24.964

Phonetic Realization

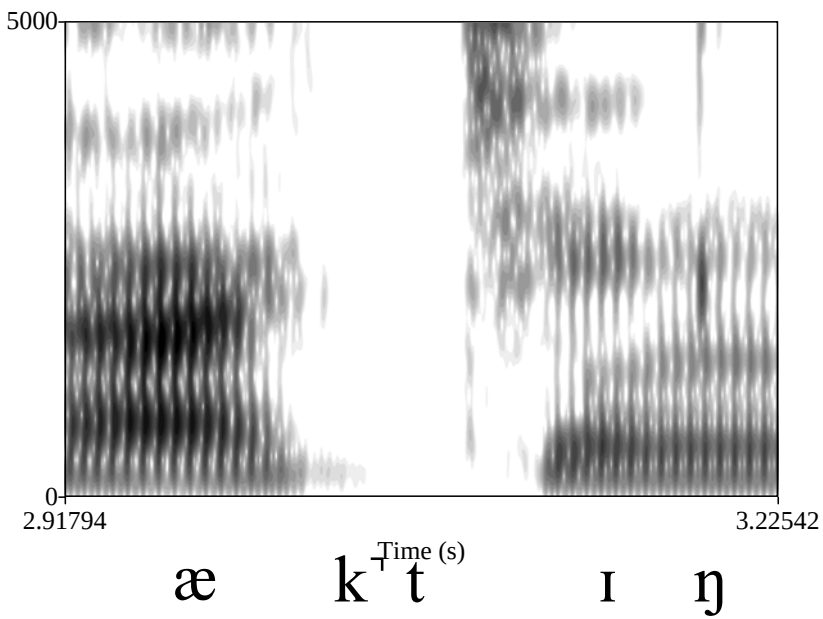
Releases and transitions

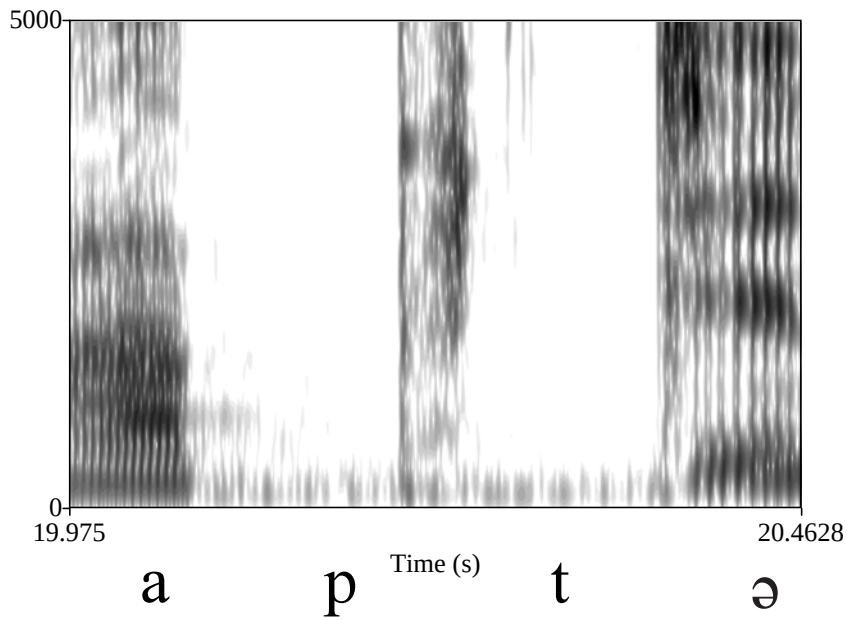
Readings for next time:

- Make-up class?

Consonant releases and transitions

- Languages differ in the realization of consonant clusters.
  - Bloomfield: Close vs. open transition
- English employs close transitions within words.
- Montana Salish employs open transitions between stops.

