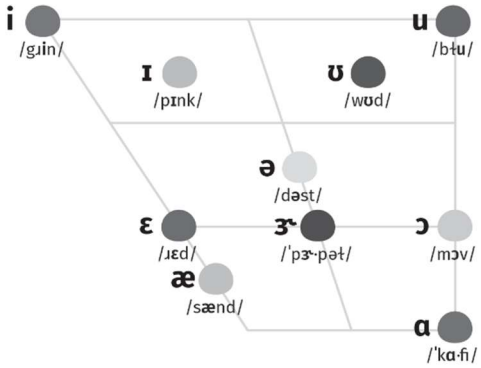
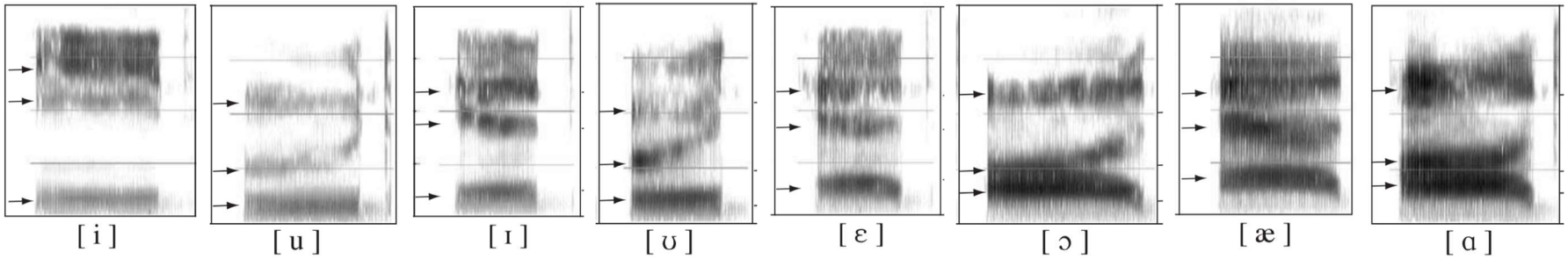
Spectogram Survival Guide



Vowels

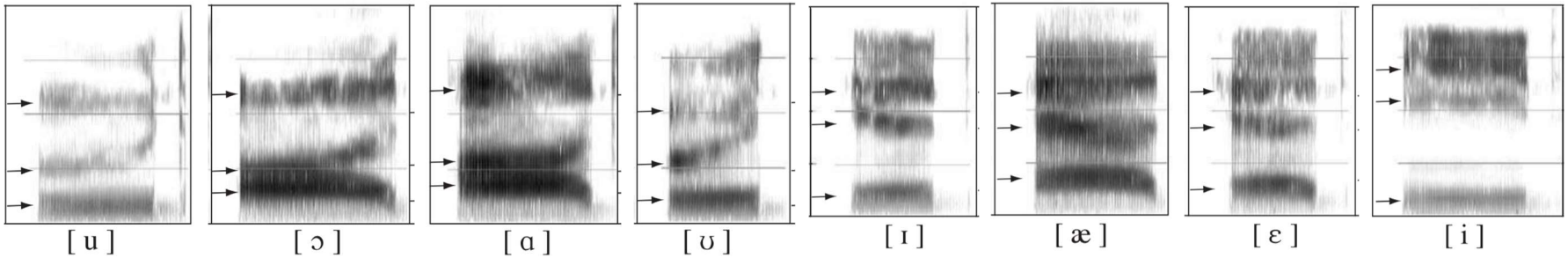
As vowels get *lower*, F1 gets *higher*.

- The highest vowels [i, u] have the lowest F1s.
- The lowest vowel [ɑ] has the highest F1.



As vowels get *backer* or *rounder*, F2 gets *lower* and *closer* to F1.

- Rounded back vowels [u, ɔ] have the lowest F2s.
- The frontest unrounded vowel [i] has the highest F2.



Stops (oral & nasal)

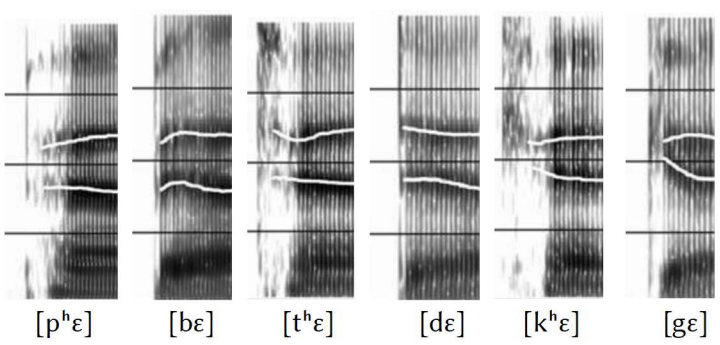
Plosive	p b		t d	ʈ ɖ	c ɟ	k g	q ɢ		
Nasal	m	ɱ	n	ɳ	ɲ	ŋ	ɴ		

