

Durational properties of consonants in rhythmically different languages: tPVI and rPVI of Russian, Spanish, and Japanese

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Speech rhythm in languages has been a controversial issue in phonetics for several decades. So called stress-timed languages and syllable-timed languages, which are said to have isochrony of a certain phonological unit, are the two major categories [1,2,3], but Japanese has been put into the third category: mora-timed languages [4]. However, there is no evidence of isochrony what so ever in the acoustic data of those languages [5]. Recently, less categorical, or continuous characterization of language rhythm has been proposed, and PVI (pairwise variability index) is one of the most frequently invoked indices of rhythmic properties of languages [6].

However, the nature of PVI has not been investigated thoroughly in the literature. We have proposed elsewhere that we can calculate *theoretical* PVI of a given piece of text material to assess the true *phonetic* PVI of a given stretch of speech. Theoretical PVI (tPVI) is a measure of durational variability of texts. For example, CVVVCVCVVVCV is fed into the definition of PVI formula, we get a PVI value of 100, from a sequence of [3,1,3,1]. Although vocalic PVI(nPVI) has been put forth in most PVI literature for a rhythmic typology, intervocalic PVI(rPVI) is of concern for durational properties of consonants including geminates.

Production experiments and phonetic corpus analysis have been done for three representative languages of rhythmic categories: Russian for stress-timed, Spanish for syllable-timed, and Japanese for mora-timed languages. Phonologically controlled nonce-word sequences were recorded from 3 to 10 native speakers of each language. Read speech of “North wind and Sun” from various corpora was also used in the analysis of PVI.

A preliminary analysis of rPVI of each language revealed that by subtracting the effect of tPVI for different language materials, we can achieve a better separation of rhythmic categories in relation to consonant clusters and geminates.

References

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