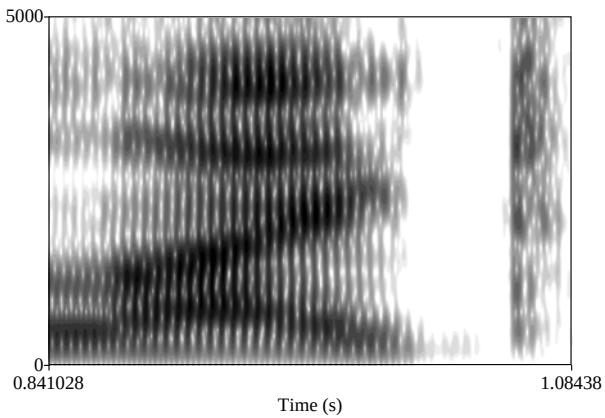




Distribution of audibly released stops

English:

- no audible release of stops before non-approximants (word-internally)
- final stops can be released.

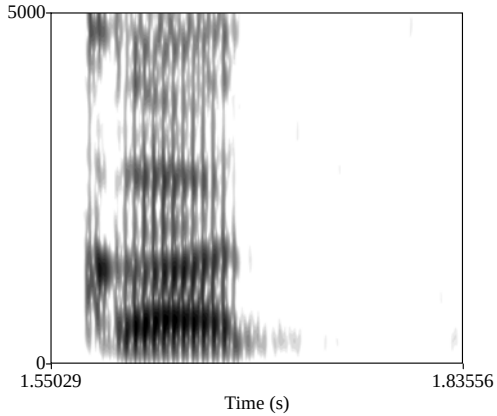


l aɪ kˀt

Audio: 1_english.wav.

Korean:

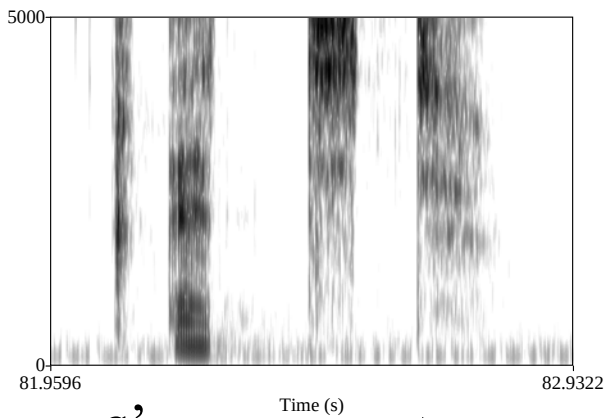
- no audible release of stops in clusters or word-finally.



Audio: 1_korean.wav.

Montana Salish:

- stops are strongly released in all contexts.



qʼ e t t

Audio: 1_salish.wav.

Consonant releases and transitions

- The nature of the transitions between consonants can have a significant impact on the availability of cues to contrasts.
  - Stop bursts: place, voicing, manner, duration, presence
  - Nasal release: place (Kurowski & Blumstein 1984 argue that the transition from murmur to oral formants provide strongest cues).
  - Open interval can carry formant transitions, aspiration/voicing etc, depending on duration.
- Final stop releases.
- What determines the distribution of open/close transition?

Phonological implications

- Jun (2002) argues that released stops in C_1 position of a medial C_1C_2 cluster are resistant to place assimilation and deletion:
- Languages 'in which C_1 stops are canonically released': Tswana, Arabic, Wikchamni, Tillamook, Chontal, Hindi, Motilone, Kutenai, Upper Chehalis, Zoque, Russian.
  - All have heterorganic clusters, no place assimilation or deletion.
- Languages where C_1 stops are targeted in:
  - place assimilation: German, Korean, English, Malay, Thai, Yakut, Catalan
  - deletion: Diola-Fogny, English, German, Thai, Malay, West Greenlandic, Basque.
  - All are claimed to have canonically unreleased C_1 stops.
  - In Diola-Fogny (and others?) this is inferred based on optional non-release of final stops. Assumption: non-release of final stops implies non-release of pre-obstruent stops.

Steriade (1997) - obstruent voicing

- Markedness of obstruent voicing contrast in context C depends on strength of cues to voicing in C.

Environment		Cues
*αVoice/ [-son] _ [-son], [-son]_#, #_[-son]	>>	clo voi, clo dur
*αVoice/ V_ [-son]	>>	clo voi, clo dur, V1 dur, F0, F1 in V1
*αVoice/ V_ #	>>	clo voi, clo dur, V1 dur, F0, F1 in V1, burst dur & amp
*αVoice/ V_ [+son]	>>	clo voi, clo dur, V1 dur, F0, F1 in V1, burst dur & amp, F0, F1 in V2

no burst

Image by MIT OpenCourseWare. Adapted from Steriade, Donca. "Phonetics in Phonology: The Case of Laryngeal Neutralization." Manuscript, UCLA, 1997.

