

Prosody in speech production planning and control

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In speech, production implies the encoding of linguistic information on two parallel levels: on the one hand the utterance is produced by the coordinative activity of articulatory organs to produce the segmental chain; on the other hand this segmental chain is organized such that some elements are more prominent than others and that elements are grouped into linguistic constituents larger than the segments. This prosodic organization of the chain is known to influence the articulation of segments and several studies have been concerned with the articulatory variations shown by segments in prosodically strong positions : under accent and at the boundary between constituents.

While such variations have been described in several languages (e.g. English, French, Korean, Dutch, Tamil, Estonian...) and for various types of articulatory structures (tongue, lips, glottis, velum, jaw), the mechanism governing this phenomenon is not well understood. In short, prosodically conditioned variations result in an increase in the magnitude (spatial and/or temporal) of articulatory gestures, which has been described as an articulatory strengthening. Several hypotheses have been proposed to take into account these variations : articulatory strengthening, phasing modifications, sonority expansion, local hyper-articulation. However none of them have been fully tested over a large corpus of speech data nor simulated with a realistic model of speech production. Predictions of these hypotheses, confrontations with the results found in the literature and implications for the general control of the speech apparatus will be discussed.