

# Extending lingual complexity measures to speech development and disorders

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Certain broad generalizations can be made about the order in which speech sounds are added to a child's phonemic inventory and the ways that child speech deviates from adult targets in a given language. Developmental speech patterns are presumed to reflect both phonological knowledge and the capacity for skilled motor control of speech structures, but the relative contribution of motor control remains unknown. The current study explores the relationship between lingual complexity and phonemic development using ultrasound images of preschool-aged children and adults producing various phonemes. Building upon previous research, we first select the metrics corresponding best with the gestalt impression of the complexity of a given lingual contour in both samples. Using these metrics, we test the hypothesis that child contours are less complex on average than adult contours for the same phoneme. In addition, we test the hypothesis that, for a later developing target such as /ɪ/, perceptually correct productions would have more complex contours than incorrect productions. Quantification of lingual complexity in child speech represents a crucial prerequisite for understanding the relative importance of motor factors in children's non-adult-like speech patterns, and may help steer treatment decision for children with speech delays.