Stability of phonetic features in reduction processes in spontaneous Czech

Spontaneous Czech – like German, English, Dutch or French – is rich in reduced word forms. However, viewing reduced forms as a mere consequence of segment elision or as a result of weakened articulation in a linear ordering of segments seems not to be satisfactory. An appropriate identification of speech units usually depends on the presence of articulatory prosodies, parallel articulation (phonetic features of two distinct sounds realized simultaneously through the whole segment) and deviations from the principles of Czech phonotactics (e.g. neighborhood of obstruents differing in voicing etc.).

Intelligibility of a particular stretch of the speech signal seems to be guaranteed as long as *a minimal phonetic information (phonetic essence)* is preserved (e.g. *Já nevím, jestli jsem to už nepsala* [jaːˈneviːmˈjestlɪsemtouʃˈnepsala] > [aˈə̃ɪ̃ˈes͡sə̃təuʃˈə̃psaa]). The structure of the phonetic minimum is, however, far from clear: what features are just sufficient to ensure proper understanding of a particular speech unit? Do they vary for different segments and words in a systematic manner? To what degree are they context-dependent?

In our experiment, we concentrate on pairs of highly similar reduced speech units (words or sequences of words, e.g. [ə̃ʃ] X [əʃ] = [nɛʃ] *než* ‚sooner than' X [aʃ] *až* ‚as soon as') which differ only in a single phonetic feature, and examine the participants´ perceptual response. The participants´ task is to assign an appropriate meaning to the perceived speech form. Where possible, we manipulate a resynthesized speech signal, in other cases we rely on controlled recordings of reduced speech unit pairs.

As regards reduced speech forms, it appears that a model of speech consisting of dynamic phonetic features varying in time should be preferred to a model in which speech consists of single segment sequences. As our experiment shows, in reduced word forms it is often the case that even though a segment as a whole seemingly disappears it leaves a "trait" in the neighboring segments in the form of their non-inherent phonetic features (e.g. [ə̃sʃəa] X [ə̃s̪ʃ̪əa] = [nɛslɪʃɛla] *neslyšela* ‚she did not hear' X [nɛsluʃɛla] *neslušela* ‚it did not suit [you]').

Through this process, interestingly, some phonetic features which are not considered phonological in standard accounts of Czech actually turn out to be distinctive in reduced variants. Indeed, the results of our experiment suggest that while processing spontaneous speech Czech listeners may rely on the distinctiveness of features such as nasality of vowels or labialization, palatalization and quantity of consonants. Thus, feature distinctiveness in reduced speech forms proves to be a marker of phonetic feature stability.