The influence of syllable position and prosodic weakening on the stability of fricatives

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This study aims to investigate the influence of syllable position (onset vs. coda) and prosodic weakening (accented vs. deaccented) in the production and perception of voiceless fricatives in order to relate the contemporary production to the stability of the segments and a possible basis of sound change.

Alveolar and post-alveolar voiceless fricatives /s/, /ʃ/ are contrastive in many languages as in English, German and Portuguese (e.g. Sue vs. shoe in English, Suppe ‘soup’, Schuppe ‘hovel’ in German, Sá ‘name’ vs. chá ‘tea’ in Portuguese). However, this contrast is neutralized in the Swabian variety of German and in European Portuguese in coda but not in onset position without consonant cluster (Mateus & d’Andrade, 2000).

According to articulatory phonology, syllable position has an influence on segment production. Segments are globally organized and strongly overlapped in the onset and sequentially organized, they are less overlapped and more variable in the coda (Browman and Goldstein 1988, 2000, Marin & Pouplier 2000). To test this hypothesis for fricatives and vowel sequences (CV vs. VC) is the first aim of this study. Regarding perception, we predict in line with Ohde & Sharp (1977) and Fowler (2006) that CV-vowel transitions are easier to recover than VC-transitions.

Previous research has suggested more coarticulation in unaccented than in accented positions (Cho, 2004; Lindblom et al., 2009), but very little is known about the relationship between overlapping gestures in time and their distribution in space. In an acoustic and perceptual analysis of VCV-coarticulation, Harrington et al. (2013) suggested that coarticulation may be similar but the increased variability in prosodically weak constituents might mask coarticulation causing listener errors in attributing the coarticulation to the source that gives rise to it.

In order to explore these ideas further, EMA data were recorded from eight speakers of southern German using the 3D CARSTENS AG501. The sensors were attached to the tongue tip and tongue back, to the jaw, upper and lower lips. The speech material consisted of initial fricative-vowel sequences for the onset condition and vowel-fricative sequences for the coda condition followed by /ɪ, ʊ/ in the German lexical words Suppen ‘soup’, Schuppen ‘dandruff, hovel’, Sippen ‘clans’, Schippen ‘scoop’, Bus ‘bus’, Busch ‘bush’, Biss ‘bit’ and Bisch ‘name’. The target words were embedded in a context to elicit either accented or deaccented position by shifting the focus between the initial and target word in the carrier phrase Maria mag ___ (Mary likes ___ ). The target words were presented together with 14 distracters on a computer screen to the participants.

For the perception experiment, we synthetized a 10-step continuum between /s/ and /ʃ/ and substituted the fricatives in the same words we recorded in the production study. These materials were randomized and presented with 6 repetitions to 25 students of southern standard German.

The production results show a great influence of position in the coarticulation of consonant and vowel and more variability in coda than in onset position. However, little change to the magnitude of vowel-on-fricative coarticulation was found across prosodic conditions.
Time normalized, averaged trajectories of the horizontal TT movement, measured between the velocity peak of the closing gesture of the fricative and the vowel onset in syllable onset position.

**Bibliography:**


