Vowel-formant frequencies of Hungarian–Croatian bilinguals and Hungarian monolinguals in spontaneous speech

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Hungarian and Croatian vowel systems largely differ from each other. Hungarian has fourteen vowels: a /ɔ/, á /a:/, o /o/, ó /o:/, u /u/, ú /u:/, ö /ø/, ő /ø:/, ü /y/, ű /y:/, e /ɛ/, é /e:/, i /i/ and í /i:/ whereas Croatian has five: a /a/, e /e/, i /i/, o /o/ and u /u/. Hungarian vowels differ in their tongue position, lip rounding and duration. Croatian language does not contrast phonemically short and long vowels like Hungarian, but it does contrast four types of pitch accents on the stressed syllable: short-falling, short-rising, long-falling and long-rising. Figure 1 presents vowel charts of the two languages.

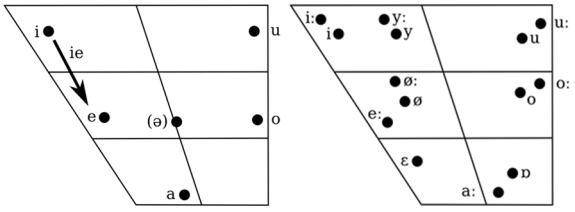

Figure 1: Left: Croatian vocal chart; right: Hungarian vocal chart (Source: https://www.internationalphoneticassociation.org/)

From Figure 1 it is obvious that Hungarian is a language with a crowded phonemic vowel space, while Croatian is a language with a sparser phonemic vowel space. Regarding their phonemically duration, out of the 14 Hungarian vowels, 5 are most similar to the Croatian ones: /i, ɛ, ɔ, o, u/. Previous studies on vowel formants in Hungarian and Croatian have shown differences in formant frequencies between the two languages. F1 of Croatian /i, e, u/ is lower than the F1 of their Hungarian counterparts /i, ɛ, u/ whereas F1 of Croatian /a, o/ is higher than the F1 of Hungarian /ɔ, o/. F2 of Croatian /a, o, u/ is lower than the F2 of their Hungarian counterparts /ɔ, o, u/, while F2 of Croatian /i, e/ is higher than the F2 of Hungarian /i, ɛ/. There have been no researches of vowel-formant frequencies in Hungarian-Croatian bilinguals so far. Since there are substantial differences in vowel quality between Hungarian and Croatian, this study aims to investigate vowel-formant frequencies of Hungarian-Croatian bilingual speakers and compare them to the ones of Hungarian monolinguals. The subjects are 10 Croatian-Hungarian bilingual adult female speakers and 10 Hungarian monolingual adult female speakers. Their spontaneous speech was recorded in a sound-attenuated booth. They were asked to talk about their jobs, free time activities and hobbies. For every speaker 7 – 8 min recording was made. Approximately 150 min material was recorded. The analysis is carried out with Praat 5.4.04 software package. Vowel-formant frequencies of F1 and F2 are analysed. Only words with C_1VC_2 in unstressed position are analysed. Formant frequencies are measured in the middle and the last syllables. In the present study only short vowels (/i, ɛ, ɔ, o, u, y, ø/) are analysed. Each vowel is represented by 20 of its occurrences in various consonant contexts (i.e. Beke & Gráczi, 2010, Auszmann, 2016). The formant values are measured in the middle of the vowel. Before the recording, the bilinguals were asked to fill a questionnaire about their language background. Two groups of speakers were formed: Hungarian dominant and Croatian dominant bilinguals. For a better comparison of the differences in dominance, the results will also be presented for both of these groups separately. Regarding five Hungarian vowels (/i, ɛ, ɔ, o, u/) whose acoustical properties are the most similar to Croatian vowels, it is expected that due to the interference of Croatian language bilinguals will produce formants that differ in their frequencies from the ones of Hungarian monolinguals, i.e. their results will show tendency towards Croatian values. When it comes to other vowels that do not have their counterparts in Croatian (and thus cannot be compared to Croatian values) it is expected that bilinguals will form a new category of vowel-formant frequencies that differs from the Hungarian monolinguals. In a comparison of Hungarian dominants and Croatian dominants it is expected that Hungarian dominants' formant frequencies will show more tendency towards values of Hungarian monolinguals. It is expected that the formant frequencies of Croatian dominants will differ from the values of Hungarian dominants. The results of the research will either provide evidence of monolingual-like production of vowels in Hungarian by Hungarian-Croatian bilinguals, or they will show a cross-language interference between the two languages. These findings will provide an insight on how Hungarian-Croatian bilinguals organize their vowel system.

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