- Assumes pre-obstruent stops lack bursts, final stops (can) have bursts.
- Stops can be released in pre-obstruent and may be consistently unreleased pre-pausally.

Steriade (1997) - obstruent voicing

- Why don't Steriade's assumptions about stop releases lead to incorrect predictions concerning implicational hierarchy of positions of neutralization?
  - Contrast pre-obstruent -> contrast in final position.
- A language which released pre-obstruent but not final stops would be problematic because pre-obs would then have more cues than final position.
- Hypothesis: release of pre-obstruent stops implies release of final stops (cf. Jun 2002).
  - Languages that do not release final stops (counter to assumptions) also do not release pre-obstruent stops, so pre-obstruent position is still no better than final position (although we might expect the two positions to pattern together under these circumstances).

Steriade (1997) - obstruent voicing

- Distribution of release may have (expected) effects on the distribution of obstruent laryngeal contrasts.
- E.g. Korean neutralizes laryngeal contrasts in final position - final stops are never audibly released.

Obstruent voicing

- Ukrainian: voicing is neutralized only before voiced obstruents:

_#	*rot*	'mouth'	*rod*	'kind'
_T	*ri*[dᵊk]o	'seldom'	*ve*[zᵊt]*y*	'to drive'
_D	*xo*[db]*a*	'walking'	*tb	

- Zilynskyj (1979) reports that clusters are broken up by an open transition, particularly noticeable in voiced-voiceless clusters.
- Also there is a correlation between devoicing and loss of this transition, across Ukrainian dialects.

Meccan Arabic

- Voicing is neutralized only before voiceless obstruents (Kenstowicz et al 2000):

/yi+ktub/	[yiktub]	‘writes’	[katab]	‘wrote’
/yi+dbaħ/	[yidbaħ]	‘slaughters’	[dabaħ]	‘slaughtered’
/yi+tbaʕ/	[yitbaʕ]	‘follows’	[tabaʕ]	‘followed’
/yi+dfin/	[yitfin]	‘buries’	[dafan]	‘buried’

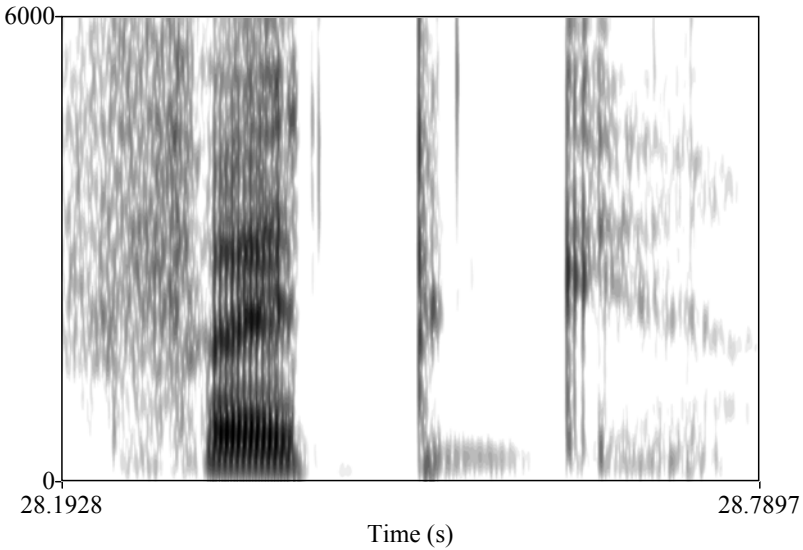
Meccan Arabic

- Voicing is neutralized only before voiceless obstruents in word-final clusters also:

