

Lexical Tone Production in Singaporean Mandarin-English Bilingual Preschoolers: Associations with Articulation, Vocabulary and Grammar?

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Abstract

Despite the early mastery of lexical tones by Mandarin monolingual children (Hua & Dodd, 2000), Mandarin-English bilingual children are less sensitive to tone errors relative to vowel and consonant errors in spoken word recognition (Wewalaarachchi & Singh, 2020). This raises a question about how tonal development correlates with the linguistic environment of bilingual children, which impacts their language knowledge across linguistic domains. Previous studies have documented within- and cross-language associations between phonological abilities and both vocabulary size (Scarpino et al., 2019) and grammatical proficiency (Kehoe et al., 2021) in Spanish/French-English bilingual children. This study is the first to investigate whether similar correlations exist between tone production in a tonal language and broader abilities in both languages in bilingual children.

We assessed phonological, lexical, and grammatical knowledge in 63 Singaporean Mandarin-English bilingual preschoolers with varying exposure to both languages (3;3-5;2, $M_{age}=3;11$). They were tested using standardized assessment tools for English (GFTA-3, PPVT-4 and TROG-2) and compatible tools for Mandarin (MAT, MRVT, MRGT), among which tone production was assessed through a picture naming task targeting the four basic tones of Mandarin in monosyllabic and disyllabic words. Results showed high tone accuracy, with a 30% error rate for the falling-rising tone (T3) vs. 2-5% for the other tones, consistent with previous findings on T3 difficulty in Mandarin monolingual preschoolers (Xu et al., 2018). The bilinguals' T3 challenges may reflect influence of English, where dipping intonations are rare. Tone accuracy correlated with Mandarin receptive vocabulary ($r_s=.496$, $p<.001$) and receptive grammar ($r_s=.462$, $p<.001$). The tone-vocabulary correlation highlights the importance of tones in lexical differentiation in Mandarin, while the tone-grammar correlation might have been mediated by vocabulary, as grammar and vocabulary often correlate. Mandarin tone accuracy did not correlate with any of the English skills tested, probably because lexical tone knowledge impacts vocabulary and grammar development specifically within the tonal language (Mandarin) and does not transfer to the non-tonal language (English). Regression revealed higher tone accuracy with fewer English speakers ($\beta=-0.31$, $SE=0.01$, $t=-2.63$, $p=0.01$) and more Mandarin speakers at home ($\beta=0.26$, $SE=0.01$, $t=2.04$, $p=0.05$), suggesting the significance of language exposure in Mandarin-English bilingual children's tonal development.

(350 words)

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