

DIMINUTIVES IN BRAZILIAN PORTUGUESE AND OUTPUT- OUTPUT CORRESPONDENCE*

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1. *Introduction*

In this paper, I discuss some puzzling, long-distance phonological effects triggered by the plural suffix *-s* in Brazilian Portuguese (BP), when it attaches to diminutives. I present an optimality-theoretic analysis (Prince and Smolensky 1993; and subsequent references), based on output-output correspondence (Benua 1995; Burzio 1994; Kenstowicz 1996; Steriade 1996; *inter alia*), and argue that it provides a simple solution to the puzzles. I show that the analysis can be straightforwardly extended to cover cases of under- and over-application related to mid-vowel alternations and nasality in BP diminutives, providing thus a unified account for all the morphophonological peculiarities involving diminutives in the language.

The paper is organized as follows: in Section 2, I present the relevant background on diminutive and plural formation in BP, focusing on cases in which the plural morpheme triggers phonological changes on the bases to which it attaches. In Section 3, I discuss the affixal nature of the diminutive morphemes and reject the idea that BP diminutives involve infixation or compounding. In Section 4, I present my analysis, according to which diminutive words in BP are evaluated with respect to the corresponding non-diminutive forms, *i.e.*, forms that share the same grammatical features (number and gender) but in which the diminutive morphemes are absent. In Section 5, I show how the same mechanisms can straightforwardly account for the absence of certain vocalic alternations in BP diminutives. Section 6 is a brief conclusion.

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2. BP diminutives and plurals

There are two diminutive affixes in BP: stem-level *-inho/a* and word-level *-zinho/a* (*nh* represents a palatal nasal).¹ *-inho/a* attaches to consonant-final stems that form nouns and adjectives with the theme vowels *-a*, *-o* and *-e*, whereas *-zinho/a* typically attaches to words ending in consonants, diphthongs, and stressed vowels:²

- | | | | | |
|-----|----|---------------|---|----------------------|
| (1) | a. | <i>cas-a</i> | - | <i>cas- inh -a</i> |
| | | “house | - | little house” |
| | b. | <i>livr-o</i> | - | <i>livr- inh -o</i> |
| | | “book | - | little book” |
| | c. | <i>pent-e</i> | - | <i>pent- inh -o</i> |
| | | “comb | - | little comb” |
| (2) | a. | <i>mar</i> | - | <i>mar-zinh -o</i> |
| | | “sea | - | little sea” |
| | b. | <i>irmão</i> | - | <i>irmão-zinh -o</i> |
| | | “brother | - | little brother” |
| | c. | <i>caju</i> | - | <i>caju-zinh -o</i> |
| | | “cashew | - | little cashew” |

The plural suffix *-s* is always the outermost suffix in plural words. Thus, the plural of both diminutive and non-diminutive words are formed by adding *-s* to the corresponding singular forms.

- | | | | | |
|-----|----|----------------|---|---------------------|
| (3) | a. | <i>casa-s</i> | - | <i>casinha-s</i> |
| | | “houses | - | little houses” |
| | b. | <i>irmão-s</i> | - | <i>irmãozinho-s</i> |
| | | “brothers | - | little brothers” |

¹ Throughout the paper, examples are given in their orthographic forms, except for the segments directly involved in the morphophonological alternations related to the analysis presented in the paper. In these cases, a phonetic transcription is given and its interpretation provided in the text.

² I say ‘typically’ because the use of *-zinho/a* with words ending in a theme vowel is also attested and in some cases, alternation between the two forms has become a matter of preference. For relevant diachronic and dialectal considerations on the use of these morphemes, see Maurer Jr. (1969) and Skorge (1957).

However, sometimes, adding *-s* to a base triggers some phonological changes, as can be seen in (4)-(6) below (*i/w* refers to the front and back glides respectively; *o/O* refers to the +/- ATR contrast).

