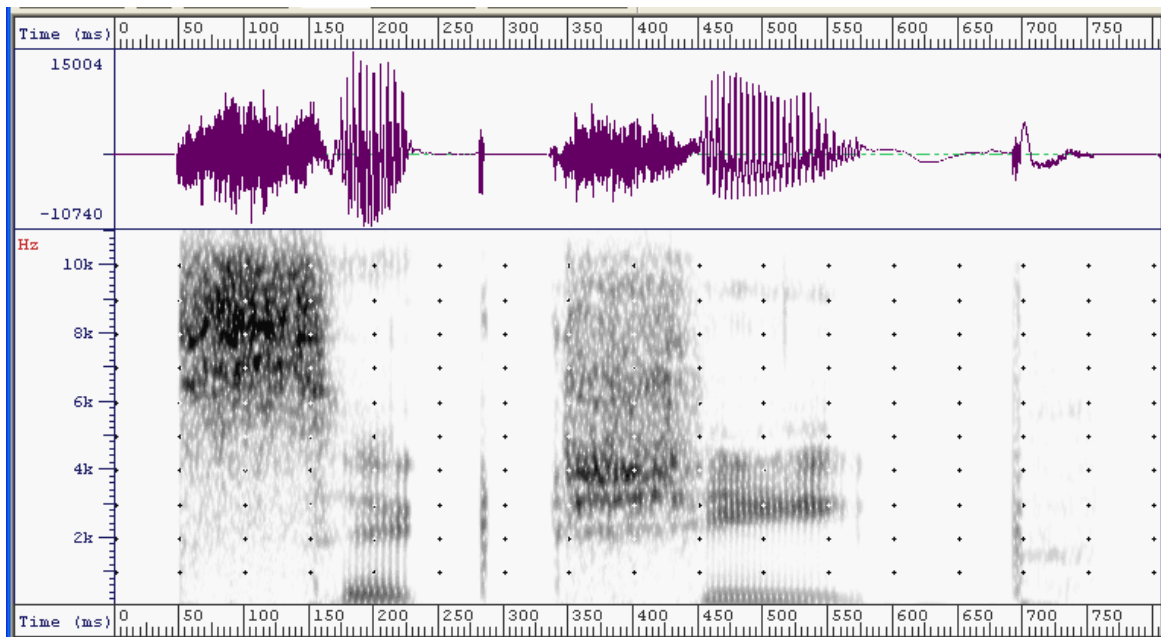


1. In the waveform and spectrogram above showing the words “top” and “dog,” locate the following acoustic landmarks:
  - a. burst and voice onset time for /t/
  - b. aspiration noise for /t/
  - c. first three formants for /a/
  - d. consonant closure (stop gap) and burst for /p/
  - e. burst and VOT for /d/
  - f. first three formants for /a/
  - g. consonant closure and burst for /g/
  
2. Which of the two initial stops above has a longer voice onset time? Why?
  
3. Which of the two words above has the longest vowel duration? Why?



4. In the waveform and spectrogram above showing the words “sick” and “sheep,” locate the following acoustic landmarks:
  - a. frication noise for /s/
  - b. first three formants for /ɪ/ (should be below 4k Hz)
  - c. burst for /k/
  - d. frication noise for /ʃ/
  - e. first three formants for /i/ (should be below 4k Hz, F2 and F3 are merged)
  - f. burst for /p/
  
5. Describe the difference in the frequency of frication noise for /s/ and /ʃ/. Why does this difference exist?
  
6. Explain why the first and second formants for /i/ and /ɪ/ differ a little from one another. (Think about tongue height and tongue advancement.)