

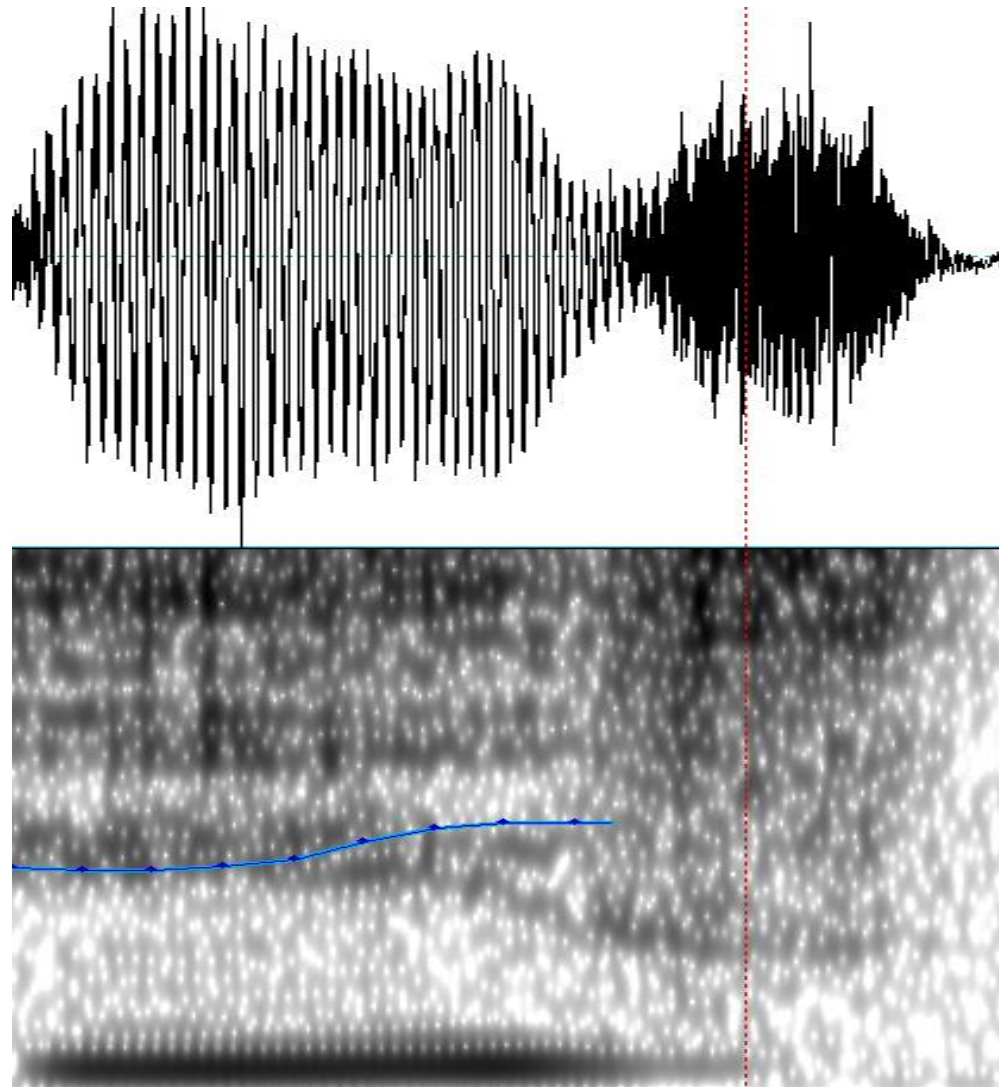
Description of RFF Consonants (Place, manner, voicing)

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Fricatives:

