

Contextual effects on Polish vowel duration and their consequences for dynamical models of language

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The study involves experimental data on Polish vowel durations in the context of voicing of the following consonant. The voicing effect is a very well documented phenomenon in many languages (Chen 1970) especially from the Germanic family (Port and Dalby 1982, Port and O'Dell 1985). According to Keating (1979) however, the effect does not occur in Polish. Keating investigated Polish minimal pairs of the CVCV type differing only in the voicing of the second consonant, a stop. Keating concluded that Polish does not exhibit the nearly universal tendency to lengthen vowels in front of voiced consonants since the vowel (before voiced C) to vowel (before voiceless C) ratio in such pairs is approx. 1.

The study to be presented replicates Keating's data placing target words in a carrier sentence to avoid emphasis. Additionally, it investigates the effect of fricatives on vowel duration. The adaptation of duration between vowels and consonants may not only be a cue to consonant voicing but also a direct compensation of length between segments to preserve regular V-to-V durations. The effect has been called relevant for the balance of syllable duration (Keating 1985) and having consequences for modeling of rhythm (Barbosa 2006). It was therefore useful to have a look at Polish fricatives, that dramatically differ in their inherent durations, to see whether the relative imbalance in duration between segments tends to trigger temporal adaptation on the part of the vowel. Preliminary study with 4 speakers shows mild compensation effects, however the level of statistical significance will be established when more data is tested.

Two hypotheses will be tested pertaining to issues raised in Port and Leary (2005) and to the dynamical rhythm model presented in Barbosa (2006) respectively:

- (a) the voicing contrast constraint does not apply to Polish vowels,
- (b) the condition of regularization of the V-to-V period within the syllabic oscillator is not met in Polish.

Building on the above, several questions will be asked concerning the topic of the session:

ad. (a) corpus data results (Nowak 2006, Breuer et al. 2006) show some contextual voicing effects on Polish vowel duration. Possible interactions with other effects need to be looked at and the question of whether Polish truly lacks this temporal specification in the phonology answered based both on controlled experimental data and corpus data,

ad. (b) it seems that the V-to-V homogeneity is disturbed and not subject to dynamic processes in Polish. This may have consequences for the dynamic model of rhythm.

The presentation will also review dynamical models of rhythm (Barbosa 2001, 2006, Cummins and Port 1998; Malisz 2004 for an extended review) and their contribution to the unification of the discrete and continuous dimensions of speech as a function of time.

References:

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