

Phrase-final lengthening on vowel length contrast

Speech is planned and organised into phrasal units to facilitate communication. Duration can be used as a cue to signal the boundary of a phrase, as in phrase-final lengthening. However, duration is also used to signal phonemic contrasts such as vowel length. Boundary-related lengthening could therefore interact with vowel length distinctions at the segmental level. The goal of the current study was therefore to examine how phrase-final lengthening is distributed over a monosyllabic word, and the extent to which it interacts with vowel length contrasts.

Recent studies of phrase-final lengthening in American English showed progressive final lengthening. Phrase-final codas were found to be lengthened the most, followed by vowel nuclei. In other words, the further the segment was from the boundary, the weaker the effect of phrase-final lengthening (Berkovits 1994, Turk & Shattuck-Hufnagel, 2007). On the basis of these studies, we predicted that the various syllabic units of the phrase-final monosyllable (onset, nucleus, coda) would be longer than their phrase-medial counterparts, and that the magnitude of lengthening would diminish from the coda to the onset. We also predicted that nucleus/rhyme and coda/rhyme ratios would not differ across utterance positions.

The current study employed an imitation task to elicit data from five Australian English speakers in Sydney. Sixteen 3 word utterance prompts were pre-recorded by a female speaker of Australian English. Half of the utterances were embedded in a carrier sentence 'Now X_{target} goes' and the other half in 'In X_{target} comes'. Two pairs of target nonce words contrastive in vowel length were used (/kɛs/-/kɛːs/; /gɛs/-/gɛːs/). There were three experimental conditions: i) focus versus no focus; ii) phrase-final versus phrase-medial; iii) short versus long vowels. Each participant was instructed to repeat 16 auditory prompts. Stimuli were played through loudspeakers and each participant's production was directly recorded onto a Mac computer at 22KHz through ProTools LE.

Repeated measures ANOVA were conducted on measures of the burst release duration, vowel duration, fricative coda duration, rhyme duration, nucleus/rhyme ratio and coda/rhyme ratio. As predicted, the results confirmed progressive phrase-final lengthening. Overall, the main effects of focus, phrase-final position and long vowels all contributed to an increase in rhyme duration. Specifically, burst durations in the onsets were longer in the focus condition than no focus condition. As for the nucleus, all three factors contributed to an increase in duration. Additionally, focus interacted with vowel length. This could be attributed to the fact that long vowels were lengthened more than short vowels in the focus condition. As for the coda, duration was longer in the phrase-final focus condition than the phrase-medial condition. Coda duration was also found to be longer in short vowels than long vowels. The results are illustrated in Figs. (1), (2), (3) and (4).

As predicted, utterance position did not affect the nucleus/rhyme ratio, but vowel length did: long vowels had a higher nucleus/rhyme ratio. Contrary to our prediction, both utterance position and vowel length also affected the coda/rhyme ratio. Our results therefore suggest that the domain of the vowel length contrast is within the entire *rhyme*, instead of just the nucleus. This results in a trading relationship between the nucleus and the coda. The results are discussed in terms of multiple processing units/domains in speech planning, raising issues about when and how this is acquired by L1 and L2 learners.

References:

Berkovits, R. 1994. Durational effects in final lengthening, gapping and contrastive stress, *Language and Speech*, 37, 237-250.

Turk, A., Shattuck-Hufnagel, S. 2007. Multiple targets of phrase-final lengthening in American English words, *Journal of Phonetics*, 35 (4), 445-461.

Fig. 1. Long vowels in Focus condition (2SE)

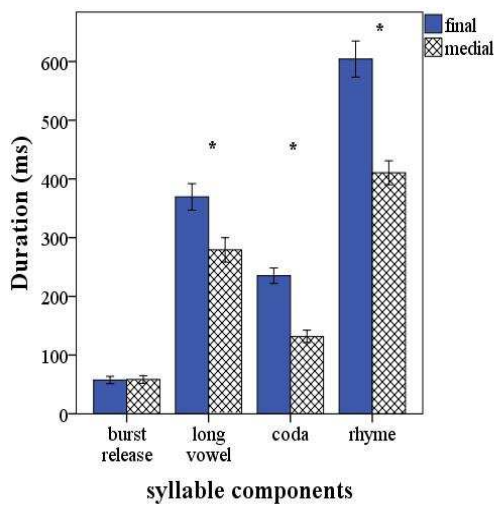


Fig. 2 Long vowels in No-Focus condition (2SE)

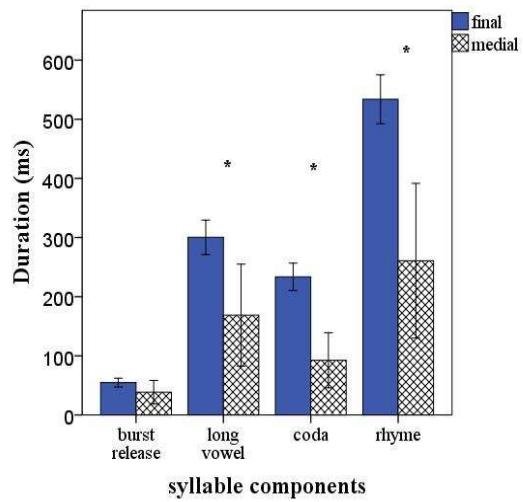


Fig. 3 Short vowels in Focus condition (2SE)

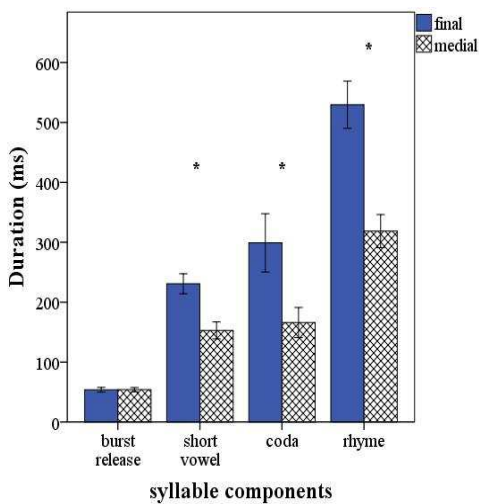


Fig. 4 Short vowels in No-Focus condition (2SE)

