

Universal properties of contrast dispersion and their phonetic realisation

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Since *The Sound Pattern of English* (SPE) (Chomsky & Halle 1968), phonology has been drastically dominated by articulatorily based approaches. SPE and its offspring, such as Autosegmental Theory (Goldsmith 1976) and Feature Geometry (McCarthy 1988), have focused on articulatorily oriented explanations. At the same time, the theoretical premises of all these theories, including SPE, have not negated the acoustic/perceptual side of the representations but rather have assumed its importance along with articulatory representation. In phonological practice, however, this assumption has only been reflected in the introduction of the feature [strident], the single commonly accepted acoustically based feature proposed for representing sibilants.

Over the last fifteen years, however, a rapid change in phonology has been observed. First of all, phonologists who include acoustic and perceptual aspects in explanations of phonological phenomena are no longer the exceptions. The present study belongs to the experimentally oriented stream in phonology. Specifically, it is aimed at further development of the acoustic and perceptual side of sibilants. It shows on the basis of a detailed acoustic study of Polish and Czech affricates that the differences between the phonemic inventories are not accidental but follow a universal principle of maximizing the contrast among sounds (see Lindblom 1986, and Flemming 2002).

The acoustic study of which results will be presented includes investigations of Polish /t, ts̺, tʂ, tɕ/ and Czech /t, c, ts̺, tʃ/ phonemes. Four Polish and four Czech native speakers repeated words containing the phonemes in word-initial and word-medial positions 10 times: The words were embedded in carrier sentences and presented in a randomized order. A total of 640 items was investigated (4 phonemes x 2 positions x 10 repetitions x 4 speakers 2 languages). The acoustic parameters included:

- 1) frequency peak of the burst
- 2) intensity of the peak burst in relation to the intensity of the following vowel
- 3) closure and frication duration
- 4) COG, skewness, curtosis
- 5) formants: F1, F2, F3, F4 of the preceding and following vowel
- 6) F1, F2, F3, F4 rate for both vowels

The results show that F2 of the following vowel and F2 rate, spectral moments, COG and especially skewness and curtosis, reliably detect even subtle differences between the individual affricates, i.e. they distinguish Polish and Czech affricates commonly denoted as <č>.

Finally, it is argued that the differences between Czech and Polish affricates are not accidental but follow a principle of contrast dispersion which is however realized differently in these two languages. The results are discussed in light of a perceptual piece of evidence as provided in Żygis & Padgett (2010).

424 words

451 words

References:

- Chomsky, N. & M. Halle (1968). *The Sound Pattern of English*. New York: Harper and Row.
- Flemming, E. S. (1995). *Auditory Representations in Phonology*. Ph.D. thesis, UCLA. [Published 2002]. New York: Routledge.
- Goldsmith, J. A. (1976). *Autosegmental Phonology*. Ph.D. Thesis, MIT.
- Lindblom, B. (1986). Phonetic universals in vowel systems. In: Ohala, J. J. & J. J. Jäger (eds.) *Experimental Phonology*. New York: Academic Press. 13-44.
- McCarthy, J. (1988). Feature geometry and dependency: A review. *Phonetica* 43, 84-108.
- Żygis, M. & J. Padgett (2010). A perceptual study of Polish sibilants, and its relation to historical sound change. *Journal of Phonetics* 38.2, 207-226.

