# Specificity of Speech Motor Learning

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***Abstract.*** *Humans are extraordinarily good at controlling forces. Indeed when we reach for an object or use a tool the brain not only controls the position of the limbs, it also concurrently corrects for dynamics, the forces that arise as a consequence of the movement. This remarkable ability is the source of one of the leading theoretical ideas in modern research on motor control, the notion that motor learning and control are based on the development of an internal representation of the dynamics of the limbs. The hypothesized internal model has been difficult to test directly and indeed all of the evidence to date has been correlational. This paper reports the findings of experiments that provide a direct test of this idea. The logic of the test is simple. If motor behaviors are based on an internal representation of dynamics, then at the least, learning should transfer when comparable dynamics are embedded in different tasks. Speech movements provide an unusual opportunity to test this idea since it is possible to vary the phonetic content while matching utterances on dynamics. In the present studies we have used a robotic device to show that motor learning in speech production is so contextually sensitive that learning fails to transfer even to utterances that are equivalent in terms of dynamics. The findings point to the specificity of speech motor learning and are incompatible with the idea that learning and control are dependent on a generalized representation of dynamics.*