Towards an articulatory based typology of laryngeal effects on vowel duration

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1. Background

• Voicing Effect: vowels are longer when followed by voiced consonants (House & Fairbanks 1953, Chen 1970)

• Aspiration Effect: vowels are longer when followed by post-aspirated stops (Maddieson & Gandour 1976, Durvasula & Luo 2012)

• Laryngeal timing hypothesis: the source of the AE is the relative timing of the initiation of glottal spread, necessary for voicelessness and aspiration (see Halle & Stevens 1967 for related ideas)

 Prediction: vowels followed by pre-aspirated stops should be shorter

• Icelandic contrasts pre-aspirated geminates stops with unaspirated geminates in word-medial and final position: i.e., *tökk* 'dark' [t^hœ^hk] vs. *tögg* 'dew' [t^hœkk]



2. Research hypothesis

Vowels followed by pre-aspirated (geminate) stops are shorter than vowels followed by unaspirated (geminate) stops.

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3. Methodology

- 5 Icelandic speakers
- 14 words (10 CVCC and 4 CVCCV), Segðu _____ aftur
- 3 repetitions per word, 210 repetitions in total

• linear mixed-effects regression analysis (Bates et al. 2015)

Table 1: Word list.

word	gloss	word	gloss
dökk	dark	dögg	dew
kokk	cook	gogg	beak
kopp	chamber pot	kubb	block of wood
sett	put	vídd	width
vítt	far and wide	þítt	thaw
takka	key	kagga	barrel
detta	fall	gedda	pike

4. Results



Figure 2. Interaction between laryngeal specification and prosodic context in conditioning vowel duration.

• vowels are 23 msec shorter if followed by a pre-aspirated stop (Figure 2)

stronger effect in CVCC words

• the voiced interval is 20 msec longer if followed by a pre-aspirated stop (Figure 3)



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Figure 3. Effect of pre-aspiration on voicing duration.

• CVCC words are 43 msec shorter if they contain a pre-aspirated stop (non-significant effect in CVCCV words, Figure 4)

not a durational trade-off!

conditioning word duration.



Figure A1. Example of n urements criteria for prerated stops.

Appendix

 Table A1: Socio-linguistic profile of the participants.

sex	age	birthplace	other languages
F	24	Reykjavik	English, Danish, German
F	25	Höfn	Danish, English, Spanish
F	27	Reykjavik	English, Danish
F	46	Reykjavik (Kápavogur)	English, Danish
M	25	(Kopavogur) Selfoss	English





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i-		JNN Low man and the second sec	
word	voicing vowel	aspiration stop	closure
	Vowel Onset to Release	Vowel Offset to	Release