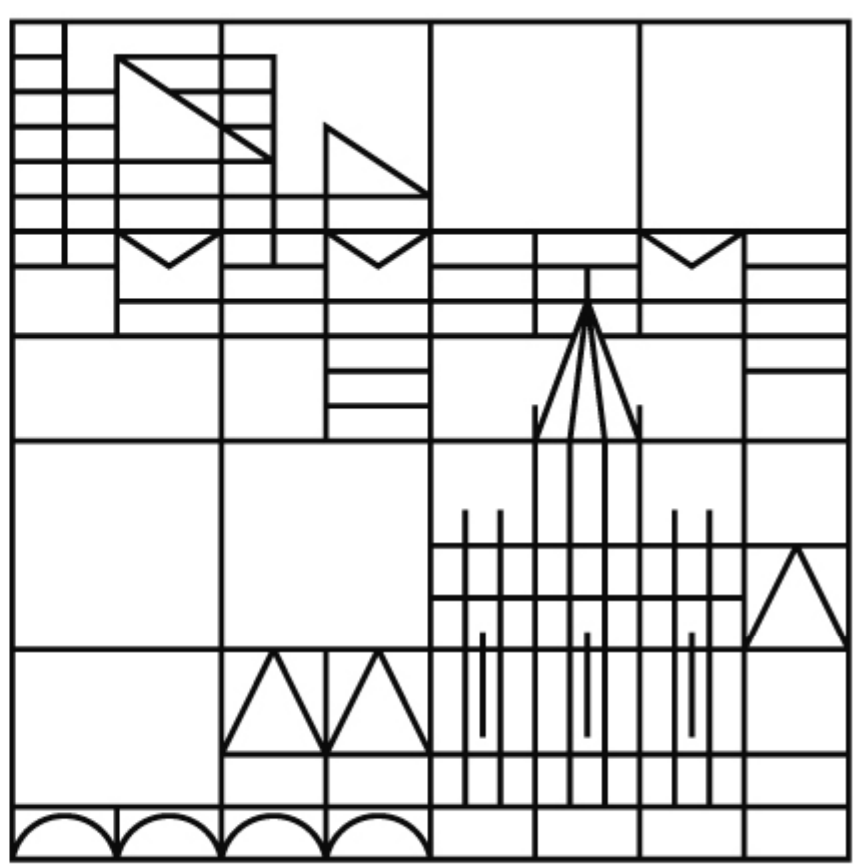


The timing of nuclear and prenuclear Icelandic pitch accents

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Abstract

Two experimental reading studies were designed to test F0 alignment in Icelandic pitch accents with a view to establishing distinct intonational categories. Four conditions were tested: (i) prenuclear accents; (ii) final nuclear accents in broad focus sentences; (iii) final narrow focus; (iv) non-final narrow focus. The results are such that (i) prenuclear accents are signalled by a late rise (L*H), final nuclear accents by an early rise; (ii) peaks in prefinal nuclear accents are aligned earlier than prenuclear peaks, but later than final nuclear peaks, suggesting a boundary effect; (iii) no differences emerged between accents in sentences with broad and narrow focus.

Background (previous research results)

Icelandic word stress: Stress the initial syllable of a word.

Pitch accent inventory (Árnason 1998; Dehé 2009):

- two bitonal pitch accents (H*L and L*H)
- two monotonal pitch accents (H* and L*)
 - ❖ T* perceptually linked to the stressed syllable
 - ❖ trailing tone completed by the time the next vowel is reached, or more generally, by the end of the following syllable (Árnason 1998)
- no previous research on the exact relation between tonal targets and segmental material

Tonal distribution and intonational meaning:

- high pitch signals a primary accent and is heard as reinforcement of stress (Haugen 1958)
- all four pitch accent types occur in prenuclear and nuclear position, in declarative and interrogative sentences, in neutral utterances and for the marking of narrow focus (Árnason 1998; Dehé 2009)
- boundary tones (Árnason 1998):
 - ❖ L% marks finality, i.e. it is primarily used at the end of utterances
 - ❖ H% signals non-finality
- typical tonal sequences (Árnason 1998; Dehé 2009):
 - ❖ H*L L% at the end of declarative utterances
 - ❖ L*H H% and H*L H% utterance-internally

→ What we know about Icelandic intonation is unsatisfactory, e.g.:

