Perceptual bases for the compensatory lengthening typology

Suyeon Yun

Chungnam National University (Korea)
suyeon.yun@cnu.ac.kr

This study provides perceptual bases for the typological patterns of compensatory lengthening (CL) from experimental results. CL refers to the lengthening of a vowel triggered by the deletion of a neighboring consonant, e.g., CVC → CVː. Moraic theory [1] assumes that (i) the deletion of postvocalic codas is likely to trigger CL, whereas the deletion of prevocalic onsets never does, and (ii) the deletion of moraic codas adjacent to the preceding vowel is likely to trigger CL, whereas the deletion of non-moraic codas not adjacent to the preceding vowel never does.

More recently, Yun [2, 3] presented the results of a cross-linguistic survey of 141 languages showing CL triggered by consonant loss either synchronically or diachronically, arguing that the typological patterns of CL may be characterized as implicational universals in terms of the position and adjacency of the trigger consonant relative to the target vowel. Specifically, it is shown that (i) if the loss of a prevocalic consonant triggers CL, so does the loss of a postvocalic consonant, and (ii) if the loss of a consonant not adjacent to the vowel triggers CL, so does the loss of a consonant adjacent to a vowel. In addition, when an intervocalic consonant is deleted, it is in most cases the preceding vowel that is lengthened, i.e., VCV → VːV.

This typology further indicates that the domains where CL applies are string-based, not syllable-based. The domains of duration preservation in CL triggered by the loss of a postvocalic consonant and by the loss of a prevocalic consonant, respectively, are [VC] and [CV], and the domains of CL triggered by the loss of a consonant adjacent to a vowel and that triggered by the loss of a consonant not adjacent to a vowel are [VC] and [VCC], respectively.

This study hypothesizes that the typological asymmetries in CL may result from differences in the perceptual salience of duration change in these sequential domains. This is based on the P-map hypothesis [4], which posits that perceptually smaller modifications are preferred, and it is encoded in grammar that the rankings in which faithfulness constraints forbidding more drastic change always dominate those forbidding less drastic change. The current perceptual hypothesis for CL typology is that the loss of a consonant duration results in a perceptually more drastic change to the [VC] domain than to the [CV] and [VCC] domains; therefore, CL is more likely to occur when a postvocalic and vowel-adjacent consonant in [V**C**] is deleted than when a prevocalic consonant in [**C**V] or non-vowel-adjacent consonant in [VC**C**] is deleted.

To test this hypothesis, ABX discrimination and ABX similarity judgment experiments were conducted with 13 English and 53 Korean speaker participants. The AXB discrimination task used nonce word stimuli that differed in the duration of a consonant, [m] or [s], located in the (i) postvocalic position (V_(C)), (ii) prevocalic position ((C)_V), (iii) postconsonantal and non-vowel-adjacent position (VC_), and (iv) preconsonantal and non-vowel-adjacent position (_CV). The baseline duration of the target consonant was 150 ms, modified in four steps: 50 ms, 100 ms, 200 ms, and 250 ms. For example, the participants heard an ABX triplet that consisted of a**m**$_{\textbf{[100 ms]}}$ vs. a**m**$_{\textbf{[150 ms]}}$ vs. a**m**$_{\textbf{[150 ms]}}$ and chose whether the third sounded the same as the first or second. The results show that listeners were more sensitive to the duration modification of a postvocalic consonant (d' = 1.94 for English, d' = 2.18 for Korean) than to that of a prevocalic consonant (d' = 1.6 for English, d' = 2.09 for Korean), postconsonantal consonant (d' = 1.38 for English, d' = 1.8 for Korean), or preconsonantal consonant (d' = 1.59 for English, d' = 1.75 for Korean).

The ABX similarity judgment task was designed to directly test whether the duration of the [VC] domain was more likely to be preserved than the duration of the [CV] domain in VCV sequences. For example, participants were asked whether **a**$_{[150ms]}$**m**$_{[150ms]}$**a**$_{[150ms]}$ sounded more similar to **a**$_{\textbf{[200ms]}}$**m**$_{[100ms]}$**a**$_{[150ms]}$ (lengthening the preceding vowel) or **a**$_{[150ms]}$**m**$_{[100ms]}$**a**$_{\textbf{[200ms]}}$ (lengthening the following vowel) when the intervocalic consonant was reduced. Listeners were more likely to

preserve the lost duration of the intervocalic consonant in the preceding vowel (53.8% for English and 56.6% for Korean) than in the following vowel (47.2% for English and 43.4% for Korean).

These results suggest that when a postvocalic and vowel-adjacent consonant in [V**C**] is reduced, listeners can identify the loss of its duration more accurately than when a prevocalic consonant in [**C**V] or a postconsonantal consonant in [VC**C**] is reduced. In addition, when an intervocalic consonant, which is simultaneously postvocalic and prevocalic, is shortened in a [VCV] sequence, listeners prefer to preserve the lost duration in the preceding vowel in [**V**C] than in the following vowel in [C**V**]. Therefore, the impetus to compensate for duration loss would be stronger for the consonant in [V**C**] than for the consonant in [**C**V] and in [VC**C**] by the P-map hypothesis, leading to frequent occurrences of CL through postvocalic and vowel-adjacent consonant loss.

References

[1] Hayes, B. (1989). Compensatory lengthening in moraic phonology. *Linguistic Inquiry, 20*(2): 253-306.

[2] Yun, S. (2010). The typology of compensatory lengthening: A phonetically-based Optimality Theoretic approach. MA thesis, Seoul National University.

[3] Yun, S. (2023). Implicational universals of compensatory lengthening. Manuscript submitted for publication.

[4] Steriade, D. (2008). The phonology of perceptibility effects: the P-Map and its consequences for constraint organization. In K. Hanson & S. Inkelas, (eds.), *The Nature of the Word: Studies in Honor of Paul Kiparsky*. (pp. 151-179). Cambridge: MIT Press.