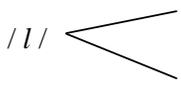
- (4) a. *jornaw* - *jornai-s*
 “newspaper- newspapers”
 b. *hotew* - *hotei-s*
 “hotel - hotels”
- (5) a. *porco* - *pOrco-s*
 “pig - pigs”
 b. *corpo* - *cOrpo-s*
 “body - bodies”
- (6) a. *coraçãõ* - *coraçõẽ-s*
 “heart - hearts”
 b. *capitãõ* - *capitãẽ-s*
 “captain - captains”

I will start by discussing the cases in (4). In those cases, there is evidence that the final glide *w* is, underlyingly, the lateral consonant *l*, as attested by the following alternations (syllable boundaries indicated by dots):

- (7) a. *jornal* + *-eiro* → *jor.na.lei.ro*
 “newspaper dealer”
 b. *jornal* + *-ista* → *jor.na.lis.ta*
 “journalist”
- (8) a. *ho.tel* + *-aria* → *ho.te.la.ria*
 “hotel business”
 b. *hotel* + *-eiro* → *ho.te.lei.ro*
 “related to a hotel”

In BP, *l* never appears in coda position. If a root or stem ending in *l* is followed by a vowel initial suffix, *l* can be syllabified as an onset, as shown in (7) and (8). But if no such suffix is available, *l* is vocalized, becoming a glide. The glide is then realized as a dorsal segment. However, as attested in (4), when *l* is immediately followed by the plural suffix *s*, it becomes *i*, not *w*. I assume that alternations as in (4) correspond to cases of tautosyllabic coronal

assimilation, in which the coronal consonant *s* is responsible for changing the back glide *w* into its front counterpart *i* (cf. Girelli 1988; Morales-Front and Holt 1997).

- (9) $/l/$  *l* in onset position
w in coda position
- $w+s]_{\sigma} \rightarrow is]_{\sigma}$ (assimilation triggered by the plural morpheme)

Turning now to cases like (5)-(6), I will consider them irregular plurals, since the changes observed in those forms do not seem to be phonologically motivated.³ I will treat them as allomorphs:

- (10) a. *porko* → *pOrko* / __ + pl
 b. *coraçãO* → *coraçõE* / __ + pl

Notice the locality constraint in the conditioning environment. Here, the suffix *-ada*, roughly meaning “bunch of”, intervenes between the root and the plural marker, and no alternation is observed:

- (11) *pork-ada-s* **pOrkadas*
 “bunches of pigs”

Consider now what happens with diminutives and their plurals:

- (12) a. *jornawzinho* - *jornaizinho-s*
 “little newspaper(s)”
 b. *hotewzinho* - *hoteizinho-s*
 “little hotel(s)”
- (13) a. *porkinho* - *pOrkinho-s*
 “little pig(s)”
 b. *corpinho* - *cOrpinho-s*
 “little body(ies)”

³ Cf. Morales-Front and Holt (1997) for an alternative for cases involving nasal diphthongs, as in (10b).

- (14) a. *coraçãozinho* - *coraçõezinho-s*
 “little heart(s)”
 b. *capitãozinho* - *capitãezinho-s*
 “little captain(s)”

The alternations above are unexpected. In (12), for instance, the plural morpheme is too far away from the glide to trigger any phonological change. In (13) and (14), the diminutive affix intervenes between the base and the plural marker, and should prevent the application of the process in (10). How can we explain the alternations above? The answer to this question will occupy us through the rest of the paper.

3. *Are -inho/a and -zinho/a suffixes?*

Looking at the cases in which no phonological change affects the base to which *-inho/a* and *-zinho/a* attaches, it seems natural to conclude that these morphemes are stem-level and word-level suffixes respectively. However, in the face of the problematic cases in (12)-(14), one might suspect that this conclusion is not warranted. In this section, I briefly sketch two alternative treatments to diminutive formation in BP, but end up rejecting them as being descriptively inadequate.

