

## Coalescence and Hybrid Vowels in the Realization of Spanish Four-Vocoid Sequences Containing a Single Non-High Vowel

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This study analyzed native Spanish speakers' production of sequences arising in syntax of four vocoids in which one was a non-high vowel and the other three were high vocoids, either vowels or glides. The purpose was to determine if it would be possible for all four vocoids to be placed in the same syllable when the realization does not violate the sonority principle. For instance consider the sentence *Fui a Irak* 'I went to Irak', which native Spanish phonologists anecdotally declare can be realized in two syllables. If the outcome were [fwjáj.rák], the quadriphthong [wjáj] would not violate the sonority principle. Cf. the triphthong [wjá] in *Fui allá* 'I went there' in which the rhyme [áj] does not violate the sonority principle either.

Data were collected from ten native Spanish speakers of different varieties in a sound-proof booth using a digital recorder Marantz CDR 420 and a cardioid microphone Shure Beta 54. The participants read aloud stimuli sentences containing vocoid sequences /wíaj/, /wíai/, /juaj/, /wioj/, /juoj/, /wiej/ and /juej/ at three different speech rates (preset relatively normal, preset relatively rapid and maximum speed according to subject's ability). Three out of four sets of recorded stimuli were incorporated into the analysis. A total of 240 tokens were analyzed for the preset relatively rapid condition and a total of 240 tokens for the maximum speed condition. Using Praat version 5.2.15., data were spectrographically analyzed by extracting the triphthong peak and measuring the F1 and F2 of the nucleus.

Results did not support the existence of quadriphthongs in Spanish. Rather, in both recording conditions all four-vocoid sequences were phonetically realized as triphthongs whose structure was GVG (i.e. a nucleus flanked by glides). Moreover, the nucleus was invariably a hybrid vowel that combined features of both the non-high vowel and the high vowel that were adjacent at the underlying level. Results also showed that in most instances this hybrid nucleus was a vowel that is absent from the phonemic inventory of Spanish, i.e. schwa or a high front lax unrounded vowel. In general, these results are similar to those of Vokic and Guitart 2009, who found support for the principle that there can be no more than three vocoids in a syllable and noticed that in most cases of contact between two non-high vowels in four- and five-vocoid sequences the nucleus of the triphthong was a hybrid vowel manifesting features of both underlying vowels.

**Key Words:** vocoid coalescence, hybrid vowel, nucleus, triphthong, syllabic contraction