The acquisition of L2 Mandarin T3 sandhi and neutral tone by Japanese speakers
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Many studies have been conducted on the acquisition of isolated Mandarin lexical tones (T1-T4) by L2 learners [1]. However, a comprehensive understanding of how they acquire the more complex prosodic patterns of Mandarin tones in various contexts (e.g., T3 sandhi) remain limited. Previous studies on Mandarin T3 sandhi have found that the Half T3 sandhi is easier for L2 learners to acquire than the Full T3 sandhi due to clearer phonetic motivation [2, 3]. However, this claim of phonetic motivation can be further tested with more contextual tone variations in Mandarin and with learners from prosodically distinct L1s (see [4] for a study on English speakers). In this preliminary study, we further compared the acquisition of the two types of T3 sandhi and neutral tone by Japanese learners of two proficiency levels. The aim is to investigate the effect of phonetic motivation and L2 proficiency on the acquisition of L2 contextual tones.

In Mandarin, T3 undergoes two different sandhi processes in specific contexts. The low-dipping T3 (214) becomes T2 (35) when followed by another T3 (Full T3 sandhi), and changes to a Half-T3 (21) when followed by T1/2/4 (Half T3 sandhi) [5]. Both types of T3 sandhi are obligatorily applied in disyllabic words across different morphological structures. In addition to the four lexical tones, Mandarin also has a neutral tone (T0). The neutral tone is different from lexical tones in that it cannot appear independently and resembles unstressed syllables with shorter duration, vowel reduction, and underspecified pitch contours [6]. The neutral tone is obligatory in morphemes that do not have citation tones (e.g., the suffix -de) but is non-obligatory in morphemes with citation tones [7].

The neutral tone can be considered more phonetically motivated than the two types of T3 sandhi, as it is a reduction phenomenon, and its surface pitch contour can be automatically derived from the preceding tone via the carryover effect [8]. In contrast, both types of sandhi T3s are full tone syllables which require more articulatory efforts. Among the two types of T3 sandhi, the Half T3 sandhi is believed to have clearer phonetic motivation than the Full T3 sandhi [5] because it is natural to simplify a complex pitch contour in speech (Half T3 sandhi), while the change of T3 into T2 in Full T3 sandhi is more arbitrary. Therefore, based on phonetic motivation, we predicted the relative ease of acquisition for the three aforementioned contextual tones to be: neutral tone > Half T3 sandhi > Full T3 sandhi.

Six Japanese learners of Mandarin with intermediate proficiency (HSK3–4) and 10 with advanced proficiency (HSK 5–6) participated in a reading experiment. The production stimuli included 60 disyllabic words for all T3 sandhi contexts (T3T1, T3T2, T3T3, T3T4) and 52 words for all preceding tone combinations with the neutral tone (T1T0, T2T0, T3T0, T4T0). Two native Mandarin speakers made auditory judgments on their production. Several generalized linear mixed-effect models were run to analyze the accuracy rate of different contextual tones by different groups of speakers.

Figure 1 shows the accuracy rate of T3 sandhi and the neutral tone for intermediate learners. The results showed that some tonal combinations are more difficult than others within each contextual tone category, i.e., T3T2 in Half T3 sandhi and T3T0 in the neutral tone. Excluding these exceptions, pairwise comparison results showed that the accuracy rate was: obligatory T0 > Half T3 > Full T3; Non-obligatory T0 > Full T3, which supported our hypothesis that the neutral tone was easier than the T3 sandhi. Figure 2 shows the accuracy of T3 sandhi and the neutral tone by intermediate and advanced learners. The advanced learners showed significantly higher accuracy rates than their intermediate counterparts for most tonal combinations for both the T3 sandhi and the neutral tone. However, similar to the intermediate group, the T3T2 and T3T0 sequences were still not as good as the other combinations. This may be due to the T2-T3 confusion that L2 learners of Mandarin have difficulties distinguishing T2 and T3 both in perception [1] and production [9, 10]. Therefore, when two confusable tones occur in the same sequence (T3T2), it may be more difficult for L2 learners to apply the correct sandhi pattern. Also, the most common error pattern of T3T0 was to produce it as T2T0, which suggests the influence of T2-T3 confusion.

To conclude, our study generally supports that phonological patterns that are more phonetically motivated are easier for L2 learners to acquire. Additionally, not all tonal combinations within the same contextual tone category are equally learnable, as this is also influenced by the acquisition of individual tones.
Figure 1. Mean accuracy rate of T3 sandhi and neutral tone in intermediate learners.

Figure 2. Mean accuracy rate of T3 sandhi (left) and neutral tone (right) of the intermediate and advanced groups

References