3.1 *Against infixation*

A plausible way to deal with the cases in (12) is to treat *-inh-* as an infix attaching to fully inflected words.⁴

- (15) a. *porco* + *-inh-* → *porkinho*
 “little pig”
 b. *pOrcos* + *-inh-* → *pOrkinhos*
 “little pigs”

In (15b) the choice of the allomorph *pOrc-* is justified by the presence of the plural marker *-s*, which is generated adjacent to the root. Despite its appealing simplicity, the analysis is problematic, since it cannot be extended to cases of roots that select for the theme vowel *-e*. As shown below in (16), what follows *-inh-* in these cases is not *-e* but *-o* or *-a* depending on the gender of the

⁴ This proposal raises important questions about the ordering between derivational and inflectional affixation, which I will not address here. See Anderson (1992), Perlmutter (1988) and Rainer (1995), among others, for discussion and relevant literature.

root (masculine or feminine). This is totally unexpected and constitutes a strong argument against the proposal.

- (16) a. *pent-e* + *-inh-* → *pentinho* (**pentinhe*)
 “little comb”
 b. *corrent-e* + *-inh-* → *correntinha* (**correntinhe*)
 “little chain”

3.2 Against diminutives as compounds

Another possible approach is to assume a different internal structure to diminutive words, one that treats them as compounds.⁵ The proposal goes as follows: *-inh-* and *-zinh-* first attach to the theme vowel and the number morpheme, and then to the bases. In the case of *-inho/a*, the base is a bounded form, a stem, and in the case of *-zinho/a*, the base is a free form, a fully inflected word:

- (17) a. [[*pOrc*]+[*inh+o+s*]] → *pOrkinhos*
 b. [[*jornal+s*]+[*zinh+o+s*]] → *jornaizinhos*

In (17a), the constituent *-inhos* is marked as being plural, requiring the presence of the allomorph *pOrc-*. In (17b), the plural morpheme *-s* is adjacent to the root *jornal* and the presence of the front glide *i* is expected. Details of implementation aside, these are welcome results. But they come at a price. Consider the doubly inflected form in (17b). Semantically, the second constituent acts as a modifier of the first one, in a way similar to noun phrases in which a noun is modified by an adjective. *Bona fide* compounds of this sort exist in BP. For instance, in (18a) below, we have a fish that looks like a sword, and not a sword that looks like a fish. Crucially, however, plurality is marked only on the first constituent in these compounds.⁶ This is never an option for diminutives, as shown below:⁷

⁵ Maurer Jr. (1969) contains a suggestion along these lines.

⁶ It is true that there are also compounds in BP that have both constituents inflected for number, as in *radio-gravador/radios-gravadores* “radio-recorder(s)”. But their semantics are similar to the semantics of conjoined phrases: A *radio-gravador* is both a radio and a recorder. There is no reason to single out one constituent as acting as the modifier of the other, as in the case of diminutives. For discussion of Portuguese nominal compounds, see Mateus et alii (2003, chapter 24).

⁷ Diminutives are also special with respect to other nominal compounds in having a bounded form as its second constituent. This asymmetry was pointed out by Rainer (1995) as another problem for the compound analysis.

- (18) a. *peixes-espada*
 “swordfish (pl)”
 b. **jornaizinho*
 “little newspaper (pl)”

Moreover there is an empirical problem with the diminutives in *-zinho/a*. For words ending in *r* and *l*, the analysis leads to predictions that are not borne out, as in (19):⁸

- (19) a. *flor - flores*
 “flower(s)”
 florzinha - florzinhas (**florezinhas*)
 “little flower(s)”
 b. *mar - mares*
 “sea - little sea”
 marzinho - marzinhos (**marezinhos*)
 “seas - little seas”

According to the analysis, the first half of these forms should be the plural non-diminutive words, *flores* and *mares*. The problem is that the epenthetic vowel *e* that appears in these forms is not carried over to the diminutive plural forms. This represents a serious threat to the compound analysis. I will offer an alternative in the next section.

