Categorizing Mandarin tones into listeners' native prosodic categories: the role of phonetic properties

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Studies have shown that assimilating non-native tones to the categories of listeners' native prosodic systems (e.g., tone, pitch-accent, and intonation) seems to be feasible (So, 2006; So and Best, 2008; So and Best, in press), and is consistent with the assumptions of the Perceptual Assimilation Model (Best, 1995, PAM). This raises an important question as to how adults perceive non-native lexical tones. Do they perceive foreign tones according to the pitch patterns of the intonational categories (i-Categories) in their native prosodic system (e.g., rising pitch patterns for questions)? A recent study (So and Best, 2008) has demonstrated that native English (NE) listeners can perceive non-native tones (on individual single words) in terms of their i-Categories. In general, Mandarin Tone 1 (High level) is perceived as Flat Pitch, Tone 2 (mid-rising) as Question, Tone 3 (falling-rising) as Uncertainty (Some NE listeners perceived it as Question), and Tone 4 (high falling) as Statement. The findings supported the assumption that non-native prosodic categories (e.g., tones) will be assimilated to the categories of listeners’ native prosodic system, an extension from PAM. The study also suggested that NE listeners assimilated the phonetic properties of Mandarin tones (e.g., pitch patterns) to those of English i-Categories, when both substantially share similar phonetic features.

However, how do listeners perceive foreign tones when they are embedded in a sentential environment? It is well documented that the effects of tonal coarticulation (anticipation and carried over) will be involved in connected speech (Yu, 1994, 1997). Do the phonetic characteristics of foreign tones affect the tonal perception of listeners from non-tonal languages?

This study examined the perception of Mandarin tones by two non-tonal languages – English, a stress accented language, and French, a syllable timed language without an accent system (Fox, 2000), and investigated how native speakers of these groups (30 listeners each) perceived 72 Mandarin tones in a sentence frame according to their native intonational categories (Flat pitch, Question, Statement, and Exclamation). All stimuli were pre-screened by three native Mandarin speakers to ensure they were intelligible to all native speakers. The results indicated that both NE and NF listeners assimilated non-native tones to their native intonational categories (Tone 1 and Tone 3 as Statement, Tone 2 as Question, and Tone 4 as Statement for NE speakers and as Exclamation for NF speakers), which share phonetic similarities with those of Mandarin tones, although their perception was to some extent affected by the effect of tonal coarticulation in connected speech. In additionally, while NE listeners were unable to detect the fine phonetic (falling) difference between Statement (involving a slight falling pitch pattern) and Exclamation for Tone 4 (involving a dramatic falling pitch pattern), NF listeners were able to perceive the phonetic difference between the two i-Categories.

Overall, the results further affirm the assumption that non-tone listeners (NE and NF) assimilate non-native prosodic categories (e.g., tones) to their native prosodic categories based on the phonetic similarities they perceive. The timing properties of different language classes may also at work during the perception.

References: