

The role of articulatory information in establishing a second language lexicon

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Lexical contrasts in a second language (L2) can be established even when they contain sounds that are perceptually confusable. This often shows in the asymmetric activation of words with a difficult sound contrast. Words with the L2 sound that is more similar to a first language (L1) category are more readily activated than words with the less similar, newly-acquired L2 category (Weber & Cutler, 2004). However, it remains unclear what cues, besides the information already in the acoustic signal, contribute to the encoding of these contrasts and the resulting asymmetries in recognition. A possible cue not yet examined is the presence of additional articulatory information, which has proven beneficial in the direct categorization and production of L2 sounds (Kartushina, Hervais-Adelman, Frauenfelder & Golestani, 2015; Navarra & Soto-Faraco, 2007) but whose impact on lexical processing is still unknown. In view of this, the present study examined whether exposure to two different types of articulatory information about the sounds of a difficult L2 contrast (English /ɛ/-/æ/ for German speakers) results in the encoding of a contrast between words containing these two categories.

Seventy native speakers of German were trained to associate pairs of novel English words with pictures of novel objects. Critical pairs overlapped phonetically on their first syllable except for the vowels that formed the difficult-to-distinguish /ɛ/-/æ/ contrast (e.g., *tenzer-tandek*). Listeners were instructed to click on the picture matching the novel word and then received corrective feedback plus a repetition of the target word, which differed between test groups. A baseline 'audio' group heard the word repeated in auditory form. A 'video' group additionally saw the native speaker articulating the target words. Finally, a 'repetition' group was asked to produce the target words themselves. After training, all participants performed the same visual-world eye-tracking task with audio-only stimuli. A comparison was thus established between a baseline audio-only condition, a condition providing explicit but passive articulatory information ('video' group) and a condition where information was to be implicitly derived from active production ('repetition' group). If only explicit contrastive information could be used to establish lexical contrasts, we would only expect the 'video' group to show an asymmetry in lexical activation between /ɛ/-targets and /æ/-targets. If, however, participants were able to implicitly capture the phonetic distinction they produce while repeating the target words, they should also show the same asymmetrical behavior. As in previous studies, no asymmetry in processing would be expected in the baseline condition.

Results showed that, indeed for participants in the audio-only group, recognition of words with the two target vowels was similar, suggesting that the acoustic input alone was not enough for establishing a lexical distinction between novel words (Escudero, Hayes-Harb & Mitterer, 2008). In contrast, both exposure to videos and word repetition triggered an asymmetry in word recognition suggesting differentiation at the lexical level already during the processing of the first syllable: words with /ɛ/, the sound that better fits to an L1 category, were recognized faster than words with /æ/. Crucially, this pattern mirrors the asymmetric, non-native-like encoding found for L2 learners with real English words. This finding indicates that articulatory knowledge, both explicit and implicit, can trigger the establishment of lexical contrasts between words containing difficult foreign sounds. Articulatory knowledge is thus used by learners to anchor words with sounds that are similar to their L1, thereby reducing lexical competition for part of their L2 lexicon.

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