4. *Output-Output correspondence and diminutives in BP*

My analysis is couched within an optimality theoretic framework (Prince and Smolensky 1993 and much subsequent work), according to which phonological changes affecting the underlying form of a word reflect the existence of markedness constraints that militate against the presence of certain elements (features) in the surface form. These constraints are always in conflict with faithfulness constraints, which militate against discrepancies between elements in the input and their correspondents in the surface form. In addition to these families of constraints, I will also assume the existence of Output-Output Faithfulness constraints (Benua 1995; Burzio 1994; Kenstowicz 1996; Steriade 1996; inter alia). The idea is that certain derived words are evaluated not only with respect to an input, but also with respect to another word or

⁸ The 10 native speakers that I consulted found the starred forms below unacceptable or marginal.

output (its base). Faith-OO militates against discrepancies between elements of the output and their correspondents in the base.

The idea I want to pursue here is that BP diminutive words are evaluated with respect to a base, and that the word serving as the base is the non-diminutive form that has the same grammatical features (number and gender) as the diminutive.⁹ As an illustration, let us see how the word *jornawzinho* is obtained.

/jornal+zinh+o/ Base: jornaw	*LAT- CODA	IDENT-OO (BACK)	IDENT- IO(CONS)
a. jor.nal.zi.nho	*!		
☞ b. jor.naw. zi.nho			*
c. jor.nai. zi.nho		*!	*

Tableau 1: *jornawzinho*

Since the word is singular, the base here should also be singular. Candidate a. violates the markedness constraint banning lateral codas. This constraint appears here undominated, reflecting the inexistence of such codas in BP. Candidate c. violates the OO-FAITH constraint stating that the specification of the feature [BACK] of a segment of the base must be preserved in its output correspondent. This is so, because the back glide *w* in the base has become the front glide *i* in the diminutive output. This violation turns out to be fatal, since candidate c., in which the back specification of this segment is preserved, does not violate the constraint. Candidates b. and c. both violate the IO-FAITH constraint enforcing identity of the specification of the feature [CONSONANTAL] in the output and its correspondent in the input. The reason for these violations is the fact that the lateral consonant *l* has been changed into a vocalic segment, a back glide in the case of candidate b. and a front glide in the case of candidate c. Since this constraint is dominated by the other two, these violations are irrelevant in Tableau 1.

Now, consider what happens in the case of the plural form *jornaizinhos*. The base now should be plural, and in this case we have the non-diminutive form *jornais*. Notice the presence of the front glide *i* preceding the plural marker *s* in the base, which results from what we saw above about assimilation. IDENT-OO(BACK) will enforce the preservation of the [BACK]

⁹ On the relevance of grammatical features for choosing the base, see the discussion of vowel deletion in Palestinian Arabic in Kager (1999:278ff).

specification of this segment, and candidate c. of Tableau 2, which is most faithful to the base, wins. Interestingly, the front glide surfaces here, despite the absence of any local conditioning environment, a case that would be described in more traditional, derivational terms as the over-application of a phonological process.¹⁰

/jornal+zinh+os/ Base: jornais	*LAT-CODA	IDENT-OO (BACK)	IDENT-IO (CONS)
a. jor.nal. zi.nhos	*!		
b. jor.naw. zi.nhos		*!	*
☞ c. jor.nai. zi.nhos			*

Tableau 2: *jornaizinhos*

The cases involving *-inho/a* work the same way, as shown in Tableau 3:

/pork+inh+os/ Base: pOrkos	IDENT-OO(ATR)	IDENT-IO(ATR)
a. porkinhos	*!	
☞ b. pOrkinhos		*

Tableau 3: *pOrkinhos*

In the base, the allomorph containing the [-ATR] vowel *O* was selected due to its adjacency to the plural morpheme. In the input, adjacency is not obtained, and the allomorph with the [+ATR] vowel *o* was selected. Since IDENT-OO (ATR) is ranked above IDENT-IO(ATR), candidate (b), which is most faithful to the base, wins.

