Advanced Phonological Theory B – Lecture 4: Assimilation of place and cue-driven phonotactics

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Accounting for place assimilation: two asymmetries

1. It has been claimed that progressive assimilation of place is relatively rare (e.g., Ohala 1990), yet this can not be derived from feature-geometrical models
2. Nasal stops are more prone to regressive assimilation of place than oral stops, which are in turn more prone to regressive place assimilation than fricatives (Jun, 2004); this observation is not easily derived from feature-geometrical models

Accounting for place assimilation: Ohala's (1990) account

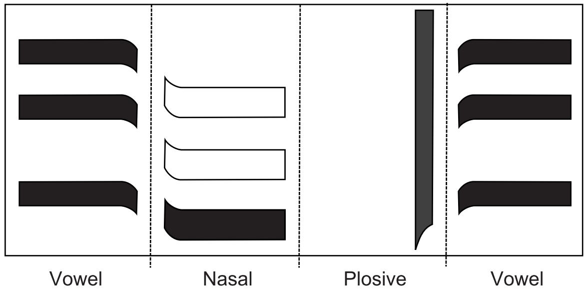
- Listeners (learners) 'misperceive' the place of articulation of a C_1 in C_1C_2 sequences with a probability that depends on the relative strengths of the phonetic cues to place of articulation in C_1 and C_2
- If the misperception is consistent enough, the listener reanalyses the original place of C_1 as homorganic with C_2, adapts the articulation of C_1 accordingly
- . . . and transmits this reanalysis to subsequent generations

Nasal C_1 - C_2 sequences

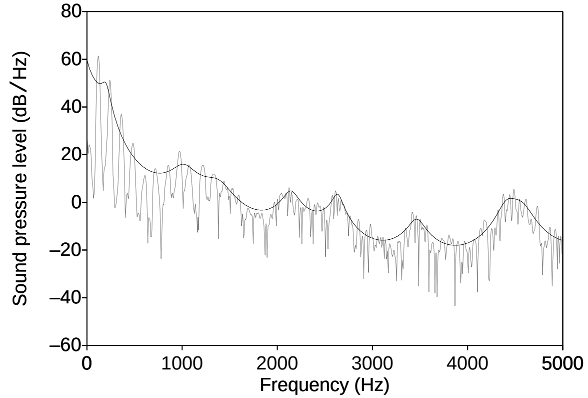
- Nasal place is cued by (relatively weak) VC transitions
- Nasal spectrum is unreliable as a cue to place because information resides partially in spectral zeros and because nasal spectra are subject to considerable inter-speaker variation

Nasal C_1 - C_2 sequences

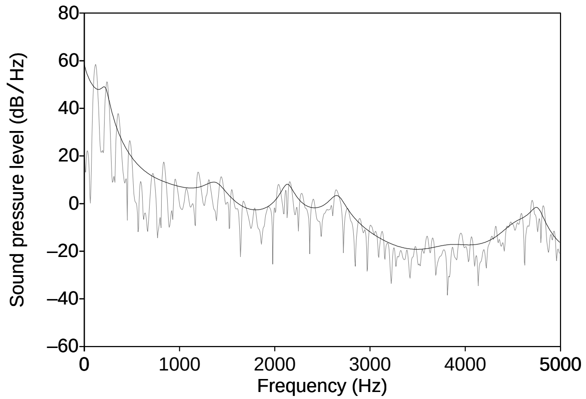
- Sequence of spectral events in a nasal + stop sequence:



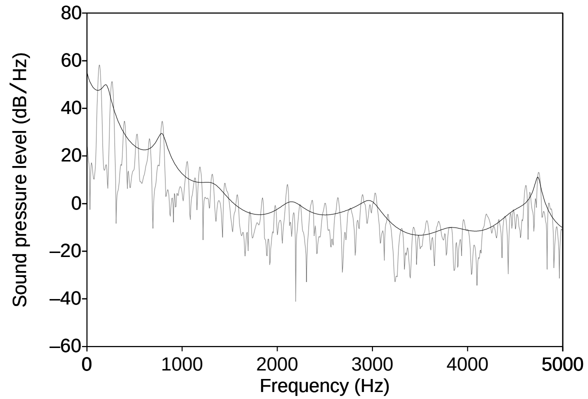
Spectrum of [m]



