Voicing contrast of sibilants in Turkish: Implications for velopharyngeal dysfunction

Background and Motivation: Sibilants are particularly affected by various speech disorders. It has been suggested that especially voiced sibilants are hard to realize, because producing voicing and frication at the same time is only possible within a limited intraoral pressure range. For speakers with velopharyngeal dysfunction (VFD) this may cause a problem for different reasons: First, they have problems to build up a sufficient amount of air pressure required for frication. Second, they may have reduced sensitivity to realize intraoral pressure in the range that allows phonation and frication at the same time.

Aim and questions: In this study, we investigated the articulatory and aerodynamic mechanisms in the production of the sibilants' voicing contrast in normal speech and compared it to acoustic and intraoral pressure data from hypernasal speech. We had two main research questions: i) how do normal speakers of Turkish realize the voicing contrast in sibilants? ii) how do individuals with hypernasality produce frication and voicing despite their velopharyngeal insufficiency?

Method: We conducted two experiments. In the first experiment we recorded six adult speakers (3 females) -without any known speech, language and hearing disorder- by means of simultaneous measures of acoustics, intraoral pressure and EPG using the same set-up as reported in Fuchs & Koenig (2009). In the ongoing second experiment we recorded six individuals with hypernasality by means of acoustic and intraoral pressure.

Results: Our results from the first experiment provide evidence that intraoral pressure rises more slowly and reaches a lower intraoral pressure maximum for voiced sibilants than voiceless cognates. In addition, voiced sibilants have shorter durations as well as slightly more palatal contacts particularly in the constriction region. Furthermore we conducted a correlation analysis with selected time points of EPG and intraoral pressure measurements, in order to learn more about the relation between tongue movements and intraoral pressure profiles. For speakers with VFD the preliminary temporal analysis of the acoustic data so far revealed that it takes more time to create the frication noise after the preceding vowel. We suppose that these speakers cannot increase intraoral pressure as quickly because of the air leak. The results of the ongoing study concerning intraoral pressure and its relation with voicing will be presented at the conference.

Reference

Fuchs, Susanne & Laura L. Koenig. 2009. The articulation and aerodynamics of voiceless consonants, clusters, and affricates of German. Journal of the Acoustical Society of America 126 (4). 1988-2001.