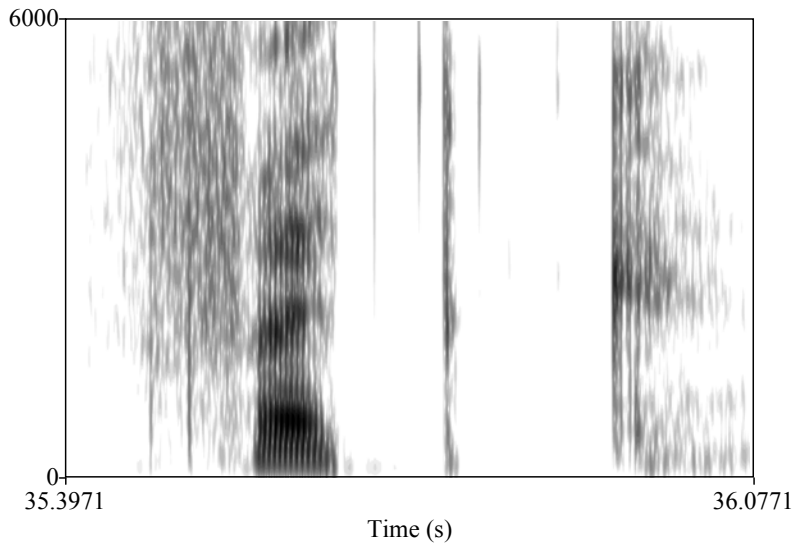
/fatk/	fatk	‘destruction’
/9abd/	9abd	‘slave’
/rabk/	rapk	‘confusion’
/rakb/	rakb	‘caravan’

Meccan Arabic

- Stops are released in most positions, often strongly.
  - Final, singleton ‘voiced’ stops are not always audibly released
  - Final voiced geminates are not audibly released.
  - [p] in [kapt] is unreleased.
- Some clusters are separated by open transitions.



fatg Audio: 10_meccan1.wav

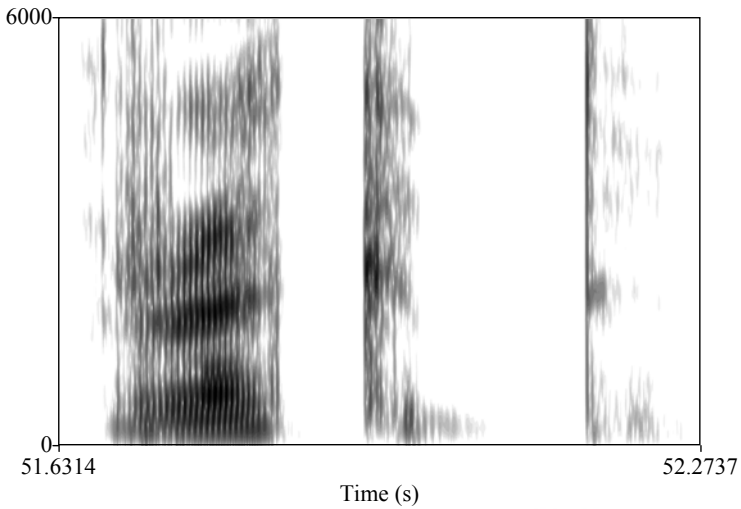


fatk Audio: 10_meccan2.wav

Audio recordings courtesy of Mahasen Abu-Mansour. Used with permission.

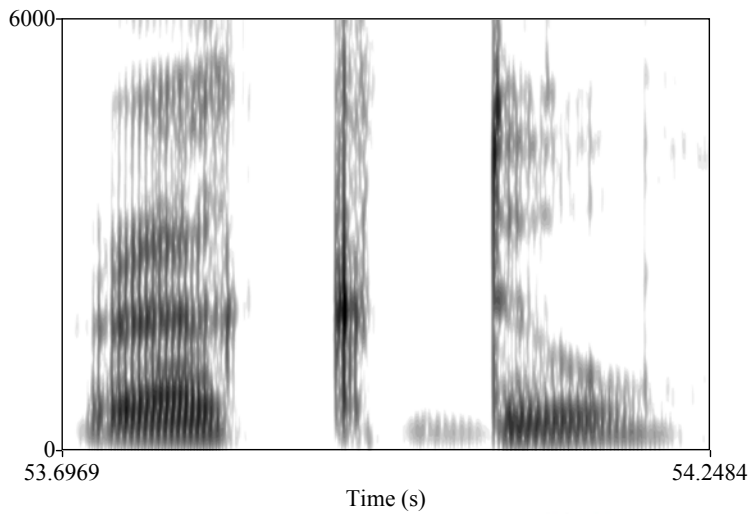
Meccan Arabic

- Some clusters are separated by open transitions, particularly TD, medially and finally.