- no systematic previous research on the distinction between non-nuclear and nuclear pitch accents
- no systematic previous research on differences between focus accents in various positions

This paper looks at the timing and distribution of Icelandic pitch accents in the following environments:

- prenuclear accents in a broad focus context
- non-final nuclear accents (narrow focus)
- sentence-final nuclear accents (broad focus)
- sentence-final nuclear accents (narrow focus)

References

- Árnason, Kristján. 1998. Toward an analysis of Icelandic intonation. In S. Werner (ed.), *Nordic Prosody. Proceedings of the VIIth Conference, Joensuu 1996*, 49–62. Frankfurt a.M. et al: Peter Lang.
- Dehé, Nicole. 2009. An intonational grammar for Icelandic. *Nordic Journal of Linguistics* 32(1): 5–34.
- Dehé, Nicole. 2010. The nature and use of Icelandic prenuclear and nuclear pitch accents: Evidence from F0 alignment and syllable/segment duration. *Nordic Journal of Linguistics* 33(1): 31–65.
- Haugen, Einar. 1958. The phonemics of Modern Icelandic. *Language* 34(1): 55–88.

Note: A longer version of this paper, including a perception study and syllable/segment duration results, has recently been published as Dehé (2010).
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Research Questions

1. Is there evidence from F0 alignment for differences between prenuclear and nuclear accents, and between nuclear accents of different types and in different positions (e.g., broad focus/ narrow focus, prefinal position/ sentence-final position)?
2. Can supporting evidence be found for the accent types previously identified for Icelandic: H*L, L*H, H* and L*?
3. Based on the evidence from F0 alignment, can other accent types be identified?

Two experimental reading studies

Materials:

syllable type	target syllables	carrier nouns
CV:	ma [ma:]	Malasíu, malaríu
CVC	mor [mɔr]; man [man]	morgunmat, mandarínur

Carrier sentences, Expt 1:

Condition 1: Nuclear accent in final position; broad focus

a. Open syllable: CV:

- e001 **Icelandair er farið að fljúga til Malasíu.**
'Icelandair has now regular flights to Malaysia.'
- e002 **Vegna skordýranna eru allir að segja frá malaríu.**
'Because of the insects everybody speaks about malaria.'

b. Closed syllable: CVC

- e007 **Venjulega hittir prófessorinn nemendur sína í morgunmat.**
'Usually the professor meets his students for breakfast.'
- e008 **Okkur finnst ávaxtasalat best með mandarínur.**
'We like fruit salad best with mandarines.'

Condition 2: Nuclear accent in final position; narrow focus

a. Open syllable: CV:

- e003 Q: Hvert fór bróðir þinn í frí? (Where ...?)
A: **Bróðir minn fór í frí til Malasíu.**
'My brother goes on holiday to Malaysia.'
- e004 Q: Frá hverju sögðu lækurinn og hjúkrunarkonan?(What about?)
A: **Lækurinn og hjúkrunarkonan sögðu frá malaríu.**
'The doctor and the nurse spoke about malaria.'

b. Closed syllable: CVC

- e009 Q: Hvenær borða Íslendingar hafragraut? (When?)
A: **Íslendingar borða hafragraut í morgunmat.**
'Icelanders eat porridge for breakfast.'
- e010 Q: Hvers konar köku ætlar þú að koma með? (What kind of cake?)
A: **Ég ætla að koma með köku með mandarínur.**
'I'll bring a cake with mandarines.'

Condition 3: Prenuclear accent; broad focus

a. Open syllable: CV:

- e005 **Icelandair flýgur frá Malasíu til Reykjavíkur.**
'Icelandair has flights from Malaysia to Reykjavik.'
- e006 **Ferðamennirnir eru hræddir við malaríu og kóleru.**
'The tourists are afraid of malaria and cholera.'

b. Closed syllable: CVC

- e011 **Ég fæ mér kaffi með morgunmat og hádegismat.**
'I have coffee for breakfast and lunch.'
- e012 **Okkur finnst fiskur góður með mandarínur og karrí.**
'We like fish with mandarines and curry.'

