

Typical things seen in visual feedback spectrogram displays – helpful in the studio

Diphthongs

/a:i/ or /a:I/, as in “rise”

/a/ F1 and F2 are closely spaced

/i/ or /I/ F1 and F2 are widely spaced

Watch for the RISE in F2 and the DROP in F1 as the vanishing vowel is approached (as the tongue moves forward and arches higher)

/a: u/ or /a: U/

/o: u/ or /o: U/

The tell tale sign of the vanishing vowel is the DROP in F1 and F2 with increased lip rounding

/ae: u/ or /ae: U/

/ae/ F1 is high and F2 is very high

/u/ or /U/ F1 and F2 are very low.

Again, the tell-tale sign of the vanishing vowel is a DROP in F1 and F2. More obvious than with /a/ or /o/

/e:i/ or /e:I/ or /E:i/ or /E:I/

F1 is lower and F2 is higher for /i/ and /I/ than for /e/ and /E/

The tell-tale sign is F1 and F2 moving farther apart (F1 down, F2 up) as the vanishing is approached.

Co-articulation of vowels and consonants

Definition: Vowels preceding consonants being colored by the consonant and consonants which precede vowels which color the vowels that follow them.

Biggest culprits for English speakers are /l, m, n, r/ and ng.

With all nasals, the tell-tale sign of anticipating or retaining the nasality of the consonant is a damping of the intensity (acoustic energy is being absorbed by soft tissue), especially high frequencies, and a slight flattening of pitch (sometimes). Some singers will also exhibit a reduction of vibrato when coarticulating. All of these are visible in the spectrogram.

/l, r/

example – anticipation of consonant in /al/

Tell tale sign is a DROP in F1 and F2, and a loss of strength in the upper partials

example – anticipation of consonant in /ar/

Tell-tale sign is DROP in F1, RISE in F2, DROP in F3 (F1 drops, F2 and F3 cluster together more)

Onsets and Releases

1. Breathy onsets – look for non-harmonic noise from the air turbulence prior to the vowel, noise (not a clear gap) between the harmonics, a delayed onset of the vibrato and weak higher partials
 2. Glottal onsets – look for a solid vertical bar on the left hand side of the display of the pitch in spectrogram. Similar to a hand clap. All sudden events look like this.
 3. Creaky onset – in spectrogram, formants will be very clear, there will be no vibrato, and no harmonics (no gaps in spectrogram or spectrum).
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1. Breathy release – look for a loss of high partials, a loss or instability of vibrato prior to the release
 2. Punched release – pitch will sometime arc up; a solid vertical bar may appear on the right side of the note – similar to glottal, but at the end of the note.

Scooping or exit glides

Watch the pitch contour in the spectrogram arc up or down

Consonants

With the voiced plosives, voiced fricatives and glides, the following may be visible:

/b/ - watch for /mb/ (see nasals above) and a scoop upward in pitch.

/d/ - watch for /nd/ (see nasals above) and a scoop upward in pitch.

/g/ - watch for /ng/ (see nasals above) and a scoop upward in pitch.

/v/ - watch for /mv/ (see nasals above) and a scoop upward in pitch.

/z/ - watch for /nz/ (see nasals above) and a scoop upward in pitch.

Consonant in “Asia” - watch for ng preceding the consonant (see nasals above) and a scoop upward in pitch.

Voiced th - watch for /n/ before th, especially in some Hispanic speakers (see nasals above) and a scoop upward in pitch.

/w/ - watch for a scoop upward in pitch, and F1 and F2 being very low prior to the next vowel.

/j/ - watch for a scoop upward in pitch, and F1 and F2 being widely separated before the next vowel.