Difficulties in adjacent vowel length of L1 Russian speakers in Czech

Zdena Palková, Tomáš Bořil, Jitka Veroňková
Institute of Phonetics, Faculty of Arts, Charles University, Czech Republic
https://doi.org/10.36505/ExLing-2020/11/0037/000452

Abstract

The sound category of the vowel quantity is applied in the structure of languages in different ways, and its adaptation from one system to another is difficult. The subject of the paper is the difficulties Russian speakers have in the production of Czech texts with more long vowels in a row, i.e., in a situation that does not exist in Russian. Sample of Czech created for the purpose of the experiment and recorded by Russian and Czech native speakers serve as the basis. The success in the realization of quantity in Russian speakers as assessed by Czech native listeners was monitored, and the duration values of short and long vowels and their ratio in the speech of Russian and Czech speakers were compared.

Keywords: Czech as L2, Russian as L1, vowel length, perception, word

Object of the research

The framework for comparing the language structures of individual languages is, at the phonological level, especially the relationship to meaning, and at the phonetic level, for example, the stability of individual characteristics in the competence of language users. It is useful to note the stability and changes in the treatment of a particular sound-relevant property in the course of transition from L1 to L2, and the way a native listener assesses the final realization in a foreigner's speech. (Major 2008, Colantoni et al 2015, 29–72)

In Czech, vowel quantity is a fundamental distinctive feature of the phonological system. The occurrence of long vowels is independent of word stress, the number of consecutive lengths and their word position. (Palková 1997) This structural independence causes difficulties for non-native speakers, including the advanced ones. In Russian, vowel length difference appears as a possible prosodic signal of the word stress. (Kasatkin 2006) In this paper, we examine how difficult it is for Russian speakers to observe the realization of the correct vowel quantity of two adjacent vowels, i.e., in a situation that does not exist in Russian, in a read Czech text.

Methodology

We recorded a text consisting of short sentences containing six-syllable sequences in the middle part. Within the sequences, the number of lengths (3 vs. 4 long vowels, 3L vs. 4L) and the word boundary (symmetrical 3syll|3syll

vs. asymmetrical 4syll|2syll variants) were controlled. Eight different structures were used, each represented by 3–4 carrier sentences: per speaker, there were 76 short (S) and 94 long (L) vowels, including 44 cases of adjacent long vowels (LL), available. The speaker group consists of 8 females with Russian as L1 (R) and 3 native Czech females (CZ) as a controlled group. Four phonetically educated native Czech listeners determined the acceptability of vowels in terms of their length. Using Praat software (Boersma, Weenink 2019), the acoustic analysis revealed the S and L's duration and their ratio.

Results

Results of the perception analysis

The success score of R in the realization of vowel quantity was 66%. The predominant error was shortening (92%; lengthening 8%). The target LL combination was successfully pronounced only in 33,6% of cases.

Variants 3L vs. 4L do not display any significant difference in the overall success rate (3L 34.1%, 4L 33.3%), nor does the difficulty of LL combination across the word boundary increase. The number of syllables in words seems to cause a slightly larger difference: the overall success rate of 3syll|3syll variants is 37.5% and the of 4syll|2syll variants is 29.2%.

The differences may be clearly observed once the specific structures have been compared. Seemingly relevant is the S/L sequence in a word and the distinction in the symmetrical and asymmetrical distribution of syllables into two words. At the same time, both tendencies complement each other in our material. For example, the SLL sequence (success rate 40.1%) is preserved better than the SLLS sequence (14.3%), and the LL sequence in a two-syllable word is relatively successful (structure^{I} 44.4%, structure^{II} 37.5%). Comparing the structures with the same S/L sequences, a lowersuccess rate for the first word in the assymmetrical variant is always obtained (the most considerable difference in success rate is 6.2% (LLSS) compared to 38.1% (LLS) in the LLSSLL sequence).

Results of the acoustic analysis

In this section, the results of acoustic analysis of R in comparison to CZ are presented. Both the values of the distribution of normalized vowel durations and the values of duration ratio of long and short vowels were considered. The division of vowels into short and long was based on the original text, i.e., canonical form, and perceptual analysis, i.e., as perceived by native Czech listeners.

Figure 1 shows the distribution of vowel duration in L1 and L2 speakers. In CZ, S and L division is clearly perceived based on the original text, both in canonical length (a) and perception (c). In R, the duration distribution based on the original text is clearly differentiated only for S (b); L's duration with the highest frequency is objectively shorter than in CZ, comp.

