Traces, *pro* and Stress Shift in Brazilian Portuguese[*]

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Abstract

This paper deals with the phonology-syntax interface by discussing the role of empty categories in the resolution of stress clash in Brazilian Portuguese. I argue that the stress clash in a V ec Adv environment can be resolved by retraction of the first stress if ec is a trace of movement, but not if it is a null pronoun (pro). I show also that the blocking of stress shift in Brazilian Portuguese is not a consequence of Case marking.

1. Introduction

This paper deals with rhythmic rules in Brazilian Portuguese (henceforth BP) and the syntax-phonology interface. My aim is to show that phonologically empty syntactic categories can affect the rhythmic organization of a sentence. More specifically, I argue that a phonetically null pronoun (*pro*) in object position can block stress shift between a verb and an adverb, but traces in the same environment cannot.

The paper is organized in the following way. Section 2 provides a summary of previous analyses of stress shift in BP. Section 3 presents the standard analysis of null objects in BP and shows, based on Santos (2002), that different kinds of phonologically null objects have a different behavior

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with respect to stress shift. Section 4 discusses whether Case marking can be responsible for blocking stress shift. Finally, section 5 presents the conclusion.

2. Stress shift in Brazilian Portuguese

Working within the framework proposed by Nespor & Vogel (1986), Abousalh (1997) argues that different prosodic domains employ different strategies for resolution of stress clash in BP.[1] Using data from spontaneous reading, the author shows that if the clash is resolved in the phonological phrase (ɸ), stress shift is the strategy chosen, as illustrated in (1); if it is resolved in the intonational phrase (I), a pause is inserted, as illustrated in (2), or different tones are used, that is, although two non-adjacent stressed syllables can in principle have the same tone, this cannot happen in a clash environment, as shown in (3):[2,3]

(1) [mas NÃO SEguem]ɸ[um estranho]ɸ

      *   .   * . * . * .
  [mas nã‿ʊ sɛgẽ‿ɹ ũ ɲĩʃtɾ̃ɲũ]ɪ
   but not follow a   stranger
  'but they don't follow a stranger'   (Abousalh, 1997:95)

(2) [todos   aqueles]ɸ[que   vieram]ɸ[antes de   MIM]ɸ[SÃO ladrões]ɸ[e assaltantes]ɸ

   * . . *. * .* . *.   . * ↗ / *   . *↗ * .   *↘.
  [todu zakelʲs ki viɛɾ̃‿ʊ ̃ɜ̃tʲz dʒʲ mɪ]ɪ [sɜ̃‿ʊ ladɾõ‿ɹ]ɪ[zɪ‿asɐ‿ʊtɜ̃tʃɪs]ɪ
   all those   that came before of me are thieves   and robbers
  'All those ones that came before me, are thieves and robbers.'
                                           (Abousalh, 1997:116)

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[1] For stress clash resolution in European Portuguese, see Frota (1995). She argues that the only strategy used in EP is the lengthening of the first syllable and that this strategy is blocked across a phonological phrase boundary.

[2] Capital letters in the first line annotate primary stresses in a stress clash configuration; the second line shows the rhythmic organization of the output, which is phonetically transcribed on the third line.

[3] Abousalh (1997) observes, even functional words can receive stress in case of stress shift, as shown (1), where *mas* is a functional word.

Abousalh (1997) analyzes only stress clashes involving primary stress and not clashes such as the one involving *ladrões e assaltantes* in (3), which involves secondary stress. In this paper I will also be concerned only with primary stress.

(3)   [todos aqueles]$_\phi$[que o seNHOR]$_\phi$[NOsso deus]$_\phi$[chaMAR]$_\phi$[PAra si] $_\phi$

H . . H .   L . L   M .   M↗ .   H   M . L↘
[todʊ zakelis ki‿ʊ seɲoh nɔsʊ de‿ʊs]$_I$[ʃamah paɾɐ si]$_I$
 all   those   that the Lord   our God   calls to himself
'all those ones that God, Our Lord, calls to Himself'

(Abousalh, 1997:124)

Abousalh also argues that stress shift may occur within phonological phrases after such phrases undergo restructuring (in the sense of Nespor & Vogel 1986).[4] The stress clash in (4), for instance, can be resolved by stress shift because the second ϕ can be restructured with the first one. By contrast, restructuring is prevented in (5) because the ϕ that is the first complement of X is branching (see fn.4); hence, stress shift is not allowed:[5]

(4) [quem NÃO]$_\phi$ [ENtra]$_\phi$ > quem NÃO ENtra]$_\phi$ >   [QUEM não ENtra]$_\phi$
      who   not   enter
      'who does not enter'   (Abousalh, 1997)

(5) [e   as conDUZ]$_\phi$ [PAra fora]$_\phi$ >   #[e as conDUZ PAra fora]$_\phi$
      and them leads   to   outside
      'and leads them to outside'   (Abousalh, 1997)

Sândalo & Truckenbrodt (2002) argue that being in ϕ is not a sufficient condition for stress shift to occur in BP. They propose that phonological phrasing in BP is determined by the interaction of the right-alignment of phonological and syntactic phrases with an "eurhythmic factor of uniformity", which favors phonological phrases with the same prosodic length, that is, with the same number of prosodic words. In (6), for instance, stress shift is allowed because both phonological phrases have the same number of prosodic words after restructuring; in (7), on the other hand, the two phonological phrases are of different length and stress shift is blocked:

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[4] Given the definition of ϕ in (i) and its construction algorithm in (ii), Nespor & Vogel (1986:168;173) propose that ϕ may be restructured along the lines of (iii):
 (i) ϕ domain: The domain of ϕ consists of a C [= clitic group; RSS] which contains a lexical head and all Cs on its nonrecursive