

Neutralisation of the feature [\pm constricted] in the high vowels of Standard Austrian German: A sound change in progress?

Introduction

It has been observed for Standard Austrian German (SAG) that speakers tend to neutralise the opposition [\pm constricted] of the high vowels /i/ – /ɪ/, /y/ – /ʏ/ and /u/ – /ʊ/ in favour of the [+constricted] vowels. Neutralisation was especially observed in spontaneous speech, but also in unstressed positions in the more formal task of reading sentences. The question arose whether this observation might be evaluated as a sound change in progress, caused by the interaction with the Viennese dialect (VD), a variety whose phoneme inventory lacks the [-constricted] high vowels /ɪ/ and /ʊ/ (the phoneme inventory of the VD lacks front rounded vowels in general) or whether phonetic and phonological reasons might be responsible for these variations. In cooperation with the Institute of Phonetics and Speech Processing, Munich, articulatory, acoustic, and perceptual investigations are currently performed in order to shed light on the formation and dynamics of this process.

Method

The current presentation focuses on the acoustic analysis of the front vowels /i/ and /ɪ/ of the speaking task “reading of logatomes” of 14 speakers of SAG. All /i/ and /ɪ/ vowels (> 600) have been segmented manually. F1, F2, and F3 were extracted (software: STx, method: LPC, window length 46ms, overlap 95%). Depending on the length of the vowel, the measurement procedure described rendered 40 to 150 measurements per vowel, i.e., the formant movements over time enter the analysis. For statistical analysis, one-tailed t-tests and cluster analyses were performed.

Results

Cluster analysis revealed that some speakers, independent of age, did not clearly separate /i/ and /ɪ/. For them, a third, mixed cluster, containing both /i/ and /ɪ/, was generated. /i/-vowels of this cluster proved to be significantly shorter than the /i/-vowels pooled in cluster 1. In-depth inspection of formant movements over time revealed that the steady states of the /i/-vowels of the 3rd cluster were shortened, whereas the duration of offset formant transitions was not affected.

The acoustic pattern of /i/-vowels of SAG characteristically shows a high F3 coming close to F4 (Author2). Changes in articulatory settings in the transition phase of the vowel causes a monotonous and substantial drop in F3 frequency. Since formant transitions enter the analysis, this drop in F3 frequency, starting relatively early as compared to the longer vowels, might be responsible for the formation of 3rd cluster.

Consequently, at least as concerns the vowels /i/, the observed 3rd cluster might be caused by both the methodological approach (vowel transitions entering the analysis) and by the acoustics which causes a monotonous and substantial drop in F3 frequency at the offset transition of the vowel (especially for subsequent bilabial and velar plosives). Therefore, the mere formation of a 3rd cluster does not necessarily point to an ongoing neutralisation of the /i/ and /ɪ/ vowels. However, articulatory analysis, acoustic analysis of spontaneous speech, and perception tests will shed more light on this phenomenon.

References

Author2. 2007. Vowels in Standard Austrian German. An Acoustic-Phonetic and Phonological Analysis. Habilitationsschrift, Wien.