

## **Variability of the hiatus /ia/ in European Portuguese: A combined analysis of duration and formant dynamics**

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Vowel sequences of rising sonority can be classified phonologically either as a diphthong, i.e. a semi-vowel followed by a full vowel which together constitute the nucleus of a syllable, or as a hiatus, i.e. a sequence of two full vowels separated by a syllable boundary. While all vowel sequences such as /ia/ were considered a hiatus in Latin, Spanish and Romanian have evolved to distinguish between hiatus and diphthong, and French and Italian classify all vowel sequences as diphthongs. Portuguese is the only one of the large Romance languages that has not developed diphthongs from the Latin hiatus /ia/ through historical sound changes. From a phonetic-acoustic point of view, however, the distinction between diphthongs and hiatus is likely much more gradient when subjected to factors such as lexical stress or speech style which can cause reductions in the duration or formant dynamics of vowels. In this study, we use a large corpus of radio and TV show recordings in European Portuguese to test whether the hiatus /ia/ is maintained in naturalistic, spontaneous speech and whether the acoustic configuration of /ia/ depends on its proximity to the stressed syllable or its position within the word. After a substantial cleaning and annotation process, 6785 tokens of /ia/ were selected for analysis. For each token, the first two formants and their duration were analysed using Functional Principal Components Analysis, a technique that identifies systematic variations in the shapes of time-varying signals. The main finding was that the acoustic realization of /ia/ in European Portuguese ranges from hiatus-like formant configurations when the sequence was stressed to almost monophthongal productions in post-tonic position. In addition, /ia/ tends to be longer and have curvier formant trajectories in word-initial compared to word-medial position. The structured variability conditioned by proximity to stress and position within the word discovered in this study far exceeds that found in previous laboratory studies, thus providing a more detailed understanding of the phonetic gradient of the phonological hiatus category in Portuguese.