- **S (Labiodental, fricative, voiceless)**

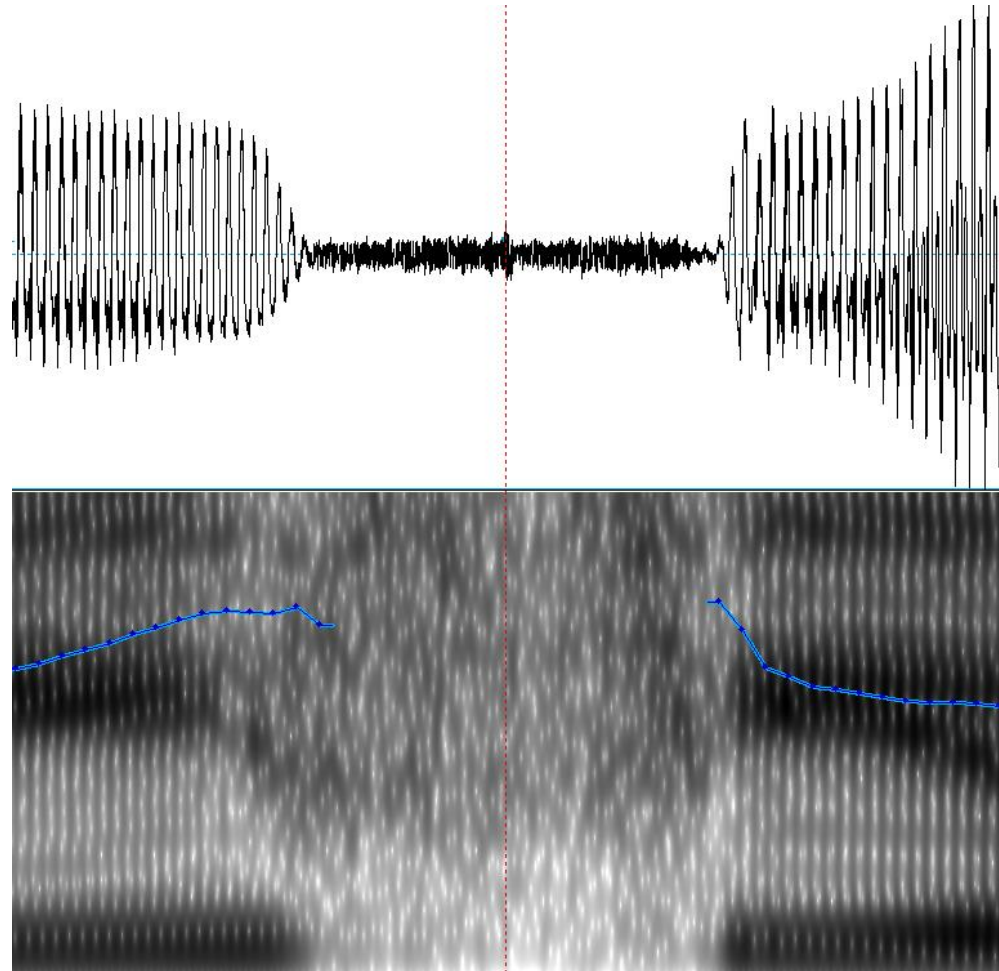
1. Note the differences between voiced and voiceless manners (cognates)
 - [s] = voiceless
 - [z] = voiced
2. To identify [s] versus [z], try listening to the sample; however, it is highly unlikely that an individual will confuse these cognates.
 - Note that [s] is aspiration noise, which may look extremely messy:



**Dark part of waveform is aspiration noise*

- Refer [here](#) for possible sound samples
- **F (Alveolar, fricative, voiceless)**
 1. Note there are differences between voice and voiceless manners
 - [f] = voiceless

- [v] = voiced
- 2. To identify [f] versus [v], try to find the aspiration noise, which may look extremely messy because of flow of air:



