

# PICKING UP THE CUES TO A NEW CONSONANT CONTRAST: DANISH LEARNERS' PRODUCTION AND PERCEPTION OF ENGLISH WORD-FINAL /s/ - /z/



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Can L2 learners reassign an acoustic cue from their own L1 to signal an unfamiliar contrast in the L2?

→ Can Danish learners of English use vowel duration to contrast /s/-/z/ in word-final position in production and perception?

## 1. Background

- English (EN) speakers use vowel duration to signal the voicing contrast in word-final fricatives in production and perception. A longer vowel indicates "voicing" (Port, Dalby 1982).
- In Danish (DK), vowel duration is used, but exclusively to contrast vowels. DK lacks voiced fricatives at all (Grønnum 1998).
- Previous studies have shown that L2 learners may be able to differentiate a new L2 contrast, but they may use different acoustic cues from native speakers (Bohn 1995). According to Broersma, perceptual cues signalling a contrast in an L2 might never be used native-like if they are not necessary for accurate perception (Broersma 2005).
- Since Danes are very familiar with English they may pick up a familiar cue (vowel duration) and reassign its function to an unfamiliar contrast (fricative voicing contrast).

## 2. Production

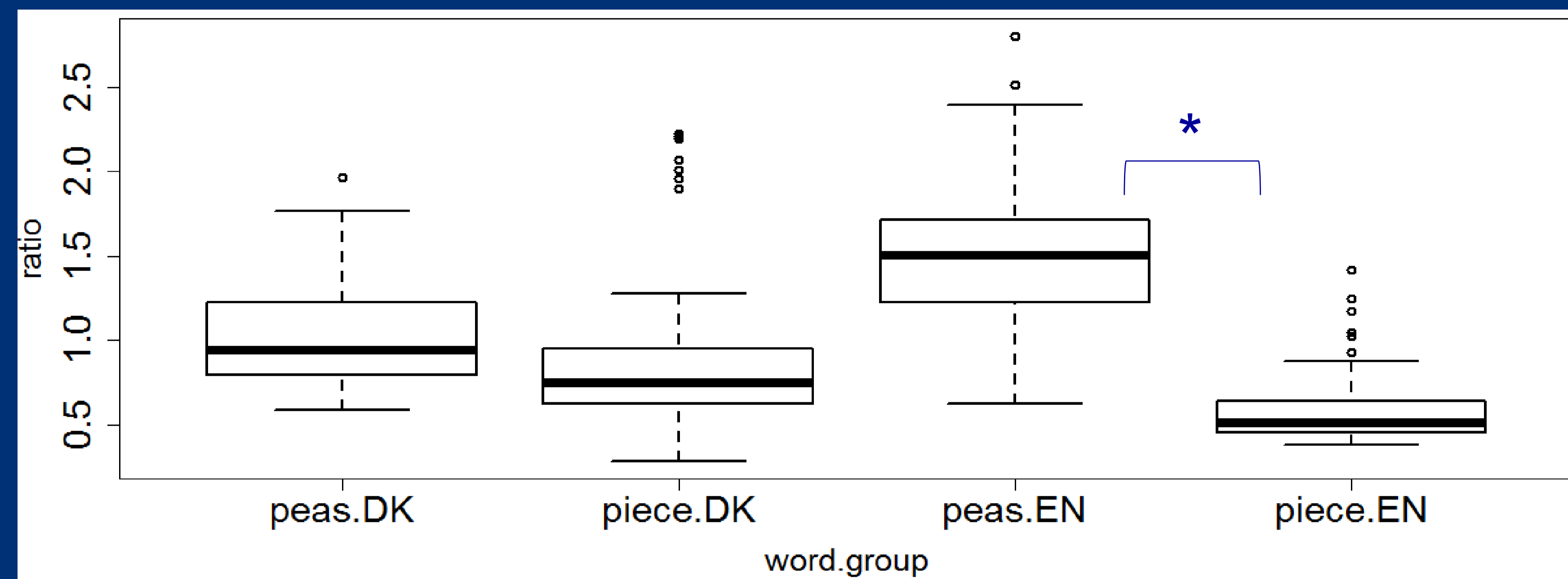
Participants: 15 DK and 11 EN speakers in two experiments

Materials: Word lists including the minimal pair *piece* – *peas*

Measurements: Duration ratio of the vowel and the fricative

Results:

- The vowel is longer before the voiced fricative.
- The difference is larger for the EN speakers.
- NB: The voicing contrast is mainly maintained by the duration ratio.
- The DK speakers produce only a nonsignificant difference, but in the same direction as the EN speakers.



## 3. Perception

H1: DK listeners perceive the word-final /s/-/z/ contrast less categorically than EN listeners.

H2: The listeners perceive more /z/ when the vowel is phonetically long.

H3: DK listeners rely even more on vowel duration than the native speakers.