Carrier sentences, Expt 2:

Conds 2 and 3 identical to Expt 1; this set replaces cond 1 of Expt 1:

Nuclear accent in prefinal position; narrow focus

a. Open syllable: CV:

- e001 Q: Flýgur Icelandair frá Noregi til Reykjavíkur?
A: **Nei, Icelandair flýgur frá Malasíu til Reykjavíkur.**
- e002 Q: Er ferðamennirnir hræddir við plágu og kóleru?
A: **Nei, ferðamennirnir eru hræddir við malaríu og kóleru.**

b. Closed syllable: CVC

- e007 Q: Færðu þér kaffi með kvöldmat og hádegismat?
A: **Nei, ég fæ mér kaffi með morgunmat og hádegismat.**
- e008 Q: Finnst ykkur fiskur góður með tómum og karrí?
A: **Nei, okkur finnst fiskur góður með mandarínur og karrí.**

Segmental landmarks

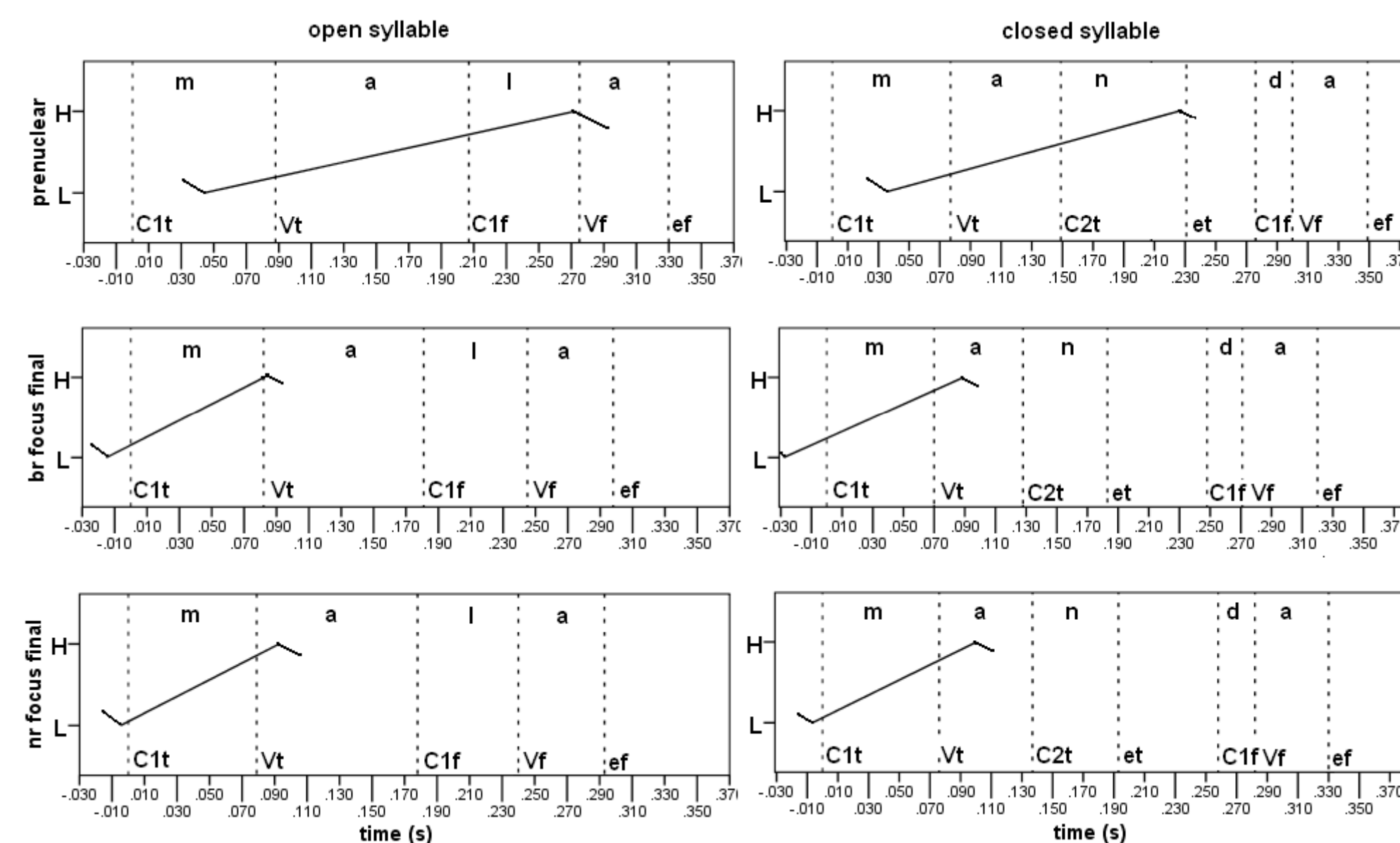
- C1t -- beginning of onset consonant of target syllable (σ)
- Vt -- beginning of vowel of σ
- C2t -- beginning of final consonant of σ (closed σ only)
- C1f -- beginning of onset consonant of syllable following σ
- et -- end of σ
- Vf -- beginning of vowel of syllable following σ
- ef -- end of syllable following σ

