

Vowel sonority and CVC weight

Recent work by Gordon (2002) suggests that cross-linguistic variation in the weight of CVC is correlated with syllable structure. Languages with a relatively large percentage of high sonority codas, such as sonorants and voiced consonants, are more likely to treat CVC as heavy than languages in which codas are predominantly low sonority, such as obstruents and voiceless consonants. Gordon shows that these differences in coda inventory are responsible for differences in the overall energy profile of the set of CVC syllables and thereby the phonological weight of CVC: CVC has greater phonetic energy and thus increased perceptual prominence in languages with proportionally more high sonority codas than in languages with relatively fewer high sonority codas.

While Gordon attributes CVC weight to the phonetic characteristics of the coda consonants themselves, he does not explore the possibility that differences in CVC weight are linked to differences between languages in the phonetic properties of their vocalic nuclei. The present work thus builds on Gordon (2002) by exploring the phonetic source of the variation in CVC weight. Four languages were targeted for investigation: two with heavy CVC (Egyptian Arabic and Hindi) and two with light CVC (Mongolian and Malayalam). For each language, a list of disyllabic words was compiled in which the first syllable, the target syllable, was systematically varied such that all occurring codas were represented. In addition, open syllables containing short vowels and long vowels were examined. The target syllables were stressed and contained a low vowel. Data were analyzed from 4-6 speakers of each language. The duration and the mean acoustic intensity of each target vowel and the overall acoustic energy (intensity integrated over time) of each target rime were measured using custom designed acoustic analysis software.

Results are consistent with Gordon (2002) in indicating phonetic differences between languages differing in weight of CVC. However, not only did acoustic energy over the entire CVC rime vary between languages with different weight criteria, differences were also observed in the vowel nucleus: the vowel in CVC had greater intensity than the vowel in CV in languages with heavy CVC but not in languages with light CVC. Furthermore, duration did not reliably differ according to CVC weight unlike in Broselow et al.'s (1997) study, in which vowels were found to be shorter in closed syllables than in open syllables in languages with light CVC but not in languages with heavy CVC.

The present results are consistent with an analysis in which weight distinctions are projected on the basis of the phonetic properties of the nucleus. The findings also line up with Gordon's (2005) account of onset-sensitive weight, which shows that onsets contribute to syllable weight only indirectly through their effect on the perceptual prominence of the following rime. The present study suggests an extension of this account to the right margin of syllables: codas contribute to the weight of CVC through their effect on the intensity of the preceding nucleus. Results are also consistent with Goedemans (1998), who finds that listeners are perceptually more attuned to the nucleus than to the coda, and with physiological studies of auditory nerve firing rates (Delgutte 1982) indicating decreased sensitivity to consonants in postvocalic environments.

References

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