

Vowel shortening in German as a function of syllable structure

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Theoretical Background

Two types of **compensatory vowel shortening (CS)**

- driven by the addition of segments in the onset/coda
- driven by the addition of syllables

Theoretical Background

COMPENSATORY VOWEL SHORTENING (CS)

- Most studies on CS have been done on English, e.g.
 - Munhall et al., 1992
CS induced by coda clusters
 - Shaiman, 2001
CS induced by simple coda & coda clusters
- Evidence for CS in German has only recently been found
 - Peters & Kleber, 2013 and 2014
CS induced by coda clusters

Theoretical Background

COMPENSATORY VOWEL SHORTENING (CS)

- CS may also be induced by the addition of syllables
 - Vayra et al., 1999
CS induced by number of following syllables

Theoretical Background

- In this experiment we
 - investigated both coda and syllable induced CS
 - to which degree CS occurs
 - compared both types of CS

Production Experiment

- 10 native speakers of German
 - 5 female, 5 male
 - in their mid-20s (mean = 24.5, SD = 1.84)
- Recordings took place at the IfL-Phonetics lab in Cologne

Production Experiment

Target words differed in

- Vowel quality (low: /a:/, mid: /e:/, o:/, high /i:/, u:/)
- Syllable structure and number of coda consonants (open and closed)
- Number of syllables (mono- & trochaic disyllabic)

C1	V1	C2	C3	L	A
m	i: u: e: o: a:	m	s	l	ɑ
			coda consonants		additional syllable

Production Experiment

/nax **[target word]** vɪl kim di: raɪzə maxən/

‘Kim wants to travel to **[target word]**’.

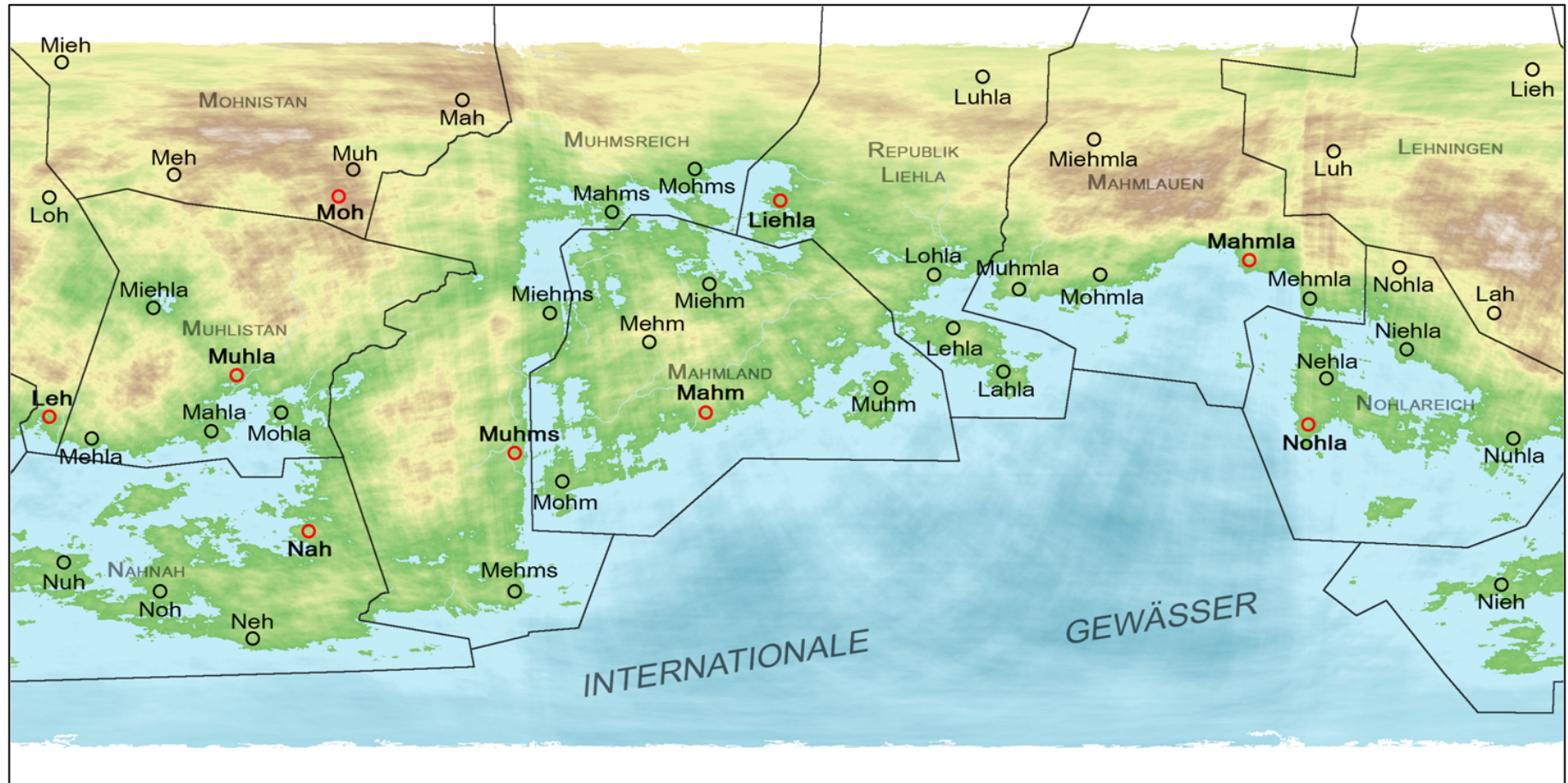
/vɪl kim di: raɪzə nax **[filler]** maxən/

