Phonological vowel length interacts with final lengthening

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Introduction

This paper investigates the interaction of phonological vowel length and final lengthening (FL) based on corpus data from 13 languages. In particular, we are asking whether the presence of a vowel length contrast affects the degree by which short and long Vs are lengthened, and whether a length contrast is preserved before a pause, where one would expect final lengthening (FL). FL in itself is hypothesized to be a universal feature of language (Fletcher 2010) and has also been found in animals and music performance, which is why one could assume a more general underlying motor pattern of deceleration at the end of an action (cf. Turk & Shattuck-Hufnagel, 2015).

Data

We are using spontaneous speech data (narratives) from a diverse set of 13 languages (Table 1). Our data come from language documentation collections and have been 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 lesser studied languages for cross-linguistic research (see also Henrich et al. 2010).

Language	**Family/Phylum**	**Language**	**Family/Phylum**
Arapaho	Algic	Sadu	Sino-Tibetan
Beja	Afro-Asiatic	Sanzhi Dargwa	Nakh-Dagestanian
Bora	Boran	Svan	Kartvelian
Fanbyak	Austronesian	Urum	Turkic
Kamas	Uralic	Yali	Nuclear Trans New Guinea
Lower Sorbian	Indo-European	Yongning Na	Sino-Tibetan
Movima	(isolate)		

Table 1: Languages analyzed in this study.

Method

We added forced alignments to the original corpus data using WebMAUS (Schiel 2004), manually corrected on- and offsets of words, labelled disfluencies, and ran WebMAUS again. This procedure ensures reliable results at the segmental level. For the analysis, we selected vowels (n ~ 225,000) occurring before a silent pause (final) and vowels surrounded by other segments but not a pause or a disfluency (non-final). The 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(Duration) as the dependent variable and Position (final vs. non-final) and Length (V vs. VV) as fixed effects. One model was run for each language with speaker, segment, surrounding segmental context, and word as random effects.

Results

The results can be summarized as follows:
(i) languages without a length contrast (Lower Sorbian, Sanzhi Dargwa, Sadu, Yali, Yongning Na) consistently showed strong effects of FL (Fig. 1)
(ii) languages with a length contrast showed strong, selective, or no effects of FL
(ii-a) one language had FL only for V but not for VV (Fig. 2)
(ii-b) two languages preserved or slightly enhanced the length contrast (Svan, Fig. 3 Fanbyak)
(ii-c) two languages (Bora, Fig.3 Movima) had no or very little FL but a stable length contrast

(ii-d) final short vowels were on average never longer than non-final long vowels
(iii) one languages (Kamas) had a phonotactic restriction barring VV word-finally.

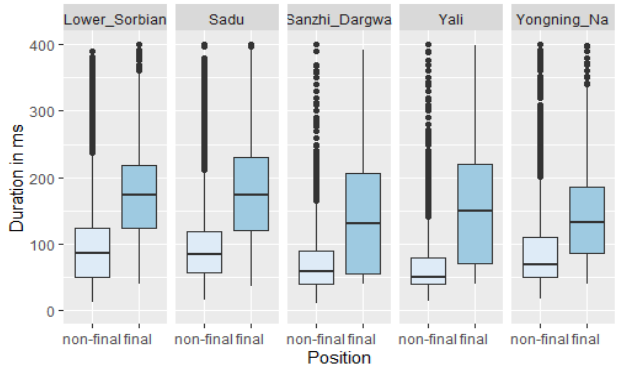

Figure 1: Languages with no length contrast.

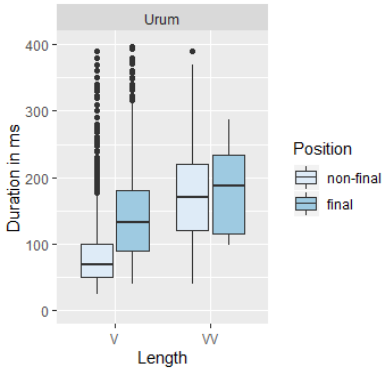

Figure 2: Selective lengthening.

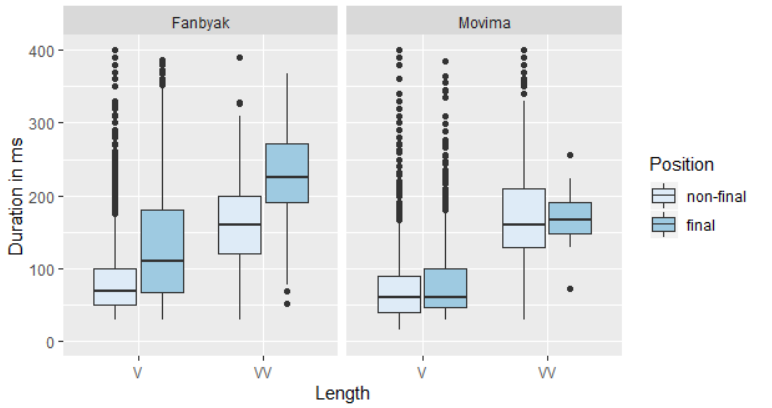

Figure 3: Preservation of length contrast (Fanbyak & Movima). No final lengthening in Movima.

Discussion

The results have a number of theoretical consequences. First, there has to be language- specific parameter(s) that allow to derive the entire spectrum of observed patterns and overwrite the general slowing effect at the end of an utterance. Second, our empirical results clearly speak for FL as a linguistic phenomenon rather than a general motor pattern. The most consistent findings are that languages with no length contrast show FL, while languages with a vowel length contrast show a variety of scenarios, including the preservation of the contrast, selective lengthening and no final lengthening at all.

References

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