

Phonological Representation and Phonetic Realization of Two Consecutive Neutral Tones in Mandarin-Speaking Children

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This study examined the spontaneous speech production of two consecutive syllables in neutral tone by Mandarin-speaking preschool children. De construction containing two neutral tones in succession was selected as the target, for example, māma de (妈妈的, “mother’s”). The development of prosodic patterns of the target was analyzed in terms of F0 and duration at different prosodic boundaries. Results show very few errors (1.6%) occur in phonology since the age of 1;6, indicating that preschoolers acquire the phonological representation of neutral tone as well as sandhi rules at a very early age. The preschoolers have already had the basic awareness of using different F0 contours for a neutral-tone syllable preceded by different full lexical tones, as well as compressing the pitch range, lowering the pitch register, and shortening the duration. However, these acoustic patterns are not fully adult-like even by the age of 6;0. The preschoolers’ dynamic articulation of neutral tone conditioned by the underlying tone target of neutral tone, preceding full tone, and boundary tone is still in development. On account of the tonal alignment failures of the delayed F0 peak of Tone 2 and Tone 3, the F0 contours of the consecutive neutral tones preceded by four full tones are not clearly differentiated until the age of 3;6. The tonal scaling patterns, including pitch range and register, and duration pattern of the target are developing toward the adult pattern with fluctuations among the age groups under 3;5 and hops at 3;6-4;11 and 4;6-4;11. Considering different prosodic boundary positions, preschoolers over 3;6 are capable of realizing a low-tone target for the second neutral tone in succession at intonational phrase boundaries and a mid-tone at prosodic word boundaries. The preschoolers’ production shows evidence of integrating the boundary tonal features and final-lengthening effect in the articulation of neutral tones at IP boundaries. In sum, the present study contributes to our understanding of the developmental patterns in Mandarin-speaking children’s neutral tone production. The production is constrained by the phonology and phonetics of neutral tone and its preceding full tone and is contextually conditioned by phrase-level prosody. Also, determined by the physiological and cognitive development, the preschoolers’ fine control of tonal alignment and scaling still deviate from the adult pattern, with an unstable developmental trajectory of acoustic features at intonational phrase boundaries.

Keywords: Neutral tone acquisition, phonological representation, phonetic realization, Mandarin Chinese, preschool children