Identification test (2 AFC experiment)

Stimuli: Two continua with nonsense words /gwi\_C/

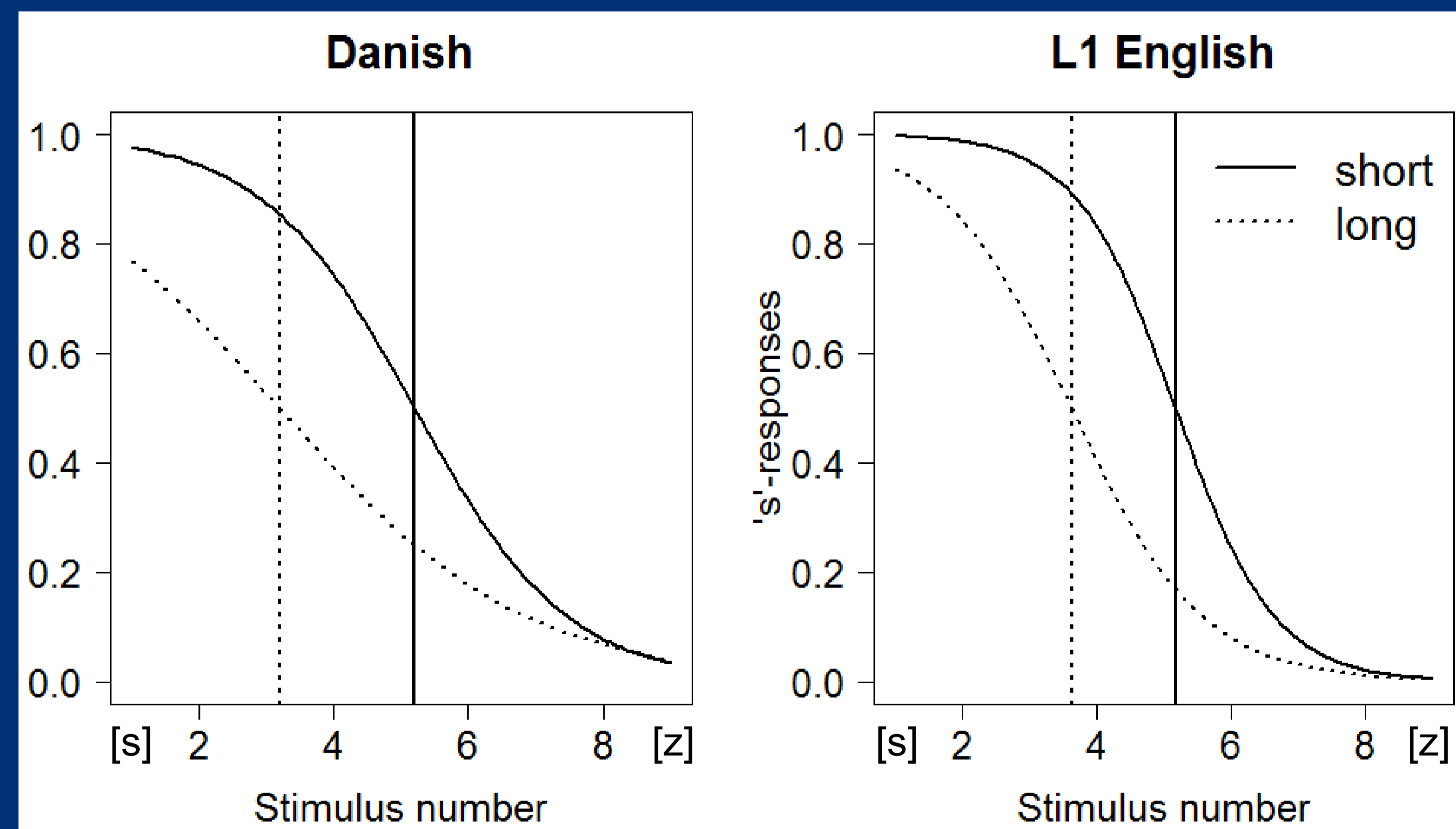
One continuum with a short vowel, the other with a long vowel

Target consonant: one of nine-step continuum /s/ to /z/ (STRAIGHT) in word-final position

Task: Does the made-up name end in /s/ or /z/ ?

Results:

- The DK listeners perceive the contrast less categorically. (shallow curves) ✓
- The listeners perceive more /z/ when the preceding vowel is long (difference of category boundaries). This is true for both EN and DK. ✓
- The category boundaries are shifted only to a very small degree for the DK listeners compared to the EN listeners. ?



## 4. Discussion

- Production: Only the EN but not the DK speakers maintain the voicing contrast.
- Perception: The contrast is maintained by both EN and DK listeners. The DK listeners seem to use the duration cue in perception much like the native speakers.
- The DK listeners in the present study do not perceive the contrast as accurately as the EN speakers.
- Perhaps the L2 contrast forces them to rely on other cues, thus reassigning the function of vowel duration.
- Further studies should address this asymmetry between production and perception.

### References

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STRAIGHT: Kawahara, H., Masuda-Katsuse, I., & de Cheveigné, A. (1999). Restructuring speech representations using a pitch-adaptive time-frequency smoothing and an instantaneous-frequency-based F0 extraction: Possible role of a repetitive structure in sounds. *Speech communication*, 27(3), 187-207.