

Variable vowel raising: acoustic analysis of word-initial pretonic mid-vowel /e/ in Brazilian Portuguese

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This work investigates the variable phonetic-phonological process named *vowel raising* of pretonic mid-vowel /e/ in the variety of Brazilian Portuguese (BP) spoken in the countryside of São Paulo State (SP). Our research focus specifically on the word-initial context, e.g. [i]n.ca.na.dor ~ [e]n.ca.na.dor ('plumber') and [i]s.pi.nho ~ [e]s.pi.nho ('thorn'), and, therefore, advances in relation to previous studies concerning vowel raising in the same variety (Silveira, 2008;^[1] Carmo, 2009;^[2] 2013;^[3] 2014;^[4] Carmo & Tenani, 2013).^[5]

Bisol (1981)^[6] argues that the linguistic factors that motivate vowel raising of *word-initial* pretonic mid-vowels are different from the ones that condition the application of the process in *word-medial* context, e.g. m[i].ni.na ('girl'), and therefore these vowels must be analysed separately. Albeit many studies highlight the protective status of initial syllables concerning alternations (cf. Becker, Nevins & Levine, 2012),^[7] studies that describe word-initial pretonic mid-vowels in other varieties of BP (Battisti, 1993;^[8] Brandão, Rocha & Santos, 2012)^[9] have observed substantial rates of vowel raising regarding word-initial pretonic mid-vowel /e/, e.g. [i]s.tá.gio ('internship'). With respect to word-initial pretonic /o/, e.g. [o].pi.ni.ão ('opinion'), the application of vowel raising is blocked.

For this research, two experiments were conducted with four participants born and/or raised in the region of São José do Rio Preto city (SP). In the first experiment, the participants read short narratives that elicited contexts of vowel sandhi, with final postonic high vowel [i] and low vowel [a] preceding the pretonic mid-vowel /e/.⁽¹⁾ In the second experiment, the speakers were submitted to repetition of words, preceded by a pause.

In addition to 40 distractors, 20 stimuli were used, previously balanced by a non-parametric (Kruskal-Wallis) test, according to *syllabic structure*, *frequency*, *diversity of occurrence* (Tang, 2012),^[10] *number of syllables* and *number of letters in the word*. The conditioners considered were *syllabic structure* and *precedent context*. The realization of 20 stimuli in three different contexts (two in the first and one in the second experiment) by four participants totalised 240 items. Due to vowel deletion, one occurrence of /e/s.pe.lho ('mirror') was discarded from the investigation. The statistical analysis was conducted with the utilisation of PRAAT software (Boersma & Weenink, 2014)^[11] and Minitab 17 and Action Stat 3.4 programs.

In a preliminary analysis, there were 69 occurrences (28.9%) of vowel raising of word-initial pretonic mid-vowel /e/. All the 69 occurrences were distributed between two syllabic structures: (i) pretonic /e/ followed by nasal consonant in coda, e.g. [i]n.fer.mei.ra ('nurse') (32 occurrences or 53.3% of vowel raising in this syllabic context); and (ii) pretonic /e/ followed by sibilant consonant, as in [i]s.mal.te ('nail polish') (37 occurrences or 62.7% of vowel raising in this context). The chi-square tests for association analysis demonstrated (i) a moderate association between the preceding context and the vowel raising; and (ii) a strong association between syllabic structure and the application of the process. In the acoustic analysis, in respect of F1 and F2 values, it was found statistical evidence that the means differ in the different syllabic structures (p<0.05) and do not differ in relation to precedent contexts (p>0.05). In general, the results highlight the substantial influence of the *syllabic structure* to the vowel raising of word-initial pretonic front mid-vowel.

- (1) E.g.: *Pedi que coloque espelho no quarto. Meu pai já foi para a loja, sempre busca espelho lá.* ('I asked Ø to put a mirror in the bedroom. My father already went to the shop, he always gets mirrors there').

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