Tonal targets

- L1 -- beginning of F0 rise (F0 minimum preceding the local peak)
- H -- local F0 peak
- L2 -- end of F0 fall (F0 minimum following the local peak)

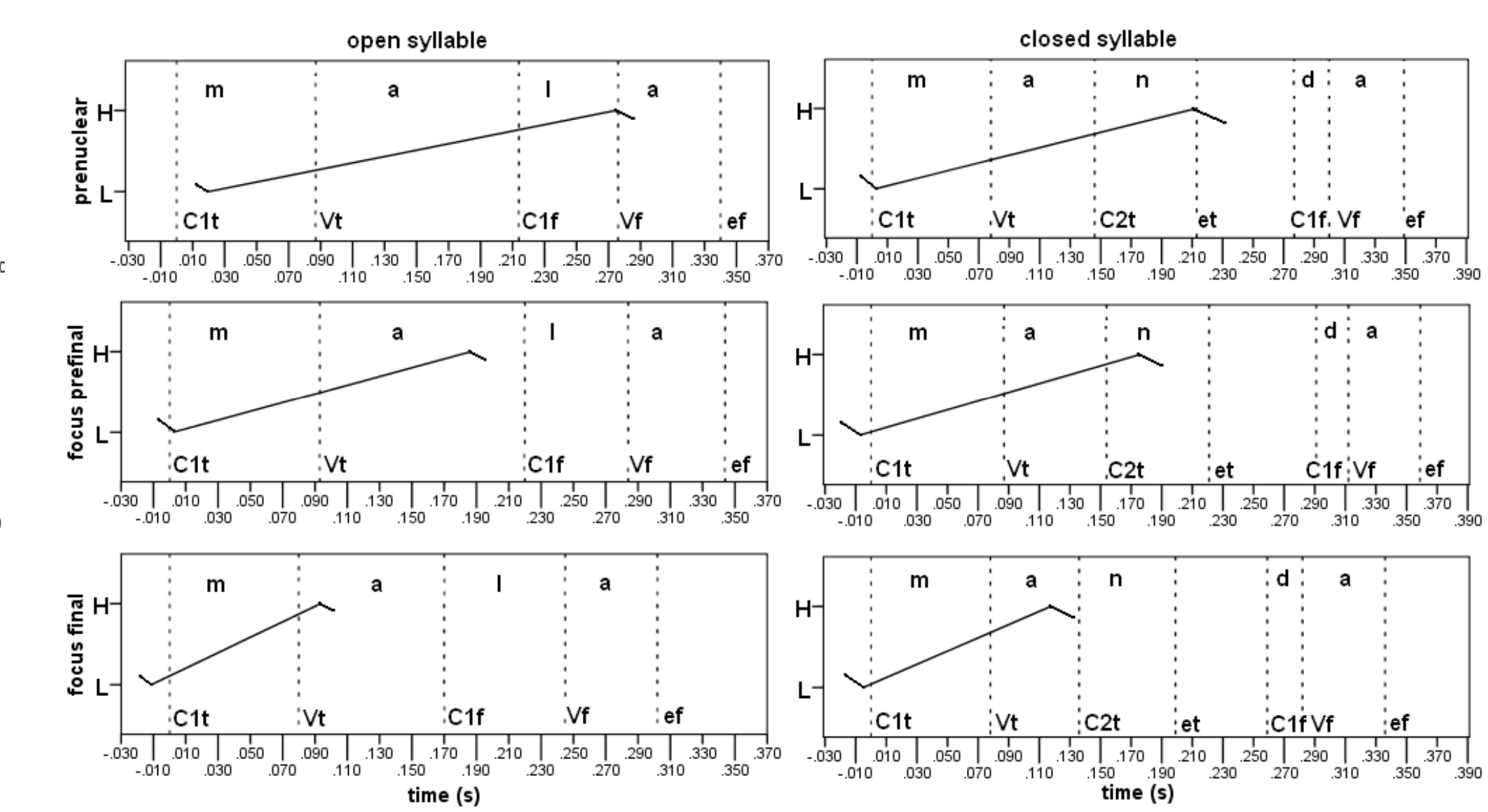
