Vowel length of emphasized Cebuano adjectives

Kevin Samejon

Notre Dame of Marbel Univ. (Philippines)
samekevin.ling@gmail.com

Introduction. The Cebuano language does not employ phonetic length distinction to express lexical contrast. However, phonetic length has been generally observed to also indicate emphasis as in the Cebuano utterance, *Lamiiiiii kaayo ang sud-an*, trans. 'The dish is veeeeeery delicious', a pragmatic use of phonetic length. Here, instead of the intensifier adverb *kaayo*, trans. 'very', it is the adjective word *lami*, trans. 'delicious', that undergoes this durational change. Following the observation of an earlier experiment in English [2], the present study investigated this phonetic behavior on Cebuano vowels. An experimental production task was administered. Responses were recorded, annotated, described, and acoustically analyzed.

Methods. Seven (7) native Cebuano speakers, average age of 19 years old, participated in the study. The stimuli for this study included six commonly used adjectives. Target words are disyllabic bearing a CV.CVC structure, with stress on the second syllable and end with a glottal stop. These words are framed first in a non-emphatic sentence, e.g., *Lami kaayo ang sud-an*, and had their vowels replicated to indicate emphasis from level 1 through 5, i.e., *lamiii, lamiiii, lamiiiii, lamiiiiii,* and *lamiiiiiii*. Noticeably, level 1 starts with three orthographic *i*'s because in Cebuano adjectives simply adding another *a* or *i*, e.g., *lamii,* can function as morphemic suffix which transforms an adjective into a verb in imperative mood. It will be read with an intervocalic glottal stop as well. There is a total of 36 stimuli (3 vowels * 2 adjectives * 6 emphasis levels).

What followed a brief practice session is the experimental production task. The production task consisted of seven blocks, with 36 randomized sentences on each block. This totals to 252 tokens. Responses were recorded using Jabra UC Voice 550 MS Duo Lync optimized corded headset, and a computer running Audacity at a 16-bit resolution with sampling rate of 22,050Hz. Stimuli were displayed on the computer screen monitor and participants proceed to the next prompt using the arrow key. Breaks were given in between blocks. Few tokens were skipped and were still mispronounced even after the orthographic precaution takes as described above.

Acoustic analysis was done by marking and extracting durational boundaries on Praat [1] using waveform and spectrogram as indicators. For statistical analysis, Pearson correlation (r) was used to measure correlation between the five emphasis levels and duration, where the "no emphasis" stimuli is excluded. A linear regression analysis on the emphatic conditions followed to determine the increase in vowel duration for each level. Given the multiplicity of comparisons for every condition in this experiment, a pair-wise comparison was not pursued to avoid Type I error. However, as learned from [2], an independent t-test for each speaker via Bonferroni adjustment of significance level to $\alpha = .01$ in each successive pair of comparison was used. Error bars are employed to aid visualization of this variance, and individual speaker data was considered.

Results and discussion. Results revealed positive correlation between emphasis levels and phonetic duration but no other significant comparisons across levels of emphasis for each speaker. This suggests that, based on the articulatory facility of speakers, they can produce gradable phonetic length beyond the usual binary distinction yet seem to find it inconsequential to maintain clear durational distinction on other levels of emphasis. Speakers then seem to subscribe to the usual two-way durational distinction of no emphasis/emphasis [4]. Statistically insignificant p-values on the conducted t-tests, and error bar reversals and overlaps may help demonstrate this, i.e., reversals in Speaker 2, 3, 5, and 6 (see Fig. 1).

It is also worth noting that using orthographic replication as indicator of emphasis in the stimuli does not interfere with the aims of the study. Simply, if participants count orthographic iterations of vowels, we may then expect linear and strict correlations between levels of emphasis

and duration. Moreover, if counting has been employed by the speakers, we cannot expect significant jump from level 0 and level 1 [2].

In the future, perception studies can be pursued. Even with a very low regression coefficient of 30 ms in the present study, compared to other parallel studies [2,3], using this value as basis for a perception task may be enough because listeners were found to be sensitive to durational differences of as short as 12.5 ms [5]. Furthermore, a closer look at the prosody of emphatic utterances might reveal greater insight than singularly investigating phonetic cues such as length.

Table 1: Pearson *r*-value, regression coefficients, and maximum vowel/rhyme duration for each speaker.

Cebuano Speaker	*r*	Coefficient (ms)	Max duration (ms)
1	.47	30	643
2	.29	8	344
3	.27	15	487
4	.26	19	752
5	.25	14	575
6	.22	15	634
7	.18	9	530

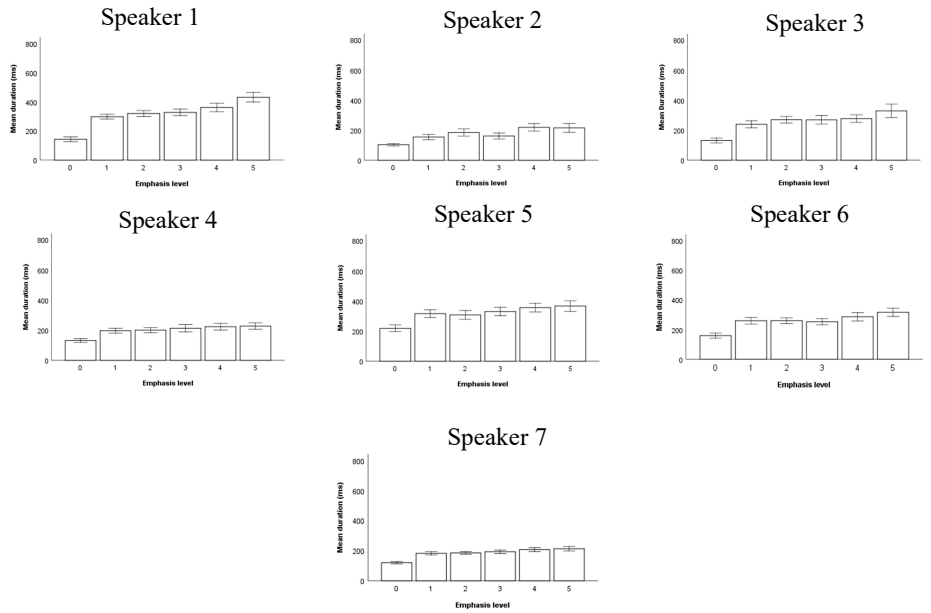

Figure 1: Error bars for speakers 1 through 7. (Error bars all throughout represent 95% CI.)

References

[1] Boersma, P., & Weenink, D. (2018). Praat: Doing phonetics by computer [Computer program]. v.6.0.40 http://www.praat.org/

[2] Braver, A., Dresher, N., & Kawahara, S. (2014). The phonetics of emphatic vowel lengthening in English. In A. Albright, & M. A. Fullwood (eds.), *Proceedings of the 2014 Annual Meeting on Phonology*. Washington, DC: Linguistic Society of America.

[3] Kawahara, S., & Braver, A. (2013). The phonetics of multiple vowel lengthening in Japanese. *Open Journal of Modern Linguistics*, *3*, 141–148.

[4] Liljencrants, J., & Lindblom, B. (1972). Numerical simulation of vowel quality systems: The role of perceptual contrast. *Language*, *48*, 839–862.

[5] Näätänen, R., Paavilainen, P., & Reinikainen, K. (1989). Do event-related potentials to infrequent decrements in duration of auditory stimuli demonstrate a memory trace in man? *Neuroscience Letters*, *107*, 347–352.