

Testing the Cue-Weighting Transfer Hypothesis with Dutch Listeners' Perception of English Lexical Stress

Annie Tremblay,¹ Mirjam Broersma,² Yuyu Zeng,¹ Anna Aumeistere,² Jinmyung Lee,¹ Hyoju Kim,¹ & Seulgi Shin¹

University of Kansas (USA), Radboud University (Nijmegen, The Netherlands)

This study investigates how listeners' knowledge of acoustic cues to lexical stress in the native language (L1) modulates their perception of lexical stress in a second language (L2), providing a further test of the cue-weighting transfer hypothesis for lexical stress.

Languages that have lexical stress differ in how stress is realized acoustically. To illustrate, whereas stressed syllables (with an intonational pitch accent) have a higher pitch, longer duration, and higher intensity than unstressed syllables (*ceteris paribus*) in both English and Dutch, unstressed vowels show a greater degree of centralization in English than in Dutch [1]. These acoustic differences create perceptual biases in the L1 that may in turn affect listeners' perception of lexical stress in the L2. For example, previous research has shown that English listeners rely more strongly on vowel quality than on pitch, duration, or intensity when perceiving English stress [2,3], whereas Dutch listeners rely more on duration than on vowel quality when perceiving Dutch stress [4]; these perceptual biases have been hypothesized to result in Dutch listeners' greater use of suprasegmental cues to English stress in spoken word recognition compared to English listeners [5], although this has not been tested explicitly.

Research to date, however, does not provide strong evidence in support of the hypothesis that listeners' knowledge of acoustic cues to lexical stress in the L1 determines their perception of lexical stress in the L2. Zhang and Francis [3] tested English and Mandarin listeners' weighting of acoustic cues to English stress. They found that, like English listeners, Mandarin listeners' English stress perception relied most heavily on vowel quality cues, even if lexical stress in Mandarin is signaled primarily by duration cues. Similarly, Chrabaszc et al. [2], who tested English, Mandarin, and Russian listeners, found that all three groups' stress perception relied primarily on vowel quality cues (the authors had predicted Russian listeners to attend primarily to duration cues). In both studies, L1 effects emerged only in listeners' use of secondary cues to English stress. Crucially, the non-native listeners in these two studies were tested in the United States, raising the possibility that their proficiency in English was too advanced for them to show a strong cue-weighting transfer from the L1 to the L2.

The present study provides another test of the cue-weighting transfer hypothesis for lexical stress, this time focusing on non-native English listeners who lived in an environment where their L1 was spoken: native Dutch listeners in The Netherlands. In addition to shedding light on whether or not listeners can transfer their relative reliance on acoustic cues to lexical stress from the L1 to the L2, this study seeks to determine whether the hypothesis formulated in previous studies with Dutch L2 learners of English (e.g., [5]) can be substantiated.

Native English listeners ($n=13$; data collection ongoing) and native Dutch listeners ($n=40$) completed a cue-weighting stress perception experiment in English. In each trial, listeners heard an auditory stimulus and identified it as *DEsert* (word-initial stress) or *deSSERT* (word-final stress).

The auditory stimuli were manipulated in seven acoustically equidistant steps from word-initial stress (Step 1) to word-final stress (Step 7), orthogonally manipulating two dimensions at a time (i.e., pitch [i.e., fundamental frequency] and vowel quality [i.e., first and second formants], duration and vowel quality, pitch and duration) while neutralizing the remaining dimensions at Step 4 (e.g., when pitch and vowel quality were manipulated orthogonally in seven steps, duration and intensity were neutralized at Step 4). This was done by resynthesizing both the first and second syllables of the naturally produced disyllabic

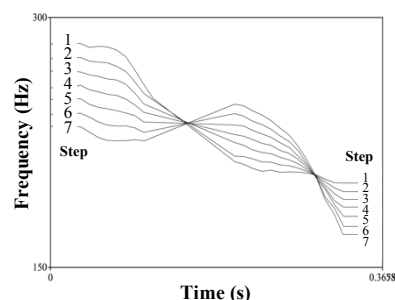


Fig. 1. Pitch Manipulation

words, as illustrated in Figure 1 for the manipulation of pitch. The experiment included 147 different auditory tokens, each heard three times in three separate blocks.

Figure 2 shows English and Dutch listeners' proportions of *DEsert* selection for the vowel quality by pitch, vowel quality by duration, and duration by pitch manipulations. Participants' proportions of *DEsert* selection were analyzed with logit mixed-effects models; only significant results are discussed. When the stimuli differed in vowel quality and pitch, both groups used both cues, but English listeners relied more on vowel quality than Dutch listeners and Dutch listeners relied more on pitch than English listeners, with English listeners relying more on vowel quality than on pitch and with Dutch listeners showing similar reliance on both cues. Unlike English listeners, Dutch listeners also showed a greater reliance on pitch at lower (i.e., more *DEsert*-like) steps of the vowel reduction cue and a greater reliance on vowel reduction at lower (i.e., more *DEsert*-like) steps of the pitch cue. When the stimuli differed in vowel quality and duration, both groups used both cues, but English listeners relied more on vowel quality than Dutch listeners, and both groups relied more on vowel quality than on duration. When the stimuli differed in duration and pitch, both groups used only pitch cues, with Dutch listeners relying more on pitch cues than English listeners. Finally, and importantly, the greater the English proficiency (as determined by LexTALE [6] scores), the larger the effect of vowel quality in both sets where this cue was manipulated; by contrast, English proficiency did not modulate the effect of pitch.

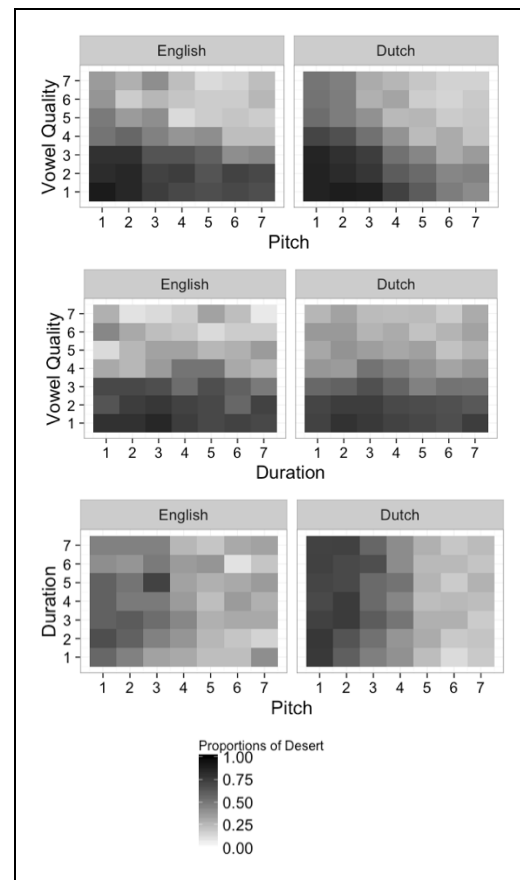


Fig. 2. Proportions of *DEsert* selection

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These results indicate that the knowledge of cues to lexical stress in the L1 has an important effect on the perception of stress in the L2, supporting the cue-weighting transfer hypothesis for lexical stress. The results also confirm that Dutch listeners rely more on suprasegmental cues to English stress than English listeners, in line with the hypothesis formulated in previous studies (e.g., [5]). Last but not least, the current findings suggest that listeners' L2 cue-weighting can become more native-like with increased L2 proficiency.

References

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