

## New developments in Polish sibilant system?!

### Introduction

The sibilant system of Standard Polish consists of fricatives /s ɕ ʂ/ and affricates /tʂ tɕ tʂ/ as well as their corresponding voiced counterparts. It has been claimed to be governed perceptually in terms of maintaining sufficient perceptual contrast (Padgett & Zygis 2007).

The present paper reports on a new development in sibilants observed in the pronunciation of young Polish women from central Poland who instead of an alveolo-palatal /ɕ/ produce a palatalized [sʲ].

### Experimental evidence

In order to substantiate the perceptual impression we conducted an acoustic experiment in which we tested both sibilant fricatives /s ɕ ʂ/ and affricates /tʂ tɕ tʂ/ pronounced in words embedded in (i) a carrier sentence and (ii) a coherent text. The sentences were repeated five times and the text was read twice. 6 native speakers of Standard Polish aged 20-23 took part in this experiment.

Using multitaper spectra (Thomson 2000) computed for the fricative part of the phonemes (35 ms), we investigated the following acoustic parameters: The highest peak of the complete spectrum ( $p_{all}$ ), the highest spectral peak in the frequency range from 2-4kHz ( $p_{2-4kHz}$ ), the power amplitude difference between  $p_{all}$  and  $p_{2-4kHz}$ , the spectral moments according to Praat (5.2) and Forrest et al. (1988), and the spectral slopes  $m1$  and  $m2$  (Jesus & Shadle 2002).

The preliminary results based on the analysis of four speakers show that the new sound [sʲ] is produced with a significantly higher peak than the alveolo-palatal sibilant [ɕ] (5125Hz vs. 4198Hz,  $p < .01$ ). Furthermore, the highest spectral peak in the frequency range from 2-4kHz is significantly lower for [sʲ] (3288 Hz) than for [ɕ] (3733 Hz,  $p < .001$ ) and the power amplitude difference between  $p_{all}$  and  $p_{2-4kHz}$  is significantly higher for [sʲ] (8.4) than for [ɕ] (2.2,  $p < .001$ ). The COG and SD values appear to be higher for [sʲ] (5227 Hz, 1873) than for [ɕ] (4115 Hz, 1466). Skewness and kurtosis values did not show significant effects. We will compare the values to spectral moments as proposed by Forrest et al. (1988). Finally, the spectral slope  $m1$  values are higher for [sʲ] (1.9) than for [ɕ] 1.15 ( $p < .05$ ) and these of  $m2$  are lower for [sʲ] (-4.98) than for [ɕ] (-4.22  $p < .001$ ).

### Conclusions

In summary, the acoustic results strongly suggest the alveolo-palatal /ɕ/ is being replaced by [sʲ]. The fact that this change has been initiated by young female university students largely accords with Labov's (2001) general conclusions that language change is commonly led by upwardly mobile individuals and might arise from nonconformity to the norms of society.

Following the reasoning put forward in Zygis & Padgett (2010) we hypothesize that this new development – if it proceeds and eventually leads to the restructuring of the underlying representation – will give rise to an optimization of perceptual contrast between the sibilants: /sʲ/ creates a better contrast to /ʂ/ than /ɕ/ does, a point which should be, however, substantiated by perceptual evidence.

### References

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