Modeling speech production as state feedback control

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For several years now, my lab has been examining how well state feedback control (SFC) models the control of speaking. In brief, speaking involves changing the dynamical state (the position and velocity) of the vocal tract articulators and in SFC, the control of speech involves maintaining a running estimate of this dynamical state. Our prior work has shown how SFC accounts for many of the behavioral phenomena associated with the role of sensory feedback in speech production as well as many of the neural phenomena associated with sensory processing during speaking. We are now examining how SFC accounts for the abnormal speech feedback processing seen in various neurological conditions. Most recently, we have also begun to develop a hierarchical extension of SFC by combining it with the Task Dynamics (TaDA) model of speech production.

SHACS is a collaboration between the UW Department of Speech and Hearing Sciences and the Virginia Merrill Bloedel Hearing Research Center (VMBHRC).
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