‘Does Kim want to travel to **[filler]**?’

750 tokens

10 speakers x 5 vowels x 5 structures x 3 repetitions

Production Experiment



Production Experiment

Will Kim die Reise nach Niehm machen?

(Nein,) nach Mohm will Kim die Reise machen.



Production Experiment

Will Kim die Reise nach Lohms machen?

(Nein,) nach Mehms will Kim die Reise machen.



Production Experiment

Will Kim die Reise nach Lohla machen?

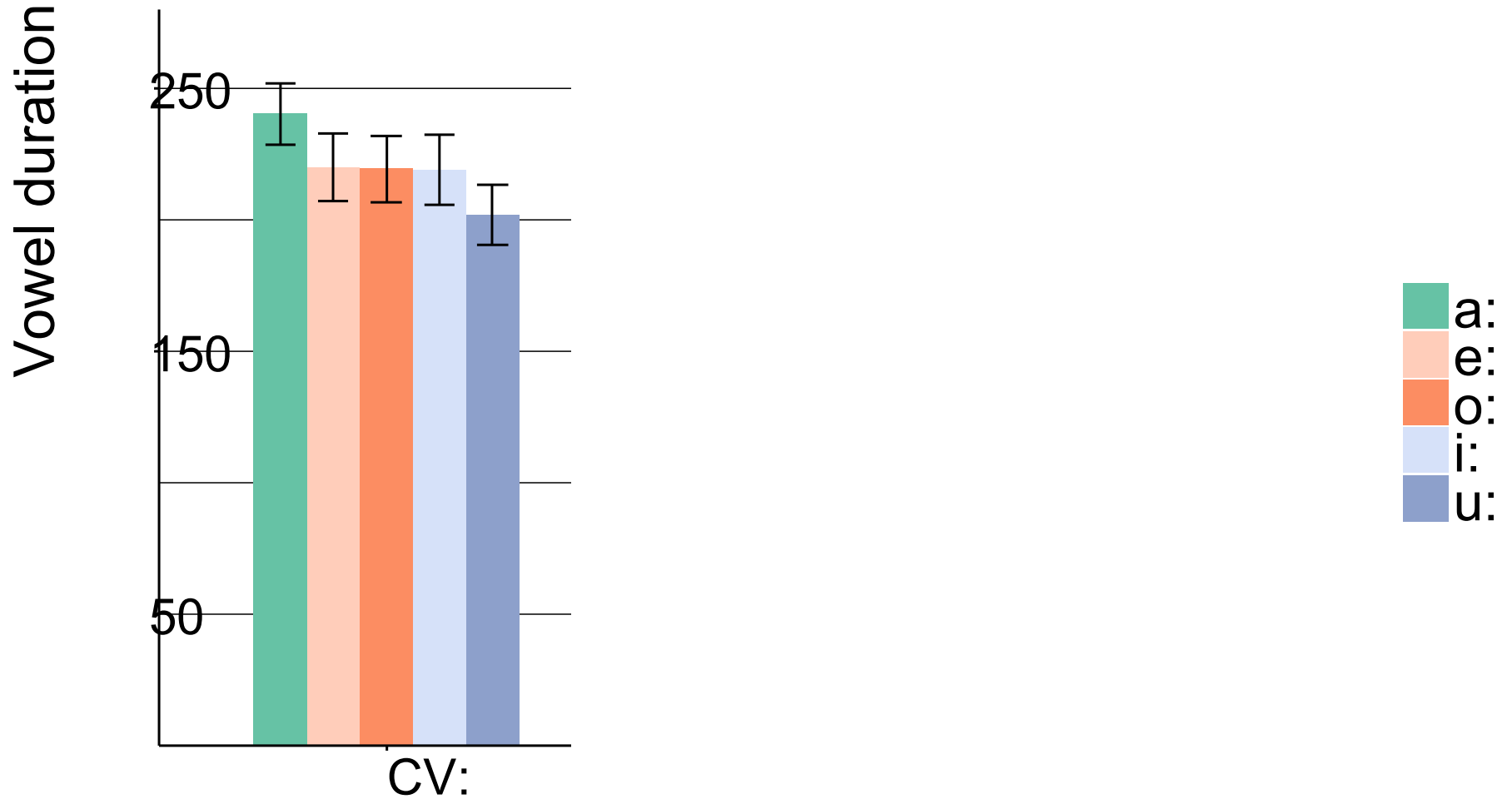
(Nein,) nach Muhla will Kim die Reise machen.