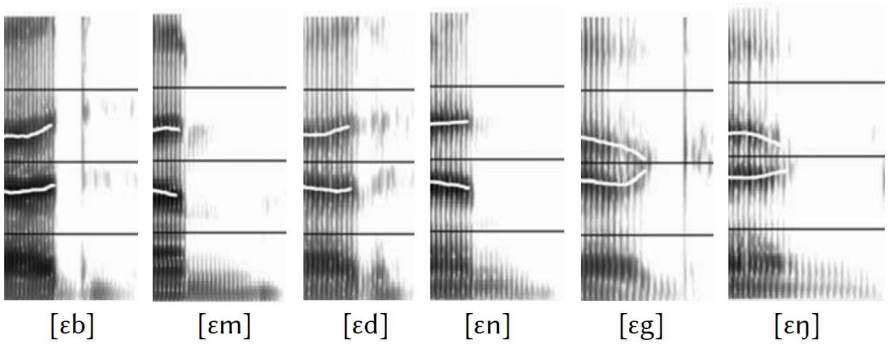
The closures of initial stops look pretty much the same.
The difference shows up in how they *affect vowels* around them.

- Aspiration [pʰ, tʰ, kʰ] creates a light, irregular pattern after release.
- F2 and F3 *start lower* after a bilabial stop [p, b] than after an alveolar stop [t, d].
- F2 and F3 *start close* and then *move away* from each other after a velar stop [k, g].

Final voiced stops show voicing at the bottom of the spectrogram ("voice bar").

- Nasal stops [m, n, ŋ] have a longer/darker voicing bar than oral stops [b, d, g].
- F2 and F3 *rise* slightly before a bilabial stop [b, m]. F2 *rises* slightly while F3 *falls* slightly or stays *flat* before an alveolar stop [d, n].
- F2 and F3 come back *close together* before a velar stop [g, ŋ] ("velar pinch").



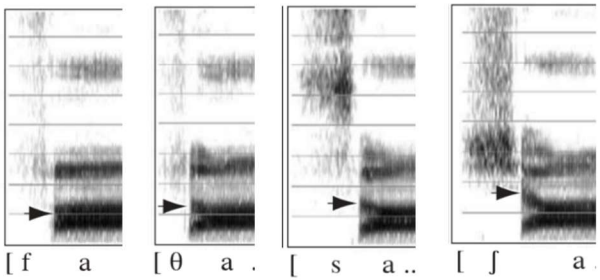


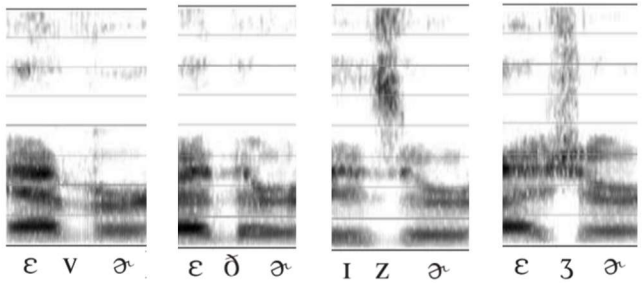
Fricatives

Fricative	ɸ	β	f	v	θ	ð	s	z	ʃ	ʒ	ʂ	ʐ	ç	ʝ	x	ɣ	χ	ʁ	ħ	ʕ	h	ɦ

Fricatives are characterized by random-looking shading at high frequencies.

- [s]/[z] and [ʃ]/[ʒ] make darker patterns than [f]/[v] and [θ]/[ð].

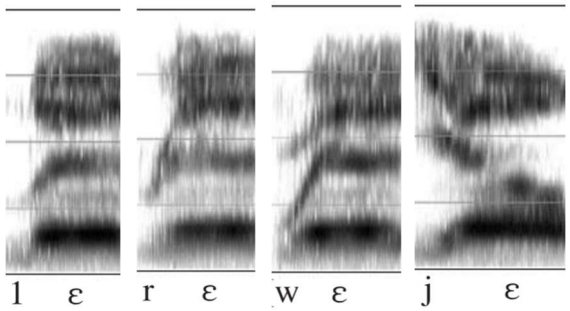




Approximants

Approximants—especially semivowels [w, j]—resemble vowels.

