## Partially Overlapping Neural Substrates of Oromotor Control M. Estep, S. Barlow, E. Auer, Jr.

OBJECTIVE: To determine the extent of shared neural correlates of healthy adult ororhythmic unvoiced syllabic speech (/da/) and nonspeech (suck) tasks performed at varying rates (1 or 3 Hz).

METHODS: Functional neuroimaging followed by random effects analyses identified task- and rate-specific changes in regional blood-oxygen-level-dependent signal magnitude correlated with the ororhythmic behaviors.

RESULTS: Task-specific correlates significantly differing in magnitude include: bilateral sensorimotor cortex, insula, basal ganglia, and thalamus; and right-lateralized cingulate gyrus and cerebellum. Rate-specific correlates significantly differing in magnitude include: bilateral cerebellum; right-lateralized cingulate; left-lateralized basal ganglia and thalamus; and a medial pontomedullary region. Non-overlapping regions of activity were manifest due to an increased spatial extent of activity correlated with suck compared to unvoiced /da/, and ororhythmic tasks performed at 3 Hz compared to 1 Hz. DISCUSSION: Our findings indicate a partially overlapping neural substrate is involved in the task- and rate-specific production of ororhythmic behaviors in healthy adults. Shared cortical and subcortical correlates support the notion of a distributed neural network subserving an oromotor repertoire encompassing speech and nonspeech behaviors. The non-overlapping substrate is hypothesized to be a manifestation of unique functional connectivity among neural bases shared for the production of different ororhythmic behaviors.

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