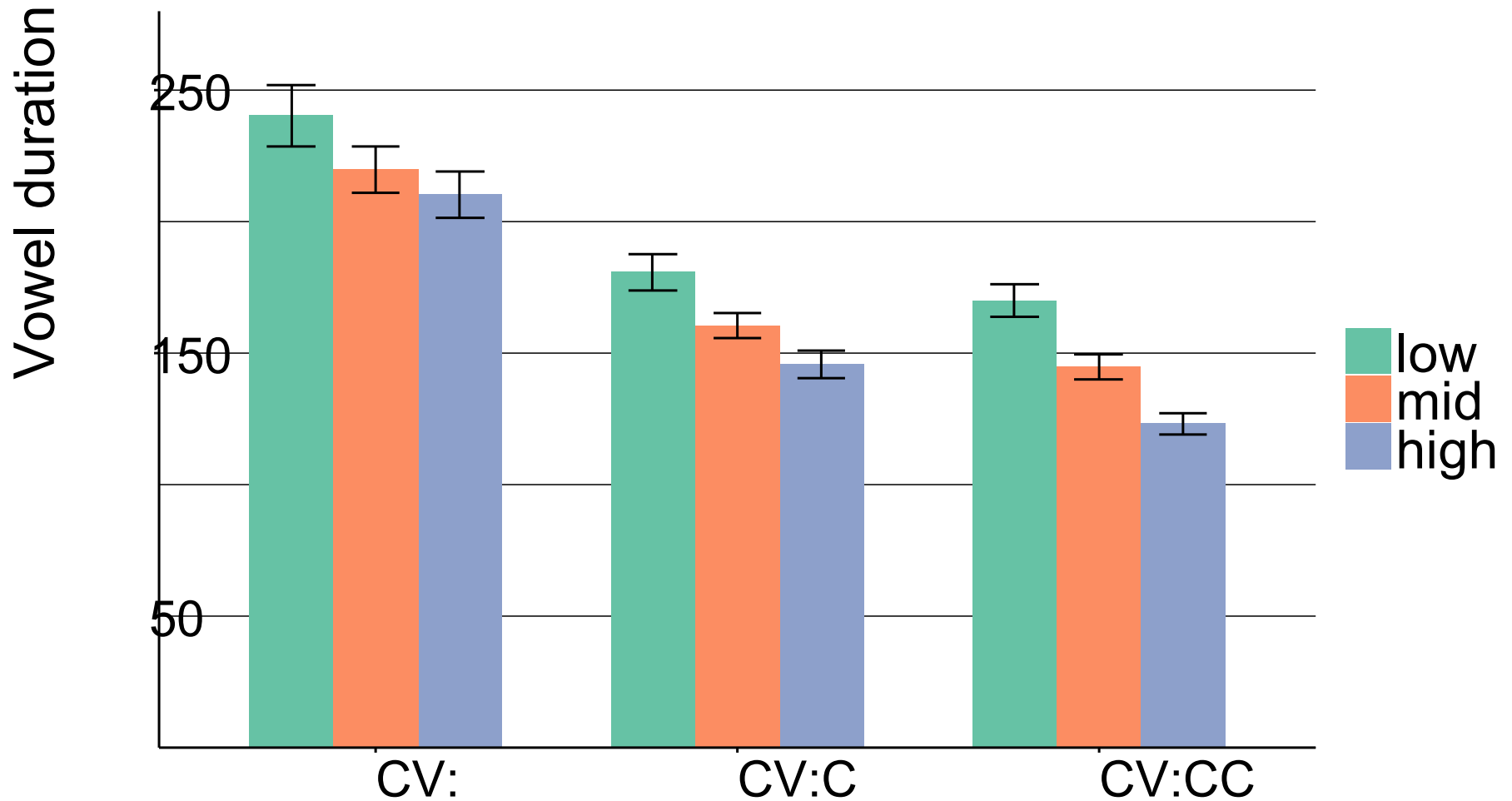
Production Experiment

- Linear mixed effects models, using R (R Development Core Team, 2008) and the package *lme4* (Bates et al., 2015)
- The fixed effect under investigation was STRUCTURE with 5 levels: /CV:/, /CV:C/, /CV:CC/, /CV:.CV/, /CV:C.CV/
- We included random intercepts and slopes for subjects for both STRUCTURE and VOWEL HEIGHT (levels: low, mid, high)
- P-values were determined using the Tukey adjusted contrast in the *multcomp* package (Hothorn et al., 2008)

