

## **Acoustic description of the English and Brazilian Portuguese front-vowel systems of Brazilian EFL teachers**

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The study acoustically compared Brazilian Portuguese (BP) front vowels to similar sounds found in the English as a Foreign Language (EFL) as realized by teachers of English in western Rio Grande do Norte. We analyzed BP [i, e, ε] and EFL [i, ɪ, ε, æ], as well as the diphthong [eɪ] in both languages. In order to ground our research theoretically, we made use of the Cardinal Vowels Theory, of the Acoustic Theory of Speech Production, as well as acoustic and articulatory descriptions of the stressed vowels in BP and General American English. We made use of four experiments as our data-collecting methodology. The first ones were termed POR1 and ING1. They were characterized by the production of stressed front vowels, between plosive consonants, in BP two-syllable words with first-syllable stress, and English one-syllable words, inserted in the carrier-sentences “X. Diga X alto” and “X. Say X again”. Experiments POR2 and ING2 employed some words which were already used in the previous experiments as street names in a small map. We asked our informers to verbalize the way from one place of the map to the other, making use, therefore, of the vowel to be analyzed. The study of the vowel sounds through the use of the experiments above was used to determine the F1, F2 and duration of the aforementioned vowels. These values were statistically compared, especially through the use of paired-samples t-tests and repeated-measures ANOVAs. Such comparisons happened intra- and inter-experiments. The results indicated a realization of the EFL pair [i, ɪ] with practically no spectral overlay, resulting in significant differences between the sounds in question. The comparison between the spectral characteristics of the EFL sound [i] and BP [i], on the other hand, revealed non-significant differences between the analyzed sounds. The comparisons involving EFL [ɪ] and BP [i] indicated significant differences between them, once the EFL sound [ɪ] was closely related to BP [e], in spectral terms. As regards duration, the front EFL pair [i, ɪ] was realized with significant differences, with the first element of the pair being significantly longer than the second. Statistical comparisons involving the duration of the aforementioned pair with BP sound [i] revealed this sound is significantly shorter than the components of the pair above. Taking into consideration the spectral characteristics of the first element of the EFL and BP sound [eɪ], our results indicated a high degree of spectral overlay. However, a few significant differences were found. In the same way, results regarding the EFL pair [ε, æ] showed a high level of spectral overlay, with a few statistical tests indicating significant differences. EFL sounds [ε, æ], however, constituted a new vowel category, significantly lower than the BP sound [ε]. Finally, as regards duration, EFL sounds [ε, æ] had no significant variation. The components of the pair in question were significantly longer than BP [ε]. These findings lead to the discussion of possible pedagogical implications as regards the teaching of English as a foreign language vowel system to Brazilian speakers. We believe that the spectral association between EFL [i] and BP [i], as well as between EFL [ɪ] and BP [e] should be explicitly taught from the beginning in order to make the acquisition of these problematic high-front vowel pair easier. Such a procedure would save precious time in learning the phonology of EFL as the literature indicates non-proficient Brazilian speakers tend to associate both EFL sounds [i, ɪ] to BP [i]. Another important pedagogical implication is related to the production of the EFL low-front vowels [ε, æ]. The literature already pointed out to the difficulty even proficient Brazilian EFL speakers had in producing such pair, and our results corroborate the need to focus on the production of the low-front vowels both in the spectral and, surprisingly, on the duration qualities of the aforementioned vowels.