Turning now to the cases of words ending in *r*, such as *flor* “flower”, recall that the plural forms contain an epenthetic vowel preceding the plural marker *s*, which is a strategy to avoid complex codas in BP¹¹. As can be seen in Tableau

¹⁰ Notice that the [z] of *jornaizinhos* cannot condition the glide to be front, since a syllable boundary intervenes between them. Cf. the singular form *jorna[w]zinho* discussed above.

¹¹ As an anonymous reviewer pointed out, there are few exceptions, consisting of words beginning with *per-*, such as *perspectiva* “perspective”, *perspicaz* “perspicuous”, and related words. I suspect that *per-* is being treated as a prefix in these cases, and the prefix-stem boundary is enough to make the constraint against complex codas irrelevant. Indeed, prefixes in BP are different from suffixes in several respects, including the fact that they never change

4, we get the desired output by ranking the relevant markedness constraint above DEP-IO, which militates against epenthesis.

/flor+s/	*COMPLEX-CODA	DEP-IO
a. flors	*!	
☞ b. flores		*

Tableau 4: *flor*

Now, consider again the plural of the diminutive form, *florzinhas*. What we detected above as a potential problem for the compounding analysis, according to which the first constituent of this form is the plural of *flor*, the absence of the epenthetic vowel is unexpected. At first sight, this problem carries over to our analysis, but in a different guise. Although diminutives in *-zinho/a* involve suffixation to a non-plural form, candidates are also evaluated with respect to a base, which, according to our assumptions, should be plural. Moreover, we have just seen two cases in which similarity to the base takes precedence over similarity to the input (cf. Tableaux (2)-(3)). Shouldn't we expect *florezinhas* instead of *florzinhas* here too? After all, the latter does not have a vocalic segment that is present in the base, namely the vowel *e*. Notice, however, that we have not dealt with discrepancies like this before. Our previous cases had to do with different specifications of a segment with respect to a certain feature, something that IDENT-OO constraints are designed to take care of. But now we are dealing with the presence/absence of a segment in one of the forms, but not in the other, something that DEP-OO/MAX-OO should take care of. As shown in Tableau 5, our problem is solved if we rank MAX-OO below DEP-IO. MAX-OO states that segments of the base must have output correspondents (no deletion!).

/flor+zinh+as/ Base: flores	*COMPLEX-CODA	DEP-IO	MAX-OO
a. florezinhas		*!	
☞ b. florzinhas			*

Tableau 5: *florzinhas*

the syntactic category of the base forms, suggesting that prefix-stem boundaries are of a different nature than stem-suffix boundaries.

Candidate a. incurs in a violation of DEP-IO because of the presence of the epenthetic vowel *e*, which is missing in the input. Being faithful to the input is, in this specific case, more important than being faithful to the base. That is why candidate b. is the winner, despite a violation of MAX-OO due to the absence of the epenthetic vowel in the candidate.

Our analysis based on OO-correspondence seems capable of solving all the puzzles concerning the interaction of diminutive formation and plurality in BP. In the next section, I show that the same ideas employed above can be used to explain the absence of certain vowel alternations in BP diminutives in a very simple way.

5. *Expanding the analysis*

5.1 *Mid-vowels*

BP has four mid-vowels that contrast in stressed positions: *e, E, o, O*.¹² When unstressed, the contrasts *e/E* and *o/O* are neutralized in favor of *e* and *o*. Alternations can be observed with suffixes that attract stress, such as the nominalizer *-eza* (stressed syllables are underlined below):

- (20) a. bE.lo - be. le.za
 “beautiful - beauty”
 b. pO.bre - po. bre.za
 “poor - poverty”

Diminutive suffixes also attract stress. However, mid-vowels *E, O* never change into *e, o* in these cases:

