Phonetic details of nonpulmonic stop release in German: inter- and intraindividual variation

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Epiphenomenal nonpulmonic sound production

- temporal overlap of phonetic correlates from adjacent phonological elements
- articulatory movements made during two stop closures can give rise to positive or negative pressure changes, fuelling a burst on release of one of the closures
- experimental studies for French and Korea (Marchal 1987; Silverman & Jun 1994) and general predictions (Ohala 1995, 1997)
1. Nonpulmonic stop release in German
1.

2.

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Epiphenomenal nonpulmonic sound production in German

- database survey of read speech in German
- nonpulmonic airstream mechanism commonly found in sequences of stops in which the place of articulation of the first stop is anterior to that of the second:
  - glottalic [t?] “weht ein”
- not strictly velaric or glottalic initiation since movements which give rise to pressure changes not actively intended to do so
- differences in occurrence and shape (egressive vs. ingressive)
n/m + k

(a) in Kiel (b) im Kalender

(a)

(b)
Speaker-specific characteristic

- presence vs. absence of audible release
- synchronization of articulatory movements
- complex interspeaker differences in possibilities for flow/pressure changes caused during movements:
  - in oral stops air pressure build-up behind first stop before second closure is made
  - in nasal stops no air pressure build-up behind first stop (velum lowered)
  - articulatory movement during double closure increasing / decreasing intraoral air pressure
Different types of release (“mit grauem”)

(a) velaric suction (b) velaric pressure (c) pulmonic pressure

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Intra-speaker consistency

- consistency across repetitions of similar structures in same recording
- consistency across repeated recordings of the same text
Intra-speaker consistency

- data from *Kiel Corpus*
- speakers consistent in presence/absence and type of release across similar structures (e.g. “acht kam”, “mit grauem”):
  - consistent presence/absence of release
  - strength of release
  - type of release
Two sisters – different behaviours

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Nonpulmonic stop release in German
Mean duration click → stop release: 48 ms
Mean duration click → stop release: 51 ms
epiphenomenal non-pulmonic sound production is a widespread phenomenon in German and presumably in other languages

occurrence, shape and reproducibility of non-pulmonic sound production promising as a reliable speaker-specific characteristic

robust in forensic context
Future work

- long term study of different speakers
- pressure and flow investigation in different types of stop+stop configurations
References