Alignment results, Expt 1

- May 2008, Reykjavík, 12 native speakers (3 male, 9 female)



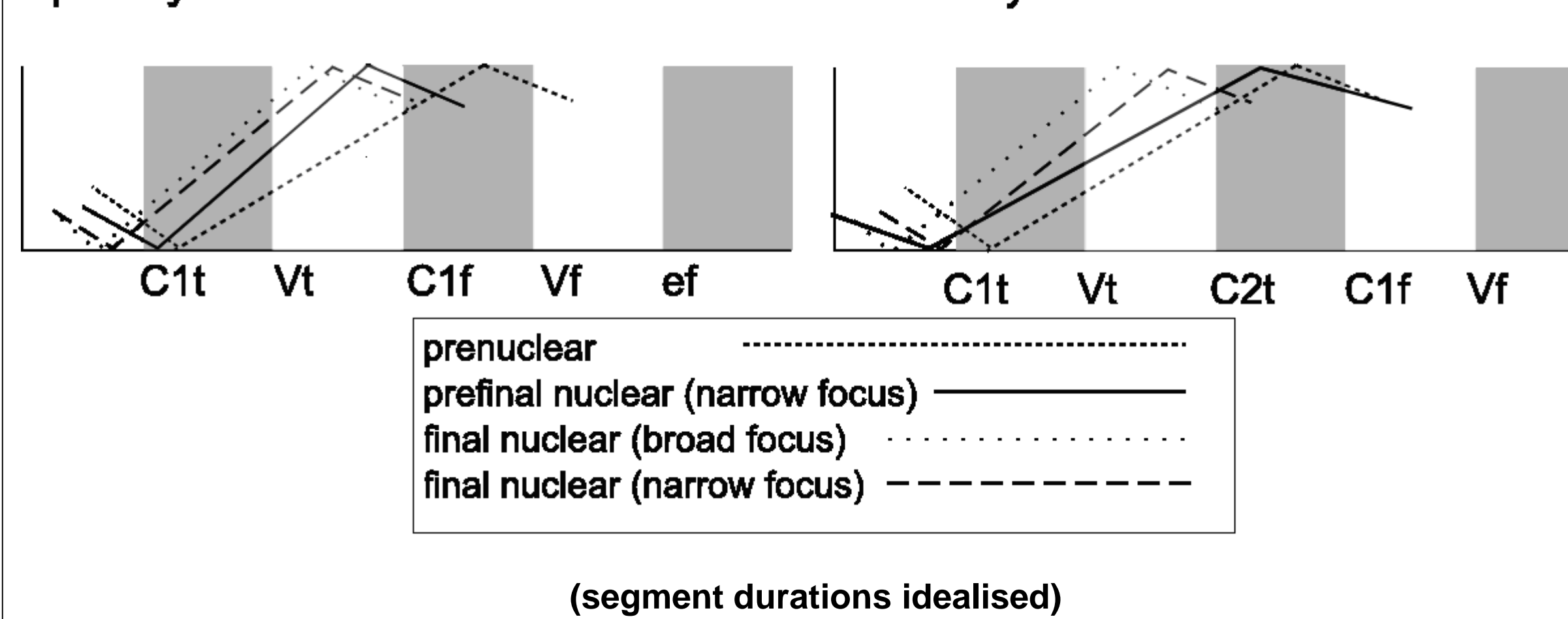
Alignment results, Expt 2

- August 2009, Reykjavík, 12 native speakers (5 male, 7 female)

