

The role of phonological processes to discussing vowel inventory in Brazilian Portuguese

One of the key aspects of Dresher's (2003) proposal to phonological representation is the idea that both contrasts and phonological processes play a major role in defining underlying forms and the way they should be represented. Such an account is directly opposite to what has been proposed by Trubetzkoy (1936), to whom only distinctive properties should be considered when determining phonemic content. The latter view has been the starting point to various proposals throughout phonological theory, among them the definition of contrast, and consequently, the vowel inventory in Brazilian Portuguese (henceforth, BP). It is well established in the literature that BP has a symmetrical seven oral vowels in stressed position /i, e, ε, a, ɔ, o, u/, reduced to a five /i, e, a, o, u/ and to a three /i, a, u/ subsystems in pretonic and final posttonic positions, respectively (cf. Câmara Jr, 1970). Regarding the non-final posttonic inventory – a subsystem that only exists in words with proparoxytonic stress (X * *), Câmara Jr. claims that it consists of four vowels /i, e, a, u/, as /o/ is usually pronounced as [u] (cf. (1)) (although /e/ may also be pronounced as [i] in most cases, in some words this seems to be blocked, the reason why the author believes it is part of the system) (cf. (2)). Bisol (2003) argues against this hypothesis claiming that an asymmetrical system would be odd if compared to the other subsystems, but the main problem would be that an asymmetrical inventory wouldn't be captured by Clements' (1989) account to vowel height in Romance languages. Therefore, Bisol proposes that neutralization rules reduce the pretonic subsystem to a three vowel inventory in non-final posttonic position, based on the facts that (i) high-mid vowels may also emerge as high vowels in the non-final posttonic position and that (ii) no contrast between high and high-mid vowels exists in the referred position. However, the author does not take into consideration the fact that in some dialects mid vowels may also emerge as low-mid (cf. (3)) (Bisol believes that the reason why, in some cases, /e/ does not emerge as [i] is because the three vowel subsystem is still a change in course, but, as the change occurs, those forms will be possible).

As said above, Dresher proposes that not only contrast, but also phonological processes should be taken into account in order to establish the phonological inventory of a language. Bisol's argument against Câmara Jr.'s (1970) hypothesis highlights the fact that asymmetry is an issue and proposes a subsystem based exclusively on contrast. Our question is whether Dresher's proposal could, in some way, be relevant to discuss a subsystem that still lacks a wider understanding.

We have ran a controlled experiment in order to discuss both the vowel inventory as well as if there is a difference between mid-vowels in this position. Our experiment was composed of 118 words with antepenultimate stress with mid-vowels in the non-final posttonic position. These words were produced by 40 subjects resulting in a corpus of 4.720 words.

After statistical analysis, we observed that the emergence of high vowels was correlated with the presence of a high word final vowel that shared the same place of articulation as the non-final post-tonic vowel, i.e., coronal to [ɪ] and labial to [u] (cf. (4)) and the emergence of mid-low vowels was correlated with the presence of the dorsal vowel, therefore low vowel /a/, in word final position (cf. (5)).

The results lead us to propose two assimilatory rules which can account for the emergency of both high and low-mid vowels. The first, in order to capture the fact that the emergence of the high vowels is an association of place of articulation and open feature, the assimilation must be of the vocalic node; and the second, for the production of mid-low to occur, there must be an assimilation of [+open3]. Crucially, for this last case, the assimilation cannot be of the vocalic node, otherwise it would assimilate the [dorsal] feature and the vowel would be produced as [a]. We also observed that no logical pattern was found to the emergency of high-mid vowels.

Based on these results, we argue that it is possible to propose rules that explain and predict the emergency of both high and low-mid vowels in non-final posttonic position, but nothing was found that could explain why high-mid vowels emerge as they do (in our data, we observed that in some cases high mid vowels emerged seven times more than high vowels).

Turning back to the hypothesis proposed for the vowel inventory in non-final posttonic position, our results showed that no significant difference was found for the emergency of the back (opposite to front) mid-vowels as high vowels, which was described by Camara Jr. as existing and that supported his hypothesis. This, alongside with Bisol's observation that an asymmetrical system would be problematic, we believe, are strong arguments to discredit this first account.

Regarding Bisol's proposal, the facts observed in our data leads us to believe that the hypothesis, which mainly focuses on the definition of contrast, has serious issues because: (i) if we assume a three vowel subsystem in non-final posttonic position, there wouldn't be possible to define when, and for that reason, high-mid vowels emerge as the most frequent vowel; also, ii) there would have to be a rule which would derive low-mid vowels (in dialects in which they are possible) from high vowels; that is, a two height level change (high → mid-high → low-mid), something that hasn't been described in BP or in any other romance language, as far as we know, therefore, another issue regarding the author's hypothesis.

On these terms, Drescher's proposal for the relevance of phonological processes on the definition of phonological representation seems to be coherent when we take into consideration the non-final posttonic vowel inventory in BP, as the proposals that only take contrast into consideration are not able to capture the empirical data observed.

Examples:

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|-------------------|---------------------|---------------|-----------------|
| (1) Políg[o/u] | <i>polygon</i> | | |
| (2) Epênt[e/i]se | <i>epenthesis</i> ; | *Vért[e/i]bra | <i>vertebra</i> |
| (3) Abób[u/o/O]ra | <i>pumpkin</i> ; | Nád[i/e/E]ga | <i>butt</i> |
| (4) Hipót[i]s[i] | <i>hypothesis</i> ; | Equív[u]c[u] | <i>mistake</i> |
| (5) Câm[E]ra | <i>camera</i> ; | Ânc[O]ra | <i>anchor</i> |

References

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