rakd

Audio:
10_meccan3.wav



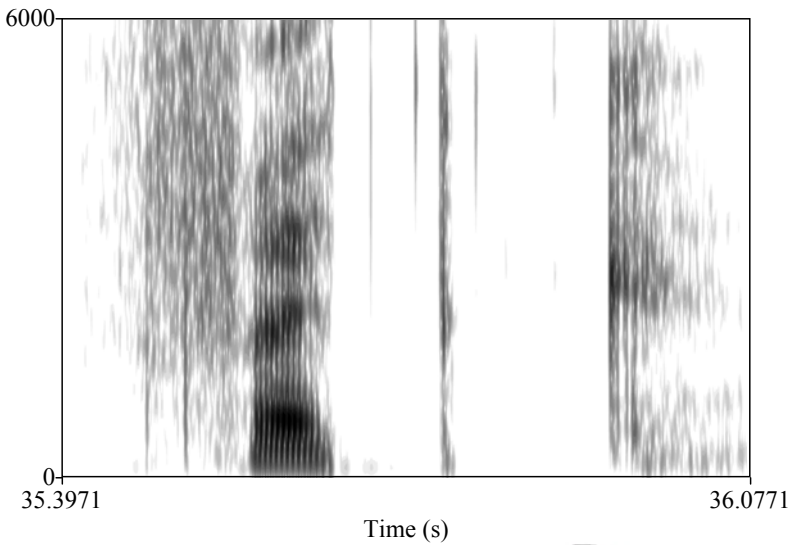
rakdu

Audio:
10_meccan4.wav

Audio recordings courtesy of Mahasen Abu-Mansour. Used with permission.

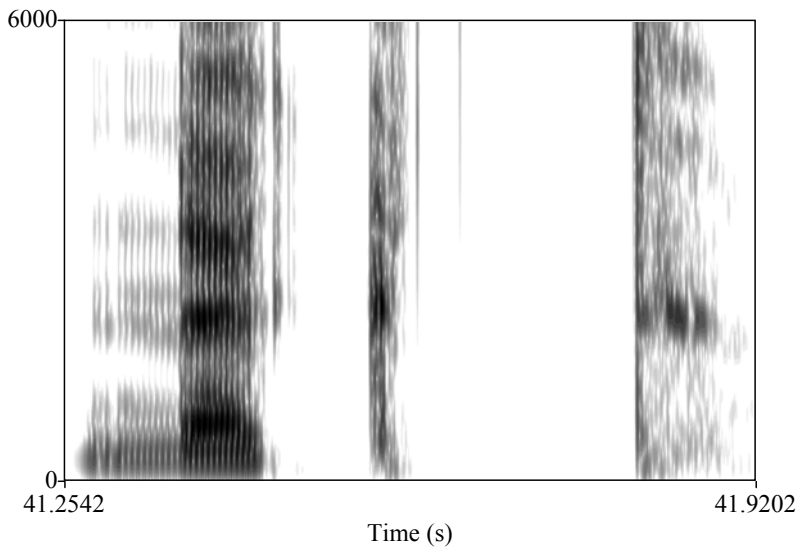
Meccan Arabic

- There are some indications that back-front clusters are less overlapped than comparable front-back clusters.
  - but this may be simply a place effect on burst duration: velar > dental > labial.
- Medial clusters look similar to final clusters (cf. Georgian)



fatk

Audio:
10_meccan2.wav



nakt

Audio:
10_meccan5.wav

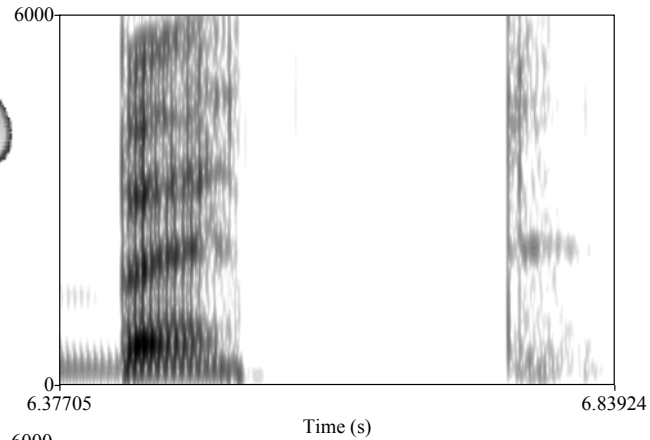
Audio recordings courtesy of Mahasen Abu-Mansour. Used with permission.

