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An articulatory and perceptual study of phrasing

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Contrastive emphasis elicited in a semispontaneous conversation paradigm was found to affect the temporal organization of syllables and boundaries in terms of increasing their respective strengths (Menezes *et al.*, accepted). This concept was tested within the framework of the Converter Distributor Model, in which a method for determining the phrasing pattern of an utterance based on articulatory mechanics is proposed (Fujimura, 1992; Fujimura, 1994; Fujimura, 2000a; Fujimura, 2000b). In this model a linear syllable pulse train represents the phrasing pattern of the utterance where the syllable strength/magnitude is directly related to the displacement of the mandible from the occlusal plane; the placement of the syllable pulse in time (syllable "center") is dependent on the movement of the consonantal articulators (e.g., tongue tip, lower lip; Mitchell *et al.*, 2000; Mitchell, 2000). An algorithm was developed to automatically construct a "syllable triangle" centering on each syllable pulse to define an abstract syllable duration. Gaps between consecutive syllable triangles are treated as boundaries. The size of the gap reflects the strength of the boundary.

Recordings of articulatory data with acoustic signals for four American English speakers were made at the Microbeam Facility, University of Wisconsin. The subjects repeatedly corrected one digit of a three-digit sequence consisting of "five" and "nine" (559, 959). The speaker's first response in this conversation is identified as the reference condition.

The sentences are presented to 10 American English listeners who undergo a short training session on how to indicate one of four boundary strengths using simple marks (a comma, and one, two or three vertical lines placed at the perceived boundaries). Differences between the perceived phrasing pattern of the reference utterances and those of corrected and repeatedly corrected utterances are analyzed; these results are then compared with those determined by the articulatory algorithm described above. Based on the assumptions above, an explanation of the temporal organization and reorganization of utterances due to contrastive emphasis is proposed. [Supported in part by ATR, Japan and NSF research grants SBR-9809046 and BCS-9977018.]

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