(b) and (a). In the case of perception, a middle duration band is set aside, which is indifferent for the Czech listeners (d); S and L vowels have got visible peaks, even though the differences in the duration are lower than in CZ and quite variable, compare (d) and (a).

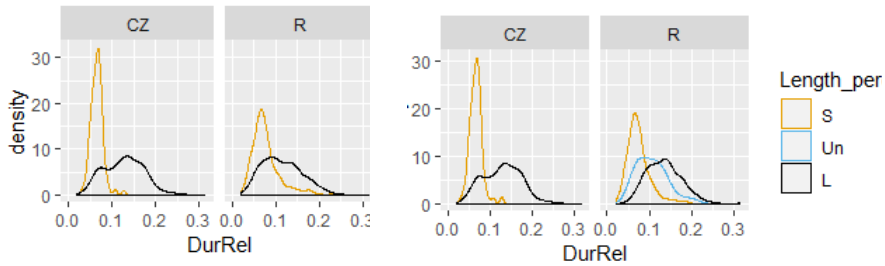

Figure 1. Distribution of normalized vowel durations split according to the vowel length as written in the original text (a, b), and based on the perceptual analysis provided by Czech native listeners (c, d). S/L – short/long vowel, Un – unresolved vowel length; CZ – Czech speakers, R – Russian speakers.

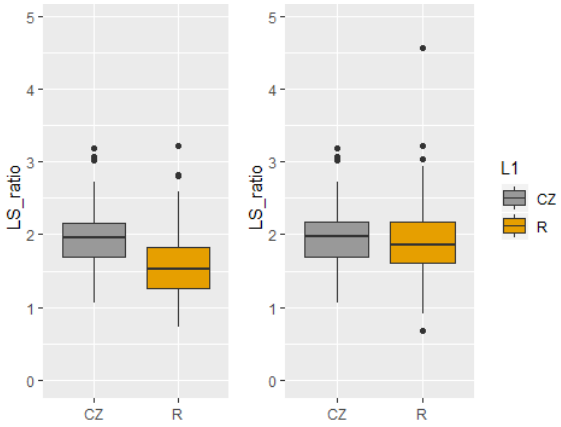

Figure 2. The ratio of long/short vowels as written in the original text (a) and based on a perceptual analysis (b). CZ – Czech speakers, R – Russian speakers.

Figure 2 shows the median of long and short vowel ratios. For text-based values (a), R's ratio is clearly lower than in CZ; the 50% interval of values overlaps only partially, and the median of R lies outside this interval. Duration ratio calculated according to native perception shows a more balanced result of both R and CZ groups; both groups approached the medians.

These results lead us to assume that native listeners project into the irregularities of R realizations a categorizing view, more phonological than phonetic.

Conclusion

a) To realize lengths in Czech, the determining unit for Russian speakers is the word and the word chain. The Russian speakers' intention seems to be to place and to realize long vowels on the right syllables. b) The Czech user probably relies more on the feeling of phonological opposition, i.e., contrast, than on the feeling of sufficiency in the duration of a particular sound. Creating such a relational basis in L2 production is difficult for the speaker, and the teaching requires a specially focused exercise. c) For the description of Czech, we obtained useful information about the acceptability of vowel duration in phonological length opposition.

Acknowledgements

This research was supported by the Czech Science Foundation project No. 18-18300S "Phonetic properties of Czech in non-native and native speakers' communication". We would like to thank Petra Poukarová and Martina Černá (Faculty of Arts, Charles University, Prague) to contribute to the listening analysis.

References

Boersma, P., Weenink, D. 2019. Praat: doing phonetics by computer [Computer program], version 6.0.25.

Colantoni, L., Steele J., Escudero, P. 2015. Second language speech. Theory and practice. Cambridge, Cambridge University Press.

Kasatkin, L. L. 2006. Sovremennyj russkyj jazyk. Fonetika. Moskva, Academa.

Major, Roy C. 2008. Transfer in second language phonology: A review. In Edwards, J. G. H., Zampini, M. L. (eds.), Phonology and Second Language Acquisition, 63–94. Amsterodam / Philadelphia, John Benjamins Publishing Company.

Palková, Z. 1997. Fonetika a fonologie češtiny. Praha, Karolinum.