

Processing word boundaries in a second language

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The online segmentation of running speech requires that the listener employ perceptual strategies to identify where word boundaries lie. One such strategy is the exploitation of non-contrastive acoustic differentiation that occurs at various prosodic boundaries. Nakatani and Dukes (1977) showed for example that listeners can use the presence of word-initial aspirated voiceless plosives to differentiate between potentially ambiguous phonemic content such as *loose pills* and *Lou spills* in English. Complicating the processes of speech perception, however, for learners of a second language (L2) is the fact that segmentation strategies vary from language to language. As a consequence, adult learners are thought to be constrained by first language (L1) processing routines in the perception and segmentation of the L2.

The present study examines the exploitation of word-initial aspiration and pre-vocalic glottal stops in L2 English by native speakers of French. Twenty-five first-year and 25 third-year French students specializing in English participated in a forced-choice identification task in which they were presented with potentially ambiguous phrases and were asked to identify what they had heard. Eighty-four stimuli were divided into three types of phonemically ambiguous pairs: 18 aspiration stimulus pairs (e.g. *loose pills/Lou spills*); 18 glottal stop stimulus pairs (e.g. *seen either/see neither*) and 6 pairs in which both cues can signal the location of the word boundary (e.g. *grape in/ grey pin*).

Participants showed greater sensitivity to the presence of glottal stops than aspiration, replicating the results of Altenberg (2005) and Ito and Strange (2009) who found similar results for speakers of Spanish and Japanese, respectively. This cross-linguistic finding suggests that glottal stops represent a more perceptually salient segmentation cue for learners than aspiration, regardless of linguistic background. In addition, third-year students showed significantly higher sensitivity than first-year students, showing that sensitivity to non-contrastive acoustic variation in adult learners improves with increased exposure to the L2 even with a lack of explicit instruction.

The current study addresses an aspect of phonological acquisition in L2 English that has received little attention to date, namely the acquisition and exploitation of non-contrastive detail. While the acquisition of L2 phonemic contrasts has generated an extensive body of work, much less research focus has been placed on the acquisition and exploitation of within-category allophonic variation in the L2. Furthermore, currently accepted models of L2 phonological acquisition (Flege 1995; Best 1994, 1995) offer little prediction as to how non-contrastive phonetic detail is perceived and/or classified by the L2 learner.

One particularly pertinent question is *how* the use of non-contrastive phonetic detail may be acquired by learners. Phonemic contrasts can be explicitly taught through classroom instruction, however the acquisition of sub-phonemic detail has yet to be sufficiently explored. Based on the results of studies dealing with the acquisition of artificial language, Peperkamp *et al.* (2006) suggest that statistical learning is involved in the acquisition of non-contrastive variation, but that statistical learning alone cannot account for the acquisition of this kind of phonetic detail. Implications for this theory as it applies to the perception and acquisition of L2 phonology will be discussed in relation to the current data.

References

- Altenberg, E. (2005). The perception of word boundaries in a second language. *Second Language Research*, 21 (4), 325–358.
- Best, C. (1995). A direct realist view of cross-language speech perception: New Directions in Research and Theory. In Winifred Strange (ed.) *Speech perception and linguistic experience: Theoretical and methodological issues*. (pp. 171–204). Baltimore: York Press.
- Flege, J. (1995). Second-language speech learning: Theory, findings, and problems. In W. Strange (Ed.), *Speech perception and linguistic experience: Theoretical and methodological issues* (pp. 233-273). Timonium, MD: York Press.
- Ito, K. & Strange, W. (2009). Perception of allophonic cues to English word boundaries by Japanese second language learners of English. *Journal of the Acoustical Society of America*, 125 (4), 2348-2360.
- Nakatani L. & Dukes, K. (1977). Locus of Segmental Cues to Word Juncture. *Journal of the Acoustical Society of America*, 62, 714-719.
- Peperkamp, S., Le Calvez, R. Nadal, J.-P. & Dupoux E. (2006). The acquisition of allophonic rules: statistical learning with linguistic constraints. *Cognition*, 101, B31-B41.