Meccan Arabic - final singletons

- Final singleton ‘voiced’ stops are devoiced, regularly unreleased, and apparently glottalized.
- Final singleton voiceless stops are voiceless, released, and induce breathiness on preceding vowel.

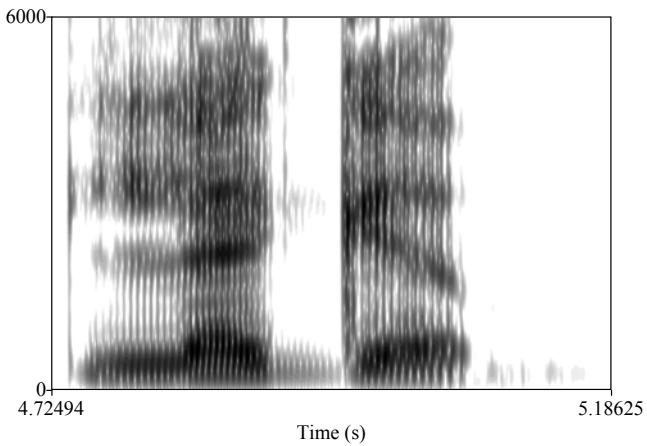
Audio:
10_meccan7.wav

nabat



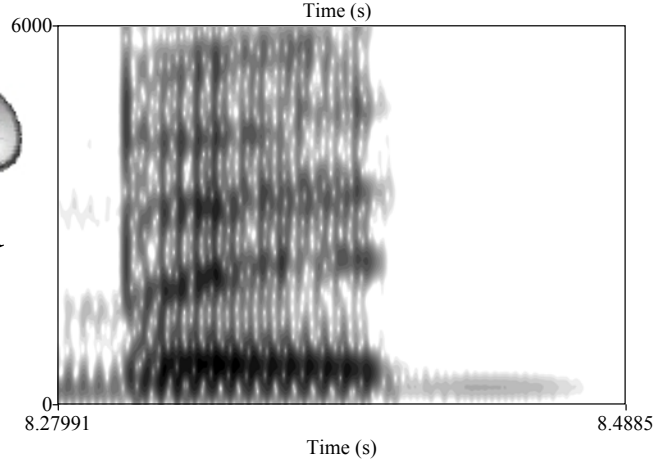
lagab

Audio:
10_meccan6.wav



Audio:
10_meccan8.wav

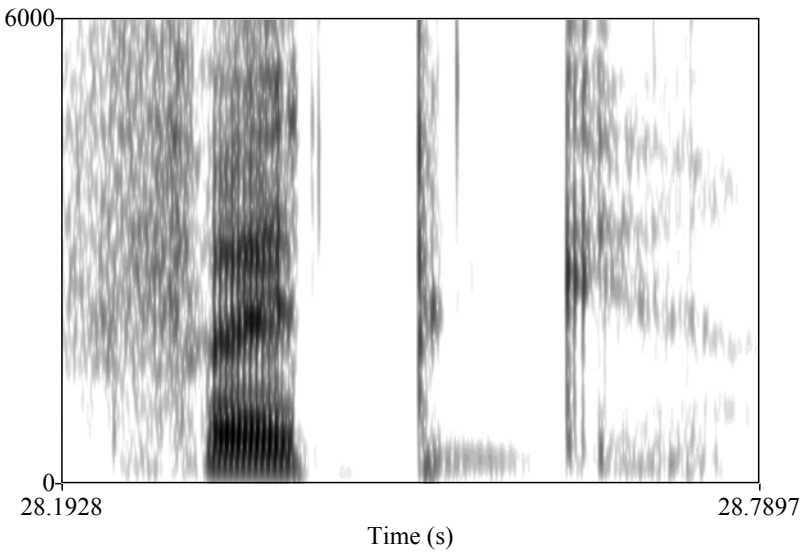
ʔabad



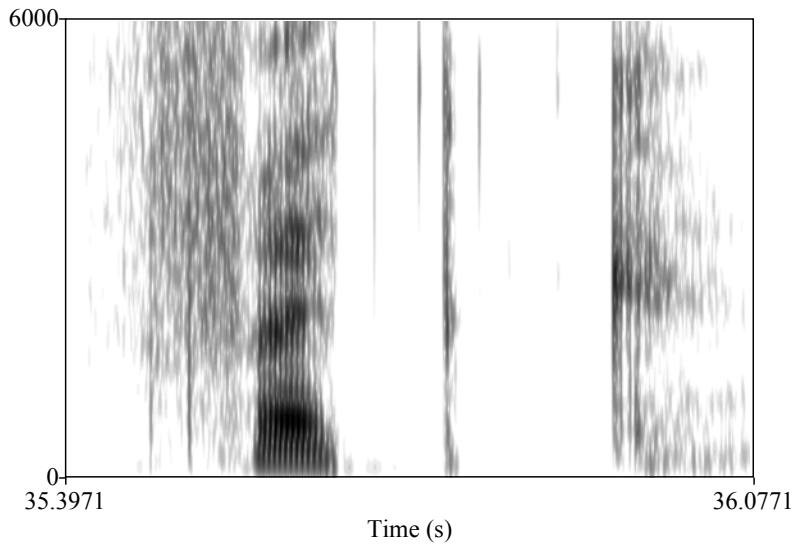
Audio recordings courtesy of Mahasen Abu-Mansour. Used with permission.

Meccan Arabic

- Intensity of release and aspiration noise seems to play an important role in realizing voicing contrasts, especially for pre-pausal 'voiced' stops which lack closure voicing.
- Why is voicing neutralized before voiceless?



