USE OF PROSODIC CUES IN NON-NATIVE SPEECH SEGMENTATION: THE PROSODIC-LEARNING INTERFERENCE HYPOTHESIS

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Speech segmentation is a challenging task for non-native listeners, because the cues that are useful for segmenting the native language (L1) can be inefficient or misleading for segmenting a second/foreign language (L2). Whether or not non-native listeners can learn to use L2 segmentation cues depends on both the nature of the cue and the similarity between the L1 and the L2. To illustrate, L2 learners have difficulty learning to use cues that are not encoded lexically (e.g., prosody) but they can easily suppress the corresponding L1 cues [1,2], whereas the opposite is true of cues that can be encoded lexically (e.g., phonotactics) [3,4].

Unclear, however, is how L2 learning is shaped by the degree of L1-L2 similarity, and whether segmentation cues such as prosody are easier or more difficult to learn if the L1 and L2 prosodies signal word boundaries similarly. Assessing whether L1-L2 similarity helps or hurts learning may shed important light on the cognitive mechanisms that underlie such learning: similar L1-L2 prosodic systems may yield greater perceptual difficulties [5,6] and fewer instances of error-driven learning [7] than different L1-L2 prosodic systems.

The present study tests the hypothesis that the learning of a segmentation cue will be more difficult if the L1 and L2 prosodic systems are similar (though not identical) than if they are very different (*Prosodic-Learning Interference (PLI) hypothesis*). Similarity is operationalized as follows: The L1 and L2 systems are similar if a prosodic cue (e.g., F0 rise) signals the *same word boundary* but is aligned differently within the syllable in the L1 and L2; the L1 and L2 systems are different if a prosodic cue signals *different word boundaries* in the L1 and L2.

The PLI hypothesis is tested by comparing French, Korean, and English listeners' use of F0-rise as a cue to word-final boundaries in French. F0 rise signals word-final boundaries in both French [8,9] and Korean [10,11], with the F0 peak occurring at the end of the French accented syllable but half-way through the Korean accented syllable; as a result, the French post-accented syllable decreases in F0, whereas the Korean post-accented syllable is already low in F0. The F0 peak in French therefore occurs too late for Korean listeners to be able to use it as a cue to word-final boundaries in French. Our PLI hypothesis predicts that English L2 learners of French will have *less* difficulty than proficiency-and-language-experience-matched Korean L2 learners of French in *learning* to use F0 rise as a cue to word-final boundaries in French, even if F0 rise signals a completely different word boundary in English.

Sixteen native French listeners, 16 late Korean L2 learners of French, and 16 late English L2 learners of French participated in the study. The L2 learners were tested in their home country (US and South Korea) and were fully matched in their (mid-to-high) proficiency in and experience with French. Participants completed a visual-world eye-tracking experiment in French adapted from [4,12]. They heard stimuli in which the target was or was not accented (e.g., *le* <u>*CHAT*</u>/*chat grincheux*… 'the cranky cat'). The stimuli were resynthesized so as to isolate F0 and duration cues, yielding four conditions (short vs. long duration; flat F0 vs. F0 rise). Participants simultaneously saw four orthographic words in a computer display: the target (e.g., "chat"), a lexical competitor (e.g., "chagrin" 'sorrow'), and two unrelated distracters (e.g., "prince" 'prince' and "principe" 'principle). They clicked on the word they heard and their eye movements were recorded from target-word onset. If listeners can use F0 rise as a cue to word-final boundaries, they should show higher proportions of fixations to the lexical competitor in the absence of an F0 rise than in the presence of an F0 rise in the stimuli.

Native French listeners showed this effect in the ambiguous time window (corresponding to *chat grin–*) and English L2 learners of French showed this effect in the post-disambiguation time window (corresponding to after *–cheux* until 1,500 ms), but Korean L2 learners of English did not show an effect of F0 rise in any of the time windows. These results support the PLI hypothesis. Based on our results, we propose that perceptual difficulties [5,6] underlie Korean listeners' difficulty in learning to use F0 rise as in French.

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