Reduction and neutralisation of unstressed central and back vowels in Contemporary Standard Bulgarian
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This paper reports the results of two experiments concerned with the spectral reduction and neutralisation of unstressed non-front vowels in Contemporary Standard Bulgarian (SB). The SB stressed vowel system consists of close and mid front and back vowels, /i, ɛ, u ɔ/, as well as two central vowels: mid /əә/ and open /a/. While it is generally agreed that unstressed /ɛ/ undergoes little reduction and stays clearly distinct from unstressed /i/, there is much more disagreement in the literature over the unstressed central and back vowels, both with regard to the degree of spectral reduction (and hence the exact phonetic values), and whether and in what cases contrast neutralisation takes place (Ternes and Vladimirova-Buhtz 1999, Wood and Pettersson 1988, Pettersson and Wood 1987, Boyadžiev and Tilkov 1997, Boyadžiev, Kucarov and Penčev 1998, Andreeva, Barry and Koreman 2013).

A production experiment was designed to measure stress-dependent F1 and F2 variation within the central and back pairs of vowel phonemes in careful speech. The results are based on recordings of 8 female speakers of SB, who were asked to read out a list of randomised target items and distractors. The target items were 8 Bulgarian words, each appearing five times in the list. They contained stressed and unstressed /a əә ɔ u/ – one word for each subcategory. The results from this experiment reveal a less unequivocal picture of the pairwise convergence of formant frequencies than has previously been reported (e.g. Andreeva, Barry and Koreman 2013): our data confirm a high degree of acoustic overlap only for the unstressed back vowels /ɔ – u/, whereas the difference in F1 frequency for the unstressed central vowels /a – əә/ remains statistically significant.

A perception experiment consisting of two tasks, identification and discrimination, was conducted to test the extent to which the existing formant frequency differences in unstressed vowels are perceptually significant. 13 native speakers of SB were first asked to listen to recordings of the eight target words from the production experiment. The words with a stressed target vowel were used as a control sample. Each stimulus was played 10 times. After listening to each stimulus, participants were given a forced-choice task to choose between two images, each representing one of the concepts in the minimal or homophone pair. The same 13 subjects took part in the discrimination task. The stimuli for this consisted of paired tokens of the same recordings as those played for the identification task: 16 pairs of either 2 identical words, or each of the words in a minimal/homophone pair. Each stimulus was played 5 times and the participants were given a forced choice to identify the two words as “same” or “different”. This time the results revealed perceptual neutralisation for both the central and the back vowel pairs: the correct-response rates in both perception tasks were not significantly higher than chance.

This partial mismatch between acoustic and perceptual data points to a near-merger caused by phonetic reduction, rather than complete neutralisation, as has often been assumed in earlier studies.

References