- (21) a. fIE.cha - fIE. chi.nha
 “arrow - little arrow”
 b. bO.la - bO. li.nha
 “ball - little ball”

The asymmetry can be explained if we assume, as we did in the previous section, that diminutive words are evaluated with respect to a base, the non-diminutive form that shares the same grammatical features. The facts illustrated in (21) become then another consequence of the work of OO-Faith

¹² On the vowel system of Portuguese, cf. Redenbarger (1981), Mateus and d’Andrade (2000), and references therein.

constraints enforcing similarity of vocalic features of segments of the base and the output. Tableau 6 illustrates the point:

/bOl+inh+a/ Base: <u>bO</u> la	IDENT-OO (ATR)	*[-ATR; -STRESS]	IDENT-IO (ATR)
a. <u>bol</u> inha	*!		*
☞ b. <u>bO</u> linha		*	

Tableau 6: *bOlinha*

As can be observed in Tableau 6, when we try to avoid violating the markedness constraint *[-ATR; -STRESS], which prohibits [-ATR] vowels in unstressed positions, we automatically incur violations of the higher ranked IDENT-OO(ATR). As a consequence, the candidate faithful to the base wins.

5.2 Nasal vowels

BP oral vowels *a*, *e*, *i*, *o*, *u* all have nasal counterparts. When followed by a nasal consonant that occupies the onset of the following syllable, vowels appear as oral, if unstressed, and nasal if stressed, as attested by the alternations below involving the stress attracting suffixes *-oso* and *-agem*:

- (22) a. fã.ma - fa. mo.so
 “fame - famous”
 b. clõ.ne - clo. na.gem
 “clone - cloning”

Once more, diminutives behave differently in preserving the nasality of their base:

- (23) a. cã.ma - cã. mi.nha
 “bed - little bed”
 b. clõ.ne - clõ. ni.nho
 “clone - little clone”

This follows from ranking the markedness constraints conspiring against unstressed nasal vowels followed by heterosyllabic nasal consonants below

IDENT-OO (NASAL), which states that the specification of the feature [NASAL] of a segment of the base must be preserved in its output correspondent.¹³

/cãminha/ Base: <u>cã</u> .ma	IDENT-OO (NASAL)	*V.N +nasal; -stress
a. ca. <u>mi</u> .nha	*!	
☞ b. <u>cã</u> . <u>mi</u> .nha		*

Tableau 7: *cãminha*

As in the case involving mid-vowels discussed above, similarity between the base and the output takes precedence here, enforcing the preservation of the vocalic features of the base in the output.¹⁴

6. Conclusion

In this paper, I developed an optimality-theoretic account of the peculiar behavior of diminutives in BP with respect to plural formation and vowel alternation. Central to the analysis was the notion of output-output correspondence (Benua 1995; Burzio 1996; Kenstowicz 1996; Steriade 1996; inter alia). In particular, I made crucial use of faithfulness constraints enforcing similarity between diminutive words and their corresponding non-diminutive forms. This provided the basis for a unified analysis of several cases, without the need of changing the apparent suffixal status of these morphemes.

¹³ For simplicity, I pack these constraints into a single one, informally represented in Tableau 7.

¹⁴ Notice that for the analysis defended here to work, it is crucial that derived words formed by other stress-attracting suffixes, such as the above mentioned *-eza*, *-oso/a*, *-agem*, should not be evaluated with respect to a base, otherwise the vowel alternations observed above in (25) and (28) are not captured. This raises some deep issues: Why are certain affixes (in our case the diminutive ones) evaluated with respect to a base, while others are not? Is it possible to predict this asymmetry on the base of some morphophonological and/or syntactic-semantic features of specific morphemes? Is there crosslinguistic variation in this area? For instance, are diminutives evaluated with respect to a base in all languages that have a diminutive affix? These important questions still await satisfactory answers. In BP, *-issimo/a*, the superlative suffix, also behaves like diminutives.

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