

How vowel length interacts with final lengthening: A corpus study

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Introduction This paper investigates how the presence of a phonological vowel length contrast interacts with final lengthening (FL), based on a corpus study of 13 languages. Specific questions include whether having a V/VV contrast affects the degree by which short and long vowels are lengthened, and whether the contrast is preserved under FL. While FL in itself is hypothesized to be a universal feature of language (Fletcher 2010), its relation to phonological length remains mysterious, and broad cross-linguistic support for conceivable scenarios (contrast enhancement, neutralization, inertness) from natural speech data is scarce.

Data We are using oral spontaneous speech data from a diverse set of 15 languages (Table 1). These data originated from language documentation collections and have been further processed as part of the DoReCo project (doreco.info). As the UNESCO has recently declared the decade of indigenous languages, DoReCo presents an effort to mobilize fieldwork data from under-studied and endangered languages for cross-linguistic research.

Quantity opposition		No quantity opposition	
Language	Family/Phylum	Language	Family/Phylum
Arapaho	Algic	Lower Sorbian	Indo-European
Beja	Afro-Asiatic	Sadu	Sino-Tibetan
Bora	Boran	Sanzhi Dargwa	Nakh-Dagestanian
Fanbyak	Austronesian	Urum	Turkic
Kamas	Uralic	Yali	Nuclear Trans New Guinea
Movima	(isolate)	Yongning Na	Sino-Tibetan
Svan	Kartvelian		

Table 1: Languages analyzed in this study.

Method We added forced alignments to the original corpus data using WebMAUS (Schiel 2004), manually corrected wordtimes, labelled disfluencies, and ran the WebMAUS service again. This procedure ensured reliable alignment results at the segmental level. For the analysis, we selected vowels ($n \approx 225,000$) in the pre-pausal syllables (final condition) and in other syllables (non-final condition). Vowels adjacent to disfluencies such as false starts and filled pauses were excluded. Length contrast was marked with V for short and VV for long vowels. Several linear mixed effect models were run using R 3.6.2 (R Core Team) with $\log(\text{Duration})$ as the dependent variable and Position (final vs. non-final) and Length (V vs. VV) as fixed effects. A model was run for each language with speaker, segment, context, and word as random effects.

Results The results can be summarized as follows.

- (i) languages without a length contrast (Lower Sorbian, Sadu, Sanzhi Dargwa, Urum, Yali, Yongning Na) consistently showed strong effects of FL (Fig. 1)
- (ii) languages with a length contrast displayed a more mixed picture (Fig. 2)
 - (ii-a) three languages (Arapaho, Bora, Movima) had no or little FL but a stable length contrast

- (ii-b) two languages (Fanbyak, Svan) had both FL and a stable quantitative contrast
- (ii-c) one languages (Kamas) had a phonotactic restriction barring VV word-finally
- (iii) languages may lack FL iff they have a length contrast, but a length contrast stays stable regardless of the degree of FL

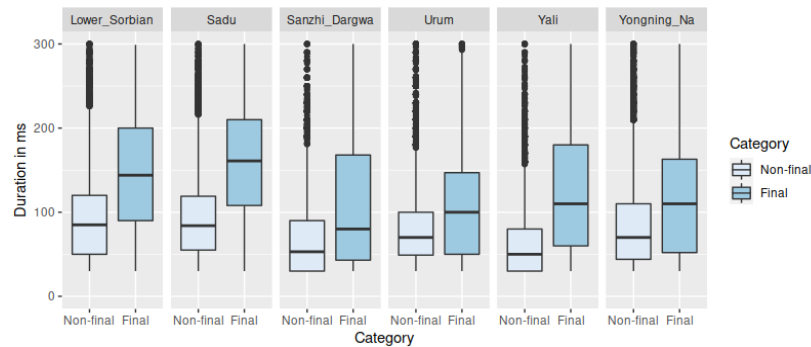


Figure 1: FL in languages with no length contrast.

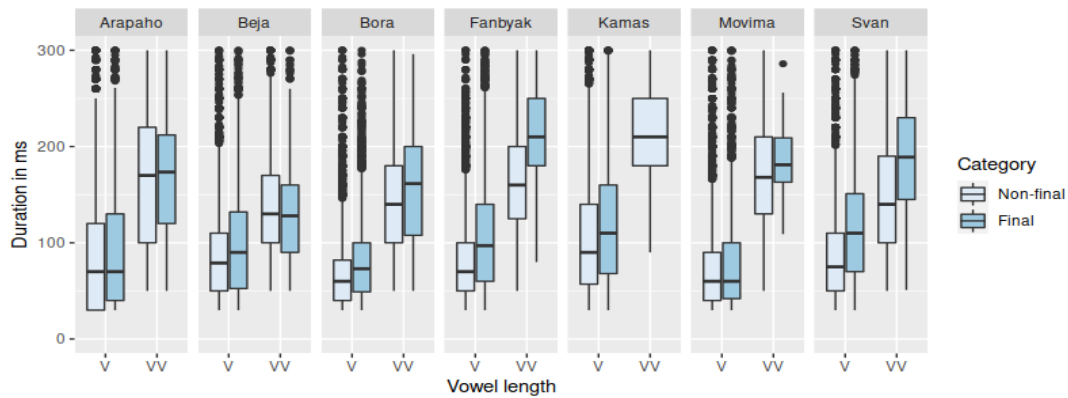


Figure 2: FL in languages with a length contrast.

Discussion The results have a number of theoretical consequences. First, there has to be a set of language-specific parameters that allow to derive the entire spectrum of observed patterns and overwrite the general slowing effect at the end of an utterance. These could be perceptually motivated constraints such as MAX-CONTRAST (Flemming 2002) or durational constraints conspiring to shield a contrast (Stanton 2018). Second, since FL is a phrase-level process, postlexical phonology may require access to the lexical contrasts, which would be challenging for cyclic theories. Third, our data do not support Myers & Hansen's (2007) claim that length contrast neutralization due to FL can explain the cross-linguistically widespread ban on word-final VV, as is the case in Kamas.

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