

## **The Influence of L1 Phonology on the Acquisition of L2 Mandarin Lexical Tonal Perception**

This study investigates how first-language (L1) phonology affects the development of categorical perception of Mandarin lexical tones in English- and Thai-speaking learners. Prior perception research offers mixed predictions about how L1 pitch use, including tonal systems, nontonal systems, pitch accent, and intonation, shapes the acquisition of L2 lexical tones (e.g., Halle et al., 2004; Schaefer & Darcy, 2014). Although tonal L1 experience is often assumed to facilitate L2 tone learning, empirical findings remain inconsistent (e.g., Laméris et al., 2023; Wayland & Guion, 2004). To address this issue, we examined how learners with different L1 pitch systems, English as a nontonal L1 and Thai as a tonal L1, develop perceptual categories for Mandarin Tone 1 (high-level) and Tone 4 (high-falling) across proficiency levels. We hypothesized that Thai learners might map L1 tonal categories onto the relevant L2 Mandarin tones and therefore show categorical perception at an early stage of acquisition, while English learners may show later development due to the lack of comparable L1 tonal categories.

A total of 50 participants, including two learner groups, L1 English ( $n = 21$ ) and L1 Thai ( $n = 11$ ), as well as Mandarin native speakers ( $n = 18$ ), completed an identification task and an ABX discrimination task using two synthesized continua between Mandarin Tone 1 and Tone 4. These tasks allowed us to track the emergence of categorical perception and to observe how tone categories develop across different stages of L2 proficiency.

In the identification task, English learners showed proficiency-linked improvement in categorical perception, with boundary location and slopes becoming increasingly target-like at higher proficiency levels. Thai learners, in contrast, exhibited an early and relatively stable boundary that did not show further refinement with increased proficiency. This pattern suggests that tonal experience may prompt an initial category boundary, although it does not necessarily support continued development toward target-like patterns.

In the ABX discrimination task, English learners showed a clearer category boundary and a pattern closer to native speakers only at intermediate and advanced proficiency levels. Thai learners showed early categorical perception-like behavior, although their boundary was not aligned with the target-like location. A weak and only partially target-like categorical discrimination pattern, with clearer differentiation, emerged only in the advanced group. Their overall category differentiation remained more constant than that of English learners. The results from both tasks suggest that tonal L1 experience may guide initial category placement, although it does not guarantee strong or target-like categorical perception.

Taken together, the findings suggest that tonal experience does not uniformly facilitate L2 Mandarin tone acquisition. Instead, L1 phonological structure interacts with developmental stage to shape the trajectory of category formation. Learners with a nontonal L1 may gradually develop more target-like categorical perception with increased proficiency, while learners with a tonal L1 may show an early categorical mapping that does not undergo substantial refinement. These results highlight the need for a more nuanced account of cross-linguistic influence in tone acquisition, beyond simple tonal versus nontonal classifications.