

Revisiting the gesture-intrinsic approach to prosody with a revised gesture dynamics

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A launching point for dynamical systems approaches to speech production was Fowler's (1980) critique of extrinsic timing theories. Since then, there has been substantial development of theories centered on a particular dynamical system, the damped mass-spring (e.g., Saltzman & Munhall, 1989; Browman & Goldstein 1989) and complexifications of this system (Byrd & Saltzman 1998; Sorenson & Gafos 2016). Early studies showed that articulatory variation across prosodic positions was difficult to capture parsimoniously with gesture-intrinsic dynamical parameters, i.e., the parameters of the damped mass-spring model (e.g., Beckman, Edwards, & Fletcher, 1992; Cho, 2006). These shortcomings motivated theories of gesture-external modulation, which conceptualize prosody as trans-gestural modulation of time (Byrd, Krivokapić, & Lee, 2006; Byrd & Saltzman, 2003) and/or space (Katsika, Krivokapić, Mooshammer, Tiede, & Goldstein, 2014; Saltzman, Nam, Krivokapic, & Goldstein, 2008). In this talk, I'll revisit the gesture-intrinsic approach to prosody with an alternative proposal for gestural dynamics, developed by PhD student Michael Stern. The new gesture dynamics are simpler than the damped mass-spring and provide excellent fits to articulatory kinematic trajectories across prosodic conditions, without the need for any gesture-external modulation. I'll close by showing the potential for dynamic neural fields to explain the effects of prosody on articulation through selection of gesture-intrinsic parameters.