**Dark part of waveform is aspiration noise*

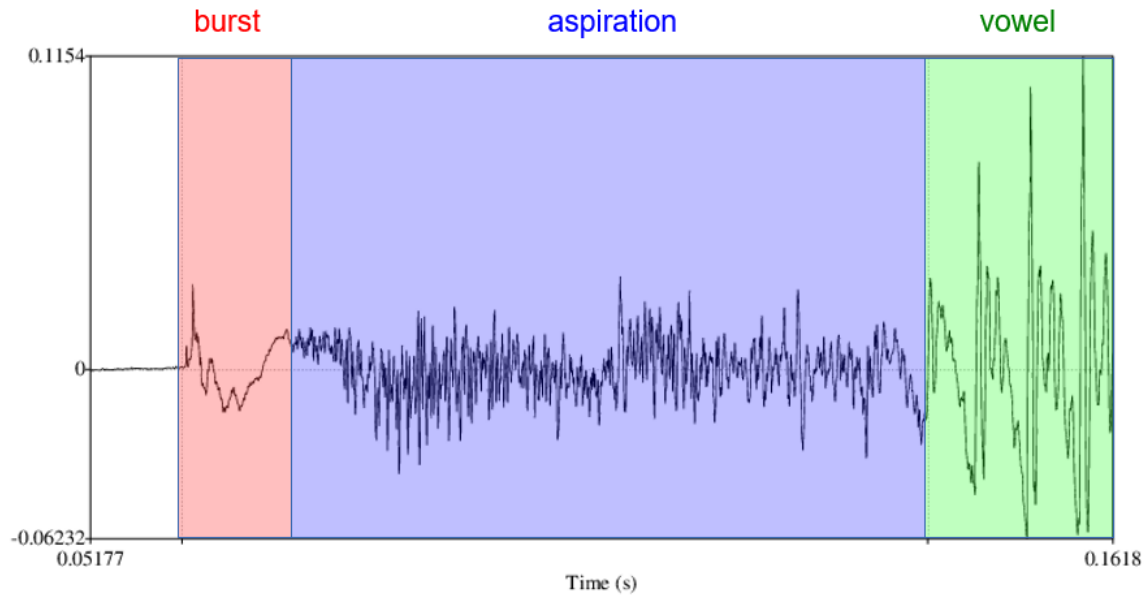
- Refer [here](#) for possible sound samples

Stops:

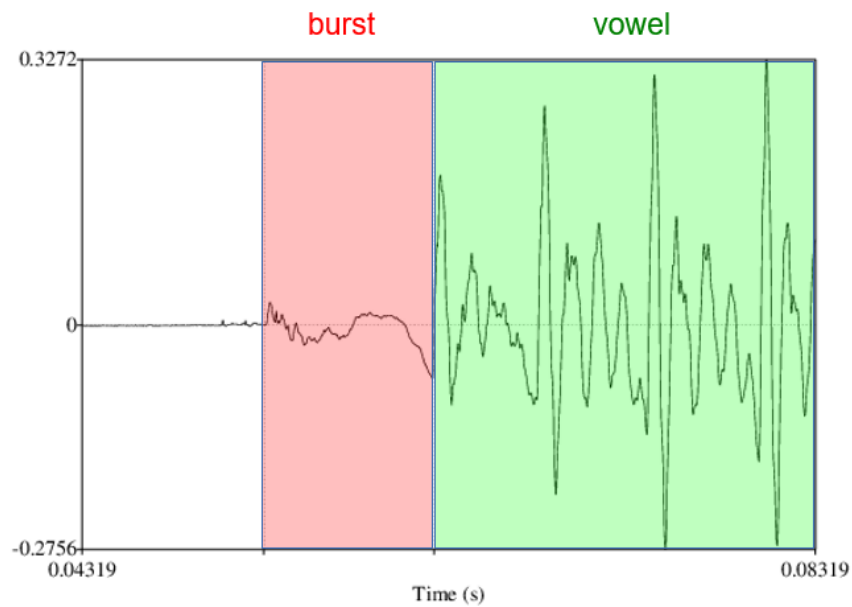
- There are three voiceless stop consonants:
 - [p] (Bilabial, stop, voiceless)
 - [t] (Alveolar, stop, voiceless)
 - [k] (Velar, stop, voiceless)
- Note the differences between voices and voiceless manners (cognates):
 - [p] is voiceless, [b] is voiced
 - [t] is voiceless, [d] is voiced
 - [k] is voiceless, [g] is voiced
- To identify a voiceless stop consonant from a voiced stop consonant, try listening to the sample. However, it may be difficult to distinguish between sounds. If this is the case, look for a voicing bar; if found, the voicing bar may lead you to believe the sound is voiced. Due to the possibility of the “voicing bar” being attributed to noise,

you should also check for a burst and a period of aspiration. If the aspiration period (from burst to beginning of cycle) < 40 ms, the sound is probably voiced.

- An example of a [p] versus a [b] is shown below. Both sounds have a burst, but the [p] has a long period of aspiration (> 40 ms)



/pa/



/ba/

- An example of a two stop consonants in the nonsense words /pa/ and /ba/. The voiceless [p] has an aspiration interval, or voice onset time (VOT) of 82 ms, while the voiced [b] has a VOT of 13 ms

