

On the vowel nasality in Forro and Lung'ie: a comparison with Portuguese spoken São Tomé and Príncipe

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Goals: This study, based on Balduino et al. (2015) and Balduino (2018; 2022), discusses and compares the status of vowel nasality in Forro (FO) and Lung'ie (LI), creole languages of the Democratic Republic of São Tomé and Príncipe (STP), and in two Portuguese varieties: Portuguese of São Tomé (PST) and Portuguese of Príncipe (PP). In order to achieve our goal, the nasality of both languages and both varieties of Portuguese was initially described. We proposed an analysis of the phenomenon based on the duration extraction of [+nasal] vowel segments and their corresponding oral counterparts. Subsequently, we investigated the similarities in nasality between these FO, LI, and Portuguese (Wetzels & Moraes 1992).

Methodology: We followed the experimental methodological approach of laboratory phonology (Albano, 2017; Ohala, 1995). Therefore, all data were analyzed acoustically using the Praat tool (Boersma & Weenick, 2022). The first set of data (1) comprises 34 minimal or analogs pairs in FO and LI. The data were collected by Ana Agostinho through the recording of lexical items inserted into carrier phrases such as “E fla X dôsu vê” (“He says X twice”) and “Ê faa X dôsu vêê” (“He does X twice”), where X was replaced by the word containing the target structure. The words of Portuguese origin in the corpus exhibit consistent nasality in the coda position, as is the case with **blanku** [ˈbl̃.ku] ‘white’ in FO, and **baanku** [ˈbẽ:.ku] meaning ‘white’ in LI. Alternatively, words of non-Portuguese origin also display nasality, as seen in the word **ndombo** [ndõ.ˈbõ] ‘tender palm leaves’. Invariably, the lexical items exhibited the opposition between the oral vowel and its nasal counterpart in pre-tonic and stressed syllables. Thus, words like **fudu** [ˈfu.du] ‘clean’ were contrasted with terms like **fundu** [ˈfũ.du] ‘deep’ in order to measure the duration of [u] and [ũ] and provide a comparative analysis. The second set of data (2) is consisted of 129 lexical items from PST and PP extracted from the carrier phrases *Eu falo X baixinho* (‘I speak X softly’) and *Eu falo X* (‘I speak X’). As for FO and LI, the replaced word was a member of a minimal or analogous pair, such as in **tampa** [ˈtẽ.pẽ] ‘lid’ and **tapa** [ˈta.pẽ] ‘slap’, or a word with potential nasality at its border, such as **álbum** [ˈabũ] ‘photo album’. We also compare the duration of oral and nasalized vowels. Besides, for sets (1) and (2) of data, the length of nasalized vowels (ṽN) and oral vowels (v) were measured based on a series of phonetic and phonological criteria, such as presenting lexical stress, being preceded or not by a previous (C1) and a later (C2) stop, vowel quality, and considering the voicing of these consonants and the position of nasality within the word and phrase. The length of each vowel was measured in milliseconds (ms) by separating them according to quality and then assigning a final average value to the target segments. During this process, we considered the portion equivalent to the nasal appendix in measurement. Therefore, the averages included the nasal murmur in their duration. **Results and Discussion:** As reported by Balduino et al. (2015) and analyzing the data from FO and LI, we reached a

similar result in both languages, where the average duration in milliseconds of the nasal/nasalized vowel was observed to be greater than its oral counterpart, as described by the averages of stressed durations. When comparing 'ṽN and 'v, we observe, in FO, an average durational lengthening of 15% for 'ṽ, while in LI, this value increases to 23%. The overall average, in turn, reveals a difference of 19%. This means that, in FO and in LI, for an oral segment of 100 ms, its nasal counterpart will have approximately 119 ms in a stressed position. In pretonic syllables, the difference in average duration between ṽ and v was 17%, slightly lower than the tonic position (specifically 11% in FO and 24% in LI). Considering the Portuguese varieties together, we found that ṽN was 40% longer than v in stressed positions and 92% longer than v in pretonic positions ($p > 0.001$). Separately, we noticed that the durational difference between nasalized and oral vowels was as follows: 37% for PST and 44% for PP in stressed syllables and 89% for PST and 96% for PP in pretonic syllables. The results obtained for both groups of data were contrasted with each other and also considering data from Brazilian and European Portuguese (Escudero et al., 2009). The contrast of results can be checked in table 1, where D% corresponds to the percentage difference between ṽN and vN.

Table 1 - Languages Comparisons: duration in milliseconds of ṽN and vN.

Language	ṽN	vN	D%
FO	187	162	15
LI	159	121	31
PST	176	117	50
PP	150	94	59
BP	180	116	55
EP	130	113	15

We interpret these results as an initial indication of the biphonemic hypothesis. In other words, there is the presence of a consonantal phoneme responsible for spreading the [+nasal] feature to the preceding vowel, thus preserving its timing in the syllabic structure (see Câmara 1953; 1970; Wetzels & Moraes 1992; Balduino 2018; 2022 for Portuguese and Agostinho, 2015; Bandeira, 2017; Agostinho et al., 2020 for FO and LI). This result is contrary to what is defended by Ferraz (1979) for FO and by Günther (1973) and Maurer (2009) for LI.

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