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Effect of vocal tract morphology on tongue shaping for American English /ɹ/ **FREE**

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There is a lack of general agreement among previous studies (e.g., Bakst, 2016; Dediu & Moisik, 2019; Westbury *et al.*, 1998) on whether measurements of vocal tract morphology are robust predictors of inter-speaker variation in tongue shaping for American English /ɹ/. One possible reason is the different quantifications of /ɹ/ tongue shapes that were employed. The current study compares the relationships between a single set of anatomical measurements and three different measures of lingual articulation for /ɹ/ in /ɑɑ/ in midsagittal real-time MRI data. A novel method was developed to quantify the palatal constriction location and length, which served as the first two measures of tongue shape. A linear Support Vector Machine divided the constriction location and length measures into regions that approximate the visually identified categories of “retroflex” and “bunched.” The third shape measurement is the signed distance of each token of /ɹ/ to the division boundary, representing the degree of “retroflexion” or “bunchedness” based on palatal constriction properties. These three measures showed marginally to moderately significant linear relationships with two specific measures of individual speakers’ vocal tract anatomy: the degree of mandibular inclination and the length of the oral cavity roof. Overall, the effect of anatomy on the lingual articulation of /ɹ/ is not strong. [Work supported by NSF, Grant 1908865.]

Topics
[Phonetics](#), [Machine learning](#), [Organs](#)

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