

Dutch Listeners' Perception of English Lexical Stress: A Cue-Weighting Approach

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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 direct test of the Cue-Weighting Transfer Hypothesis for lexical stress [1,2].

Languages with 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 in both English and Dutch, unstressed vowels show a greater degree of centralization in English than in Dutch [3]. These acoustic differences create perceptual biases (i.e., cue-weightings) in the L1, with English listeners relying more on vowel quality than on other cues when perceiving English stress [1,2], and with Dutch listeners relying more on duration than on vowel quality when perceiving Dutch stress [4]. These biases in the L1 have been hypothesized to predict listeners' perception of lexical stress in the L2, with Dutch L2 learners of English relying more than native English listeners on suprasegmental cues to stress when recognizing spoken English words [5]—though this hypothesis has not been directly tested.

The present study provides a direct test of the Cue-Weighting Transfer Hypothesis for lexical stress [1,2] by investigating Dutch listeners' perception of English stress, thus shedding light on whether L2 learners transfer their relative reliance on acoustic cues to lexical stress from the L1 to the L2 and determining whether the hypothesis formulated in [5] can be substantiated.

Native English listeners ($n=17$; 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), with the end points being determined based on averaged natural productions, and orthogonally manipulated two dimensions at a time (i.e., pitch [i.e., fundamental frequency] and vowel quality [i.e., first three 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, the halfway point between Steps 1 and 7). This was done by resynthesizing both the first and second syllables of the naturally produced disyllabic words, as illustrated in Fig. 1 for pitch. The experiment included 147 different auditory tokens (7 pitch steps x 7 vowel quality steps, 7 duration steps x 7 vowel quality steps, 7 pitch steps x 7 duration steps) heard three times.

Fig. 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 simple effects and interactions 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. 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. 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 effects of vowel quality.

These results indicate that L2 learners transfer their relative reliance on acoustic cues to lexical stress from the L1 to the L2 (though less so at a greater proficiency), supporting the Cue-Weighting Transfer Hypothesis for lexical stress [1,2] and confirming that Dutch listeners rely more on suprasegmental cues to English stress than native English listeners as in previous studies [5].

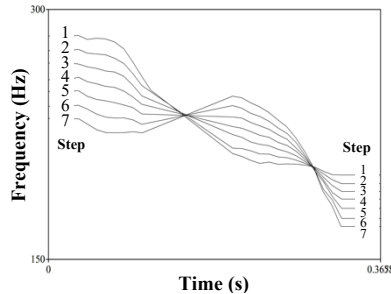


Fig. 1. Pitch Manipulation

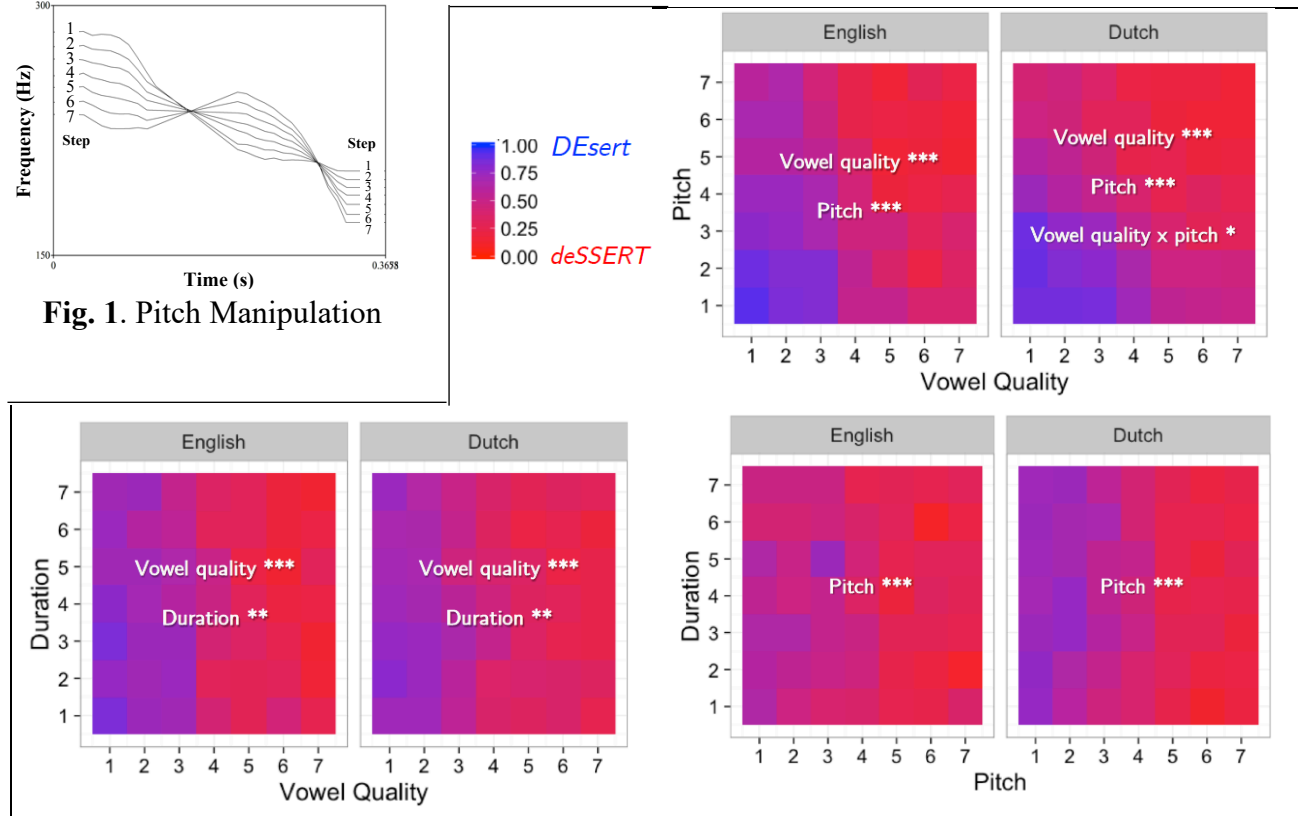


Fig. 2. Proportions of *DEsert* selection (blue) in the pitch-by-vowel-quality, duration-by-vowel-quality, and duration-by-pitch conditions, with the significant simple effects shown over the plots

References

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