

# English word stress as produced by English and Dutch speakers: the role of segmental and suprasegmental differences

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## Abstract

It has been claimed that Dutch listeners use suprasegmental cues (duration, spectral tilt) more than English listeners in distinguishing English word stress. We tested whether this asymmetry also holds in production, comparing the realization of English word stress by native English speakers and Dutch speakers. Results confirmed that English speakers centralize unstressed vowels more, while Dutch speakers of English make more use of suprasegmental differences.

**Index Terms:** lexical stress, production, foreign-accent, segmental, suprasegmental, English, Dutch

## 1. Introduction

According to [1], Dutch listeners of English are better in distinguishing English word stress than native English speakers. This finding was attributed to differences in vowel reduction: English has phonological vowel reduction; most unstressed vowels are reduced to schwa (/ə/) so that segmental properties are a strong cue for English listeners. Dutch only has phonetic vowel reduction, centralizing unstressed vowels slightly more than stressed vowels [2]. For Dutch listeners, suprasegmental differences are hence a strong cue. We tested whether these two groups of language users *produce* English word stress differently. To this end we compared the production of English word stress in words that have phonological reduction in the unstressed syllable (absurd) to words that don't (harpoon). The words were paired with ones with a different stress pattern (absence, harpist).

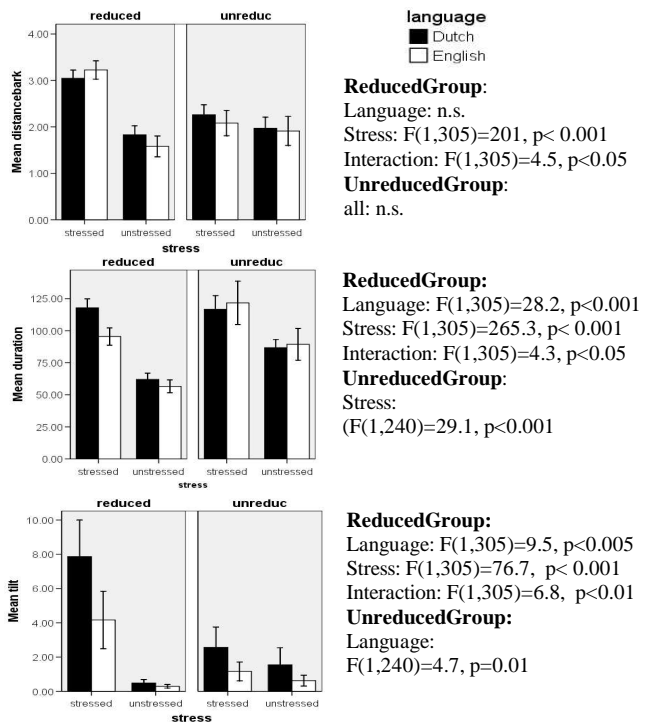
## 2. Methods

Four native English speakers from Bristol and five Dutch speakers of English read a list of English words containing 16 word whose unstressed vowel has phonological reduction (Reduced Group, e.g. absurd, paired with absence), and – as control for foreign accent – 13 words whose unstressed vowel is not reduced (Unreduced Group, harpoon, paired with harpist). We extracted the duration of the first vowel, its spectral tilt (energy in frequency band from 600 to 5000Hz divided by energy in band from 0 to 600Hz), and F1 and F2 in bark from the vowel center. F1 and F2 for each speaker's prototypical /ə/ were averaged across five productions of the definite article 'the'. For each vowel, the Euclidean distance in F1 and F2 from the speaker-specific /ə/ for F1 and F2 was calculated.

## 3. Results and Discussion

Data were analyzed separately for the unreduced and reduced Group. Independent variables were native language and

stress. For all measures, there was an interaction between language and stress for the Reduced Group, but not for the Unreduced Group. English speakers showed more segmental differences between stressed and unstressed vowels compared to Dutch speakers. In contrast, Dutch speakers produced stronger differences in the suprasegmental features vowel duration and spectral tilt than English speakers.



## 4. Conclusion

For the control words in which unstressed vowels have no vowel reduction (harpoon), Dutch speakers of English resemble native speakers. However, Dutch speakers transfer their native phonology to the production of words which have phonological vowel reduction (absurd). They distinguished stressed and unstressed vowels less through segmental differences – as English speakers do – but more through suprasegmental differences.

## 5. References

- [1] Cooper, N; Cutler, A; Wales, R. (2002). Constraints of lexical stress on lexical access in English. Evidence from native and non-native listeners. *Language and Speech* 45, 207-228.
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