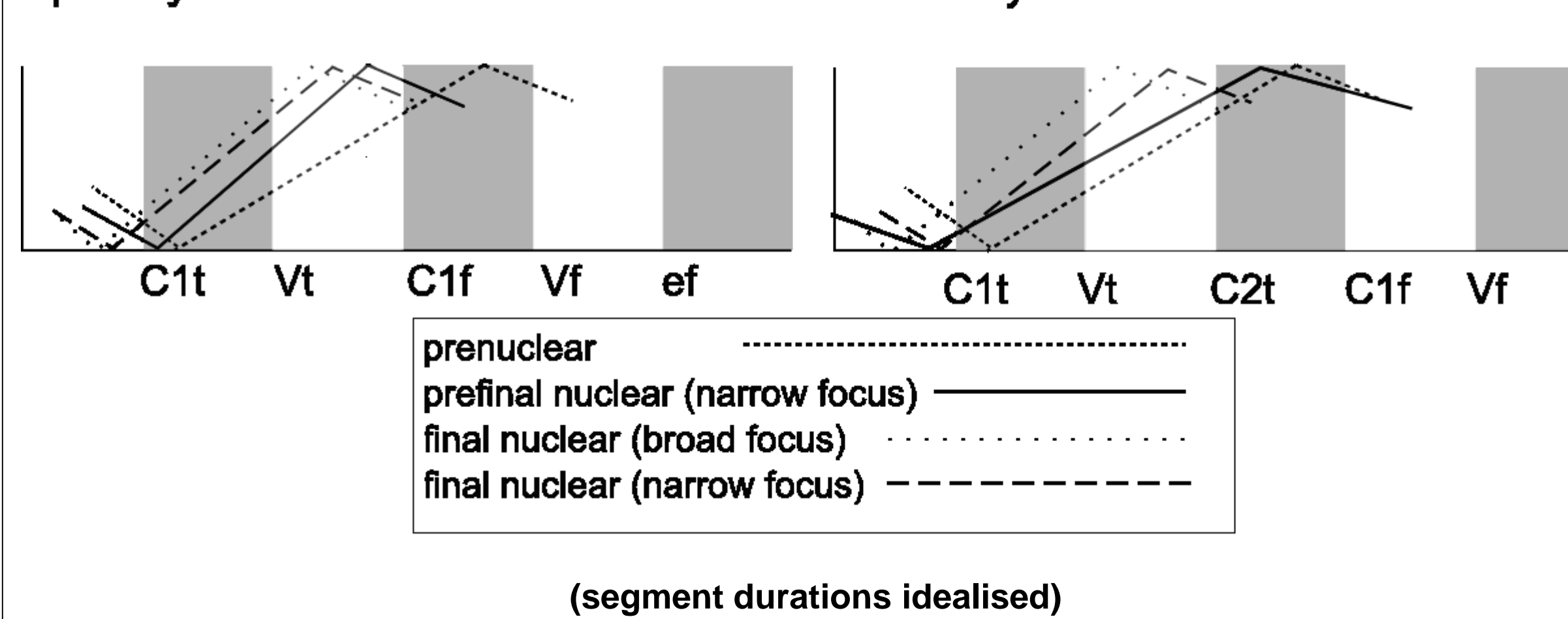


Overall results (Expt 1 and 2 combined)

open syllables



closed syllables



Outlook (research planned for 2010/11)

1. prenuclear L*H v nuclear L*H (e.g. in questions; cf. Árnason 1998, Dehé 2009):
 - a. prenuclear: ... að Dís er komin. (... that Dís has arrived)
 - b. nuclear (Q): Er Dís komin?
2. regional variation in Icelandic intonation

- stable alignment of L1 around the beginning of σ across conditions
- alignment of H variable across but stable within conditions
- no consistent alignment of L2

❖ all conditions show a rise from L to H, but H reached earlier in nuclear than in prenuclear conditions, and earlier in final than in non-final positions.

1. **prenuclear pitch accent: L*H**
 - stable alignment of L1 inside C1t
 - stable, late H alignment in C1f (CV:) or C2t (CVC)
 - perceptually low (or: rising from low)
2. **nuclear, sentence-final accents: LH***
 - no alignment differences between broad and narrow focus
 - stable alignment of L1 (just before C1t)
 - stable, early H alignment within Vt
 - perceptually high (falling)
3. **nuclear, non-final pitch accent (narrow focus): LH***
 - stable alignment of L1 around onset of C1t
 - H alignment earlier than in prenuclear accents, but later than in final nuclear accents
 - perceptually high