Laryngeal timing relationships in Germanic: a Q Theory approach

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1. Preliminaries: Q Theory

Quantized segmental representations: three discrete units, q_1, q_2, and q_3. ([2], [8])

Circumoralized nasals ([bmb]), prenasalized affricates ([^{n}ts]), vowels with three tones (HLH).

It has been argued that the number of q-positions may vary between one and five.([1], [7])

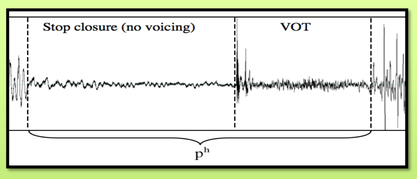
Proposal for phonological representation of plain oral stops:
- Complete oral closure phase (two C-positions) plus release phase (one R-position)

- Geminate stops: longer closure phase (extra C-position)

- Long voicing lag: longer release phase (extra R-position)

2. Laryngeal contrasts in Germanic stops

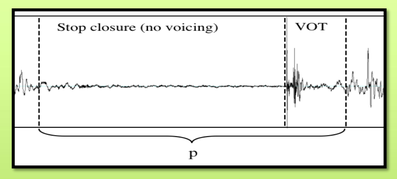
Nature of laryngeal contrasts in word-initial phrase-medial bilabial oral stops in the speech of female speakers of Danish (N=10), Dutch (N=14), and German (N=4) ([4], [6])



Da: den skønneste **par**k /skønəstə ˈpa:k/

Ger: das schönste **Paar** /ʃønstə ˈpa:/

Closure dur. 89ms (Da), 102ms (Ge)
Long voicing lag, VOT 55-80ms (Da)
'aspirated stop' (Danish & German)

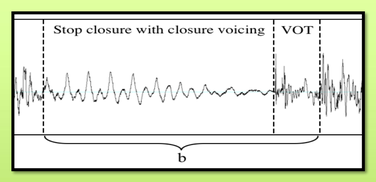


Da: den skønneste **bar**k /skønəstə ˈba:k/

Du: het mooiste **paar** /mɔ:jstə ˈpa:r/

Ger: die schönste **Bar** /ʃønstə ˈba:/

CD 116ms (Du), 111ms (Da), 94ms (Ge)
Short-voicing lag, VOT 5-11 ms.
'plain unaspirated stop'



Du: de mooiste **baar** /mɔ:jstə ˈba:r/

Closure duration 91 ms
Voicing lead (60-100% of closure)
'voiced stop' (Dutch)

3. Representing stop contrast in Dutch, Danish, High German, English, and Swiss German[(3)]

short voicing-lag singleton stop (voiceless unaspirated)	voicing-lead singleton stop (voiced)
q_1 q_2 q_3 C C R \ / Place	q_1 q_2 q_3 **C** C R | \ / | Place **[voice]**
closure specified for Place release unspecified for Place	**voicing during closure**

long voicing-lag singleton stop (voiceless aspirated)	short-lag singleton stop (voiceless unaspirated)
q_1 q_2 q_3 q_4 C C **R R** \ / Place	q_1 q_2 q_3 C C R \ / Place
longer release phase	

short voicing-lag geminate stop	short voicing-lag singleton stop
q_1 q_2 q_3 q_4 **C C C** R \ / / Place	q_1 q_2 q_3 C C R \ / Place
longer closure	

4. Word-final neutralization in Dutch

Dutch loss of [voice] and potential loss of q-position:
Syllable-final stops are typically unreleased (no R-position) when followed by a consonant in the next syllable within the phonological phrase.
For most speakers, syllable-final voiced stops are devoiced if no voiced obstruent follows → feature [voice] is delinked in final position.

C C R → C C (R) \ / \ / Place Place	C C R → C C (R) | \ / \ / | Place Place [voice]
e.g. *noot* [noʊtˇ] 'nut'	*nood* [noʊtˇ] 'distress'

5. Word-final stop contrast in Danish

Danish loss of q-position(s):
Syllable-final fortis stops are typically unreleased (no R-position).
Syllable-final lenis stops: also unreleased, but in some words, they may alternate with glides (two C-positions deleted, and Place-features reassigned to the remaining R-position).

C C R R → C C \ / \ / Place Place	C C R → C C **or** R \ / \ / | Place Place Place
e.g. *kok* [kʰɒkˇ] 'cook (n.)'	*kogt* [kʰɒktˇ] 'boiled' ~ *koge* [kɔu̯ʊ] 'to boil'

q-positions (root nodes)

C without place feature = [ʔ] (glottal stop)

R without place feature = short voicing lag

RR without place feature = long voicing lag (aspiration = quantity)

R with place feature = lenis fricated release/approximant release

RR with place feature = fortis fricated release ('voiceless fricative')

6. Word-final neutralization in German

High German loss of q-position(s):
Syllable-final fortis stops are typically unaspirated (one R-position instead of two) or unreleased (no R-positions).
Lenis stops are also voiceless unaspirated or unreleased in syllable-final position, although some phonetic cues to the distinction may remain [5]

C C R R → C C (R) \ / \ / Place Place	C C R → C C (R) \ / \ / Place Place
e.g. *Bund* [bunt] 'league'	*Bunt* [bunt] 'colorful'

7. Word-final stop contrast in English

English loss of q-position(s) and potentially loss of Place:
Syllable-final fortis stops are typically unaspirated (one R-position instead of two), or unreleased (no R-position) and/or pre-glottalized (no place feature).
Syllable-final lenis stops have a relatively shorter closure phase and the preceding vowel typically lengthens (one q-position less for the final consonant → one q-position more for the vowel).

C C R R → C C (R) **or** C C	V C C R → V V C (R)
\ / \ / | Place Place Place	\ / | Place Place
e.g. "beat" [bi t] or [bi ʔ t]	e.g. "bead" [b i: d̥]

8. Q Theory and Germanic stop contrasts

1. The segment-internal architecture of Q Theory provides us with a better understanding of (laryngeal) timing relationships in Germanic, both with respect to the nature of the contrasts involved (i.e. 'closure voicing'-'no voicing' for Dutch, 'long release duration' – 'short release duration' for Danish, German and English, and 'long closure duration' – 'short closure duration' for Swiss German), and with respect to attested gradient patterns of final stop neutralization (Dutch, German) and variation in final stop realizations (lexical in Danish; sociolinguistic in English).

2. Quantized representations, which distinguish between 'complete oral closure' (C) and 'release' (R) positions, obviate the need for the feature [spread glottis], which in our approach is replaced by scaling up the number of q-positions.

3. Final stop neutralization involves the loss of subsegments and - in languages with prevoicing (=voicing during closure) - deletion of feature [voice].

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SALT: Syllable structure, its Acquisition, Loss, and Typology

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