Spectrum of [n]

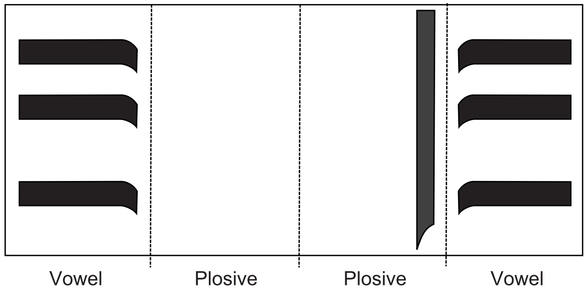


Spectrum of [ŋ]

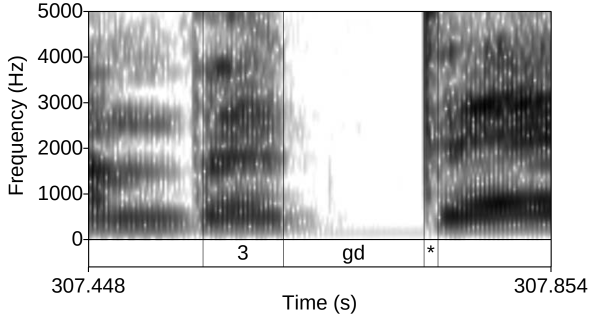


Unreleased plosive C_1 - C_2 sequences

- The place of articulation of unreleased C_1 plosives is cued by (relatively weak) VC transitions:

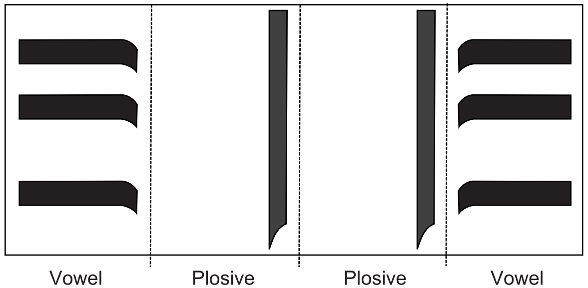


Unreleased plosive C_1 - C_2 sequences

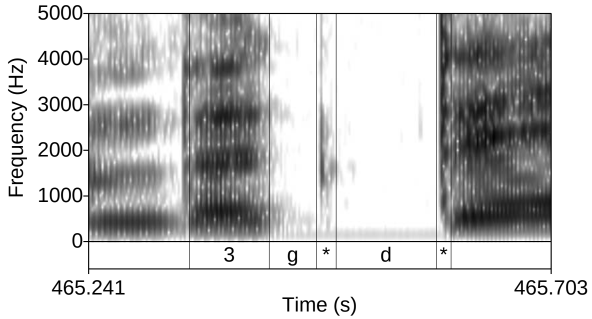


Released plosive C_1 - C_2 sequences

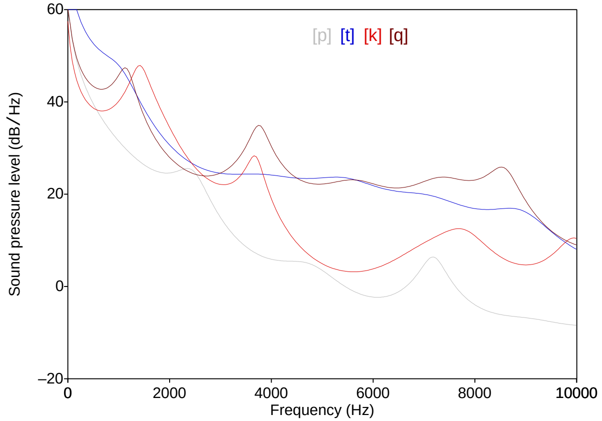
- The place of articulation of released C_1 plosives is cued by (relatively weak) VC transitions and the release burst:



Released plosive C_1 - C_2 sequences

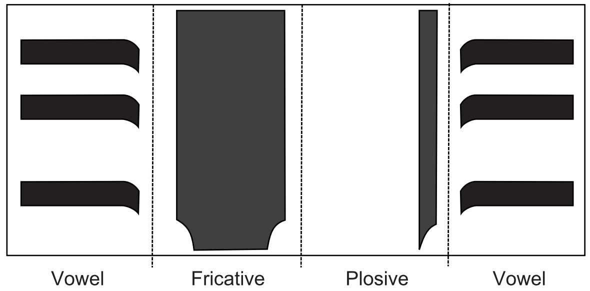


Release burst spectra for [p], [t], [k]

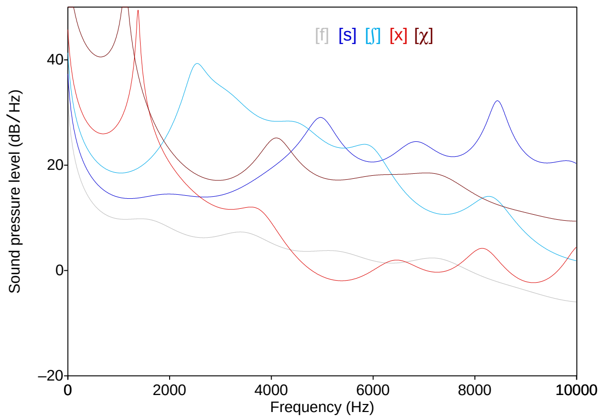


Fricative C_1 - C_2 sequences

- The place of articulation of C_1 fricatives is cued by (relatively weak) VC transitions and the noise spectrum:



Noise spectra for [f], [s], [ʃ], [x], [χ],



Cue-driven phonotactics

- Ohala's account of NPA is part of a much broader attempt to predict (all) phonotactic restrictions on the basis of (constraints on) human speech perception
- In its broadest form, this approach holds that that there is a direct correlation between the perceptibility of a feature in a given context and the probability of it's (synchronic/diachronic) survival in that context

Cue-driven phonotactics

- Optimising perceptibility in the (phonetic) grammar can take at least the following two forms:

1. Neutralisation of (some or all) distinctive values of a relatively imperceptible feature x
2. Block/trigger phonological rule in accordance with perceptibility requirements (ultimately perhaps a product of 3 below)
3. (Re)structuring phonetic realisation such that feature x remains or becomes more perceptible; this may involve neutralisation of some other feature y

Cue-driven phonotactics

- Note that to test cue-driven models we need data with a high phonetic resolution (thus that phonemic accounts are useless!)

References

Fujimura, O., M. Macchi & L Streeter (1978) Perception of stop consonants with conflicting transitional cues: A cross-linguistic study. *Language and Speech* 21: 337-346.

Johnson, K. (1997) *Acoustic and auditory phonetics.* London: Blackwell.

Jun, J. (2004) Place assimilation. In B. Hayes, R. Kirchner & D. Steriade (eds.) *Phonetically Based Phonology.* Cambridge: CUP. Draft available online from http://www.linguistics.ucla.edu/people/hayes/PBP/JunAbstract.htm

Kawasaki, H. (1982) An acoustical basis for universal constraints om sound sequences. Doctoral thesis, University of California at Berkeley.

Ohala, J. (1981) The listener as a source of sound change. In C. Masek, R. Hendrik & M Miller (eds.) *CLS 17: Papers from the Parasession on Language and Behaviour.* Chicago: Chicago Linguistics Society.

Ohala, J. (1990) The phonetics and phonology of aspects of assimilation. In J. Kingston & M. Beckman (eds.) *Papers in Laboratory Phonology 1. Between the Grammar and the Physics of Speech*. Cambridge: CUP.

Ohala, J. (1993) The phonetics of sound change. In

C. Jones (ed.) *Historical Linguistics: Problems and Perspectives*. London: Longman.

Padgett, J. (2001) The unabridged feature classes in phonology. Ms., University of California at Santa Cruz. Available online from http://people.ucsc.edu/~padgett/papers.html

Stevens, K. (1998) *Acoustic Phonetics* Cambridge, MA: MIT Press.

Repp, B. (1986) Perception of the [m]-[n] distinction in CV syllables. *Journal of the Acoustical Society of America* 79: 1987-1999.