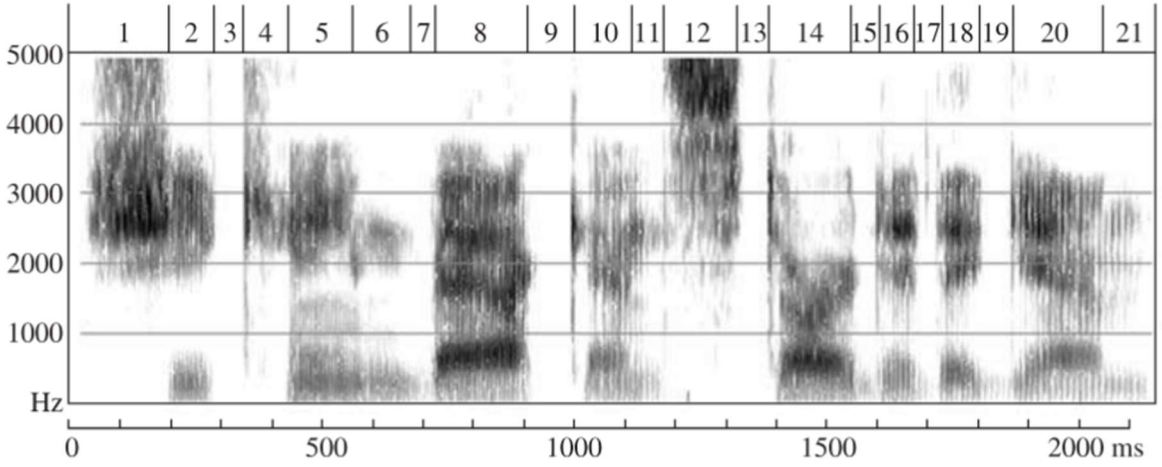
- [w] looks like a short [u] and [j] looks like a short [i].
- [w] has a sharp rise in F2; [ɹ] has a sharp rise in F3.



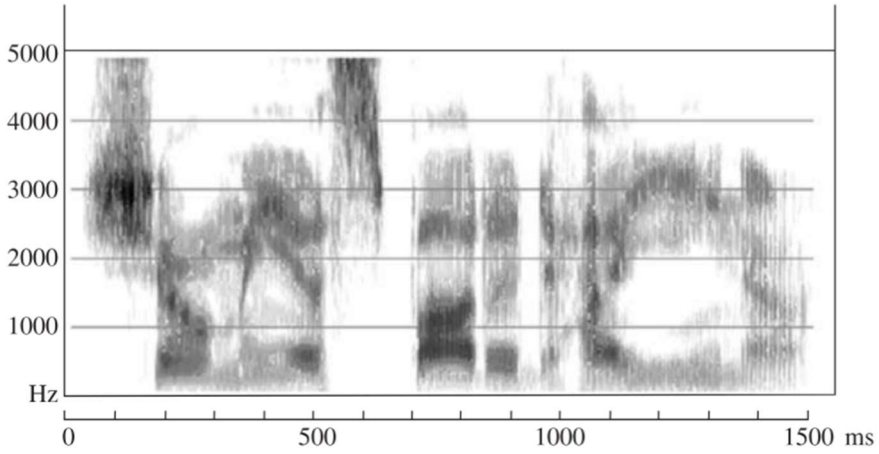
Approximant		ʊ	ɹ	ɻ	j	ɰ
Lateral approximant			l	ɭ	ʎ	ʟ

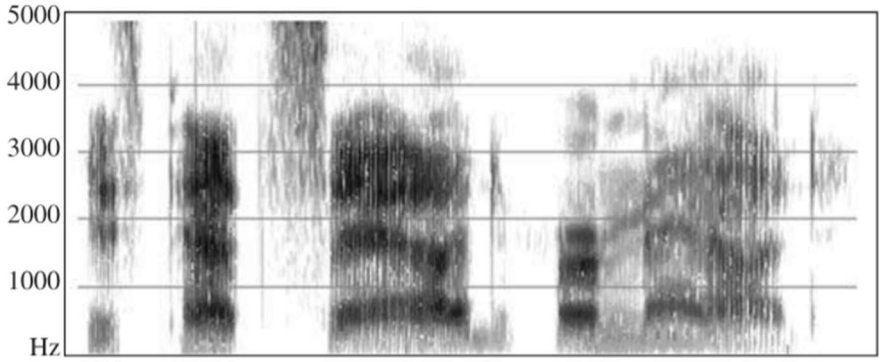
Putting it all together…

She came back and started again.



Show me a spotted hyena.





Is Pat sad, or mad?

He left here – three days ago.