fatg Audio: 10_meccan1.wav

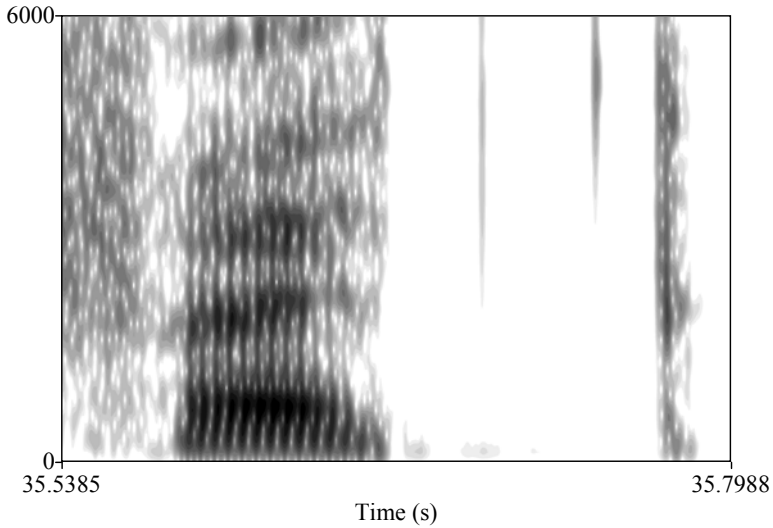


fatk Audio: 10_meccan2.wav

Audio recordings courtesy of Mahasen Abu-Mansour. Used with permission.

Why is voicing neutralized before voiceless?

- Not due to lack of C1 release in [+voi][-voi].
- Voiceless consonants appear to have significant glottal opening ([+s.g.]).
  - Breathiness on preceding vowels
  - Strong bursts, aspiration.
- Possibly the early glottal opening seen on vowels would result in glottal opening on the release of a preceding stop, resulting in a voiceless burst/open transition.
  - implies release cues are more important than closure voicing etc.



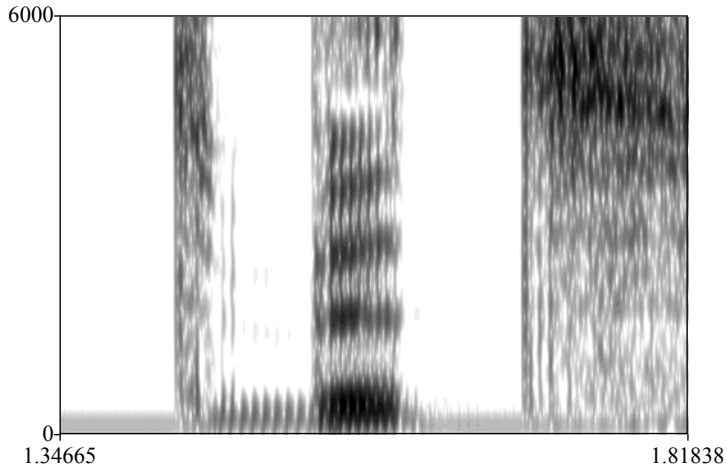
fatk

Audio:
10_meccan2.wav

Audio recording courtesy of Mahasen Abu-Mansour. Used with permission.

