

A motor differentiation model for liquid substitutions: English /r/ variants in normal and disordered acquisition

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Infants simplify arm reaching tasks by locking joints (Berthier & Keen 2006), thereby reducing kinematic degrees of freedom. Similar simplification has been observed in lip-jaw coordination in children's speech (Green & al. 2000). A model is described in which both normal and disordered learners contending with developing motor systems generally strive to reduce the degrees of freedom of complex anatomical structures (e.g., the tongue). The specific claim is pursued that segmental substitutions (e.g., /w/ replacing /r/ or /l/) are the result of compensation strategies which aim to simplify the complexity of the articulatory task. The proposal that gestural simplification may dictate substitution strategies for liquid consonants has been suggested previously (Studdert-Kennedy & Goldstein 2003). The present paper uses ultrasound imaging to evaluate /r/ productions of normal and disordered language learners in the context of a motor differentiation model. Data are presented from ultrasound studies of: successful postvocalic /r/ production of an 11-month-old female English speaker, /r/ production of 3-5-year-old English speakers, and /r/ production in the speech of adolescent English speakers with speech and hearing disorders. Results indicate that successful /r/ production consistently corresponds with differentiated tongue shapes, even for extremely young speakers, while unsuccessful /r/ production corresponds with undifferentiated tongue shapes.

References:

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