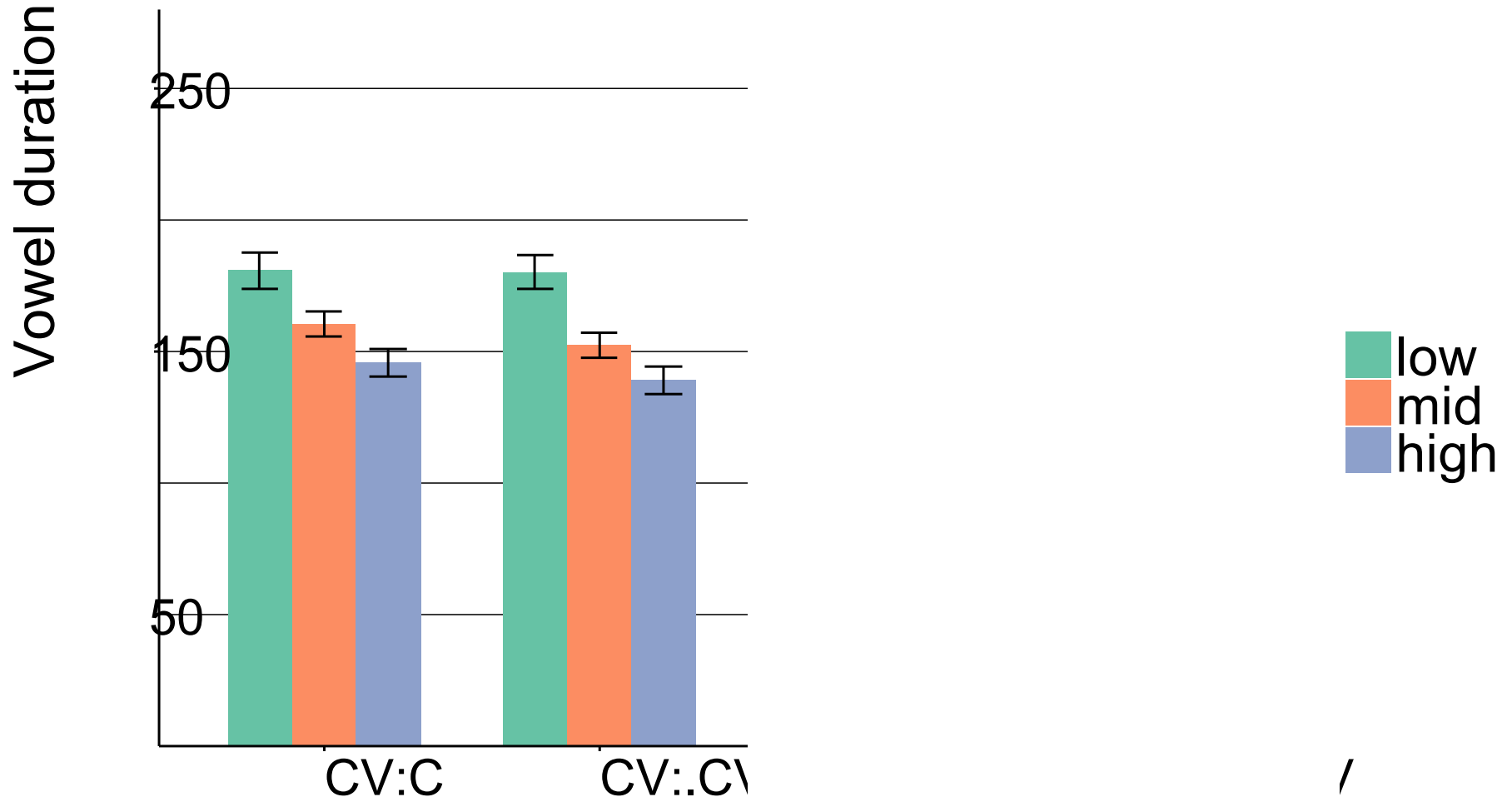
Results



Results

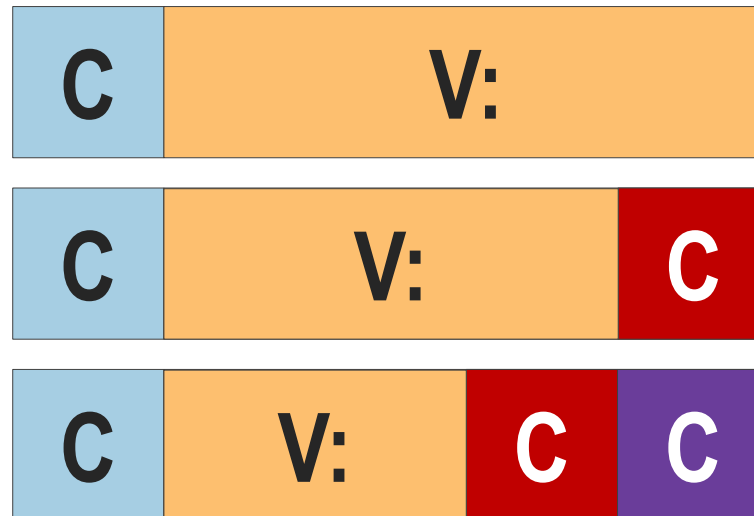


Results



Discussion

confirmed coda induced CS

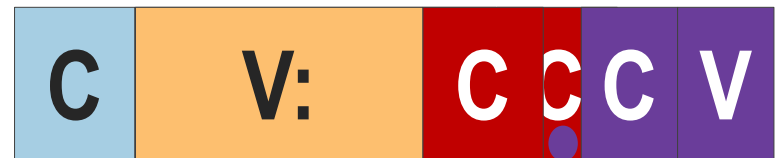
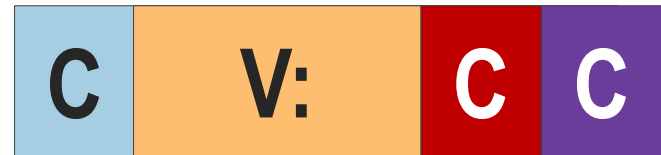


Discussion

1 element



2 elements



Discussion

intrinsic vowel duration remains across CS

/a:/

/e:, o:/

/i:, u:/

Discussion

- **Coda induced CS**

in line with Munhall et al., 1992; Shaiman, 2001

- **Coda induced CS in German**

in line with Peters & Kleber, 2014

additionally: CS induced by single coda consonants

- Evidence for **identical CS effects** of adding a syllable or coda consonant(s)

- **Intrinsic vowel duration** remains across CS

in line with Clements & Hertz, 1996