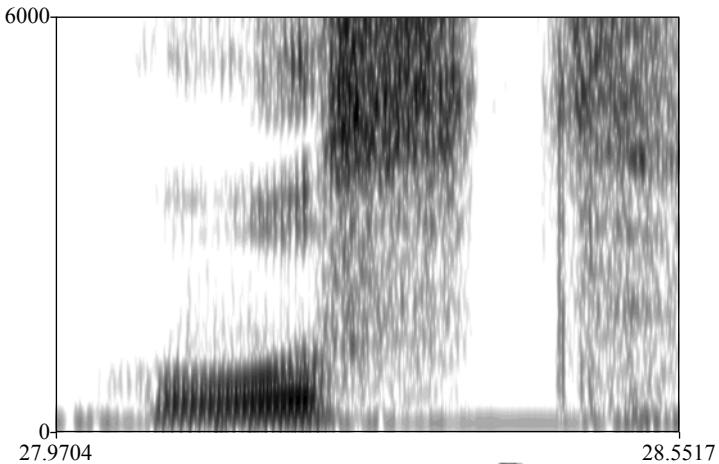
Moroccan Arabic

- C_1 stop in an initial or final cluster is strongly released.
- There is generally close transition between a fricative and a stop (cf. Montana Salish).
  - but see ɢəsb



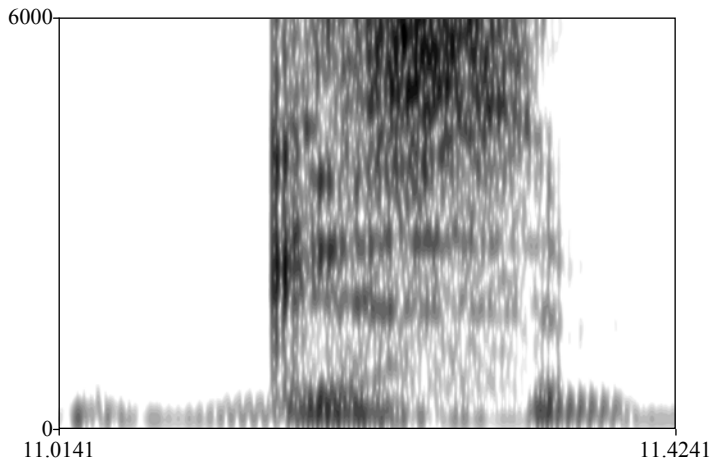
tbət

Audio: 10_moroc1.wav



wəstˤ

Audio: 10_moroc3.wav



ɢəsb

Audio: 10_moroc2.wav

Audio recordings courtesy of Karim Shoul. Used with permission.

Factors affecting distribution of release/open transition

- Position of cluster: initial vs. medial (vs. final?)
- Manner: fricative vs. stop
- Voicing
- Place ordering: back-front, front-back
- Cluster vs. singleton (final position)

- Pre-obs release -> final release?

- (Controlled) degrees of release?
- Variation in duration of open transition.
- Active measures to supress release? (Glottalization).

Possible constraints on the distribution of release/open transition

- Realization of cues - favors release of stops, nasals (?), open transitions for most consonants.
- Preference for overlap - parallel transmission.
  - favours non-release in clusters only.
- Avoidance of confusion with (reduced) vowels.
  - favours non-release, close transitions in all contexts.
  - predicts the non-release of final stops should only arise in languages with reduced vowels (problem: Trinidadian English).
- Don’t generate additional syllables.
- Final non-release could be a domain-final effect (e.g. cessation of voicing by glottal closure).

References

- Jun, Jongho (2002). Positional faithfulness, sympathy and inferred input. Ms, Yeungnam University.
- Steriade, Donca (1997). Phonetics in phonology: the case of laryngeal neutralization. Ms, UCLA.

24.964 Topics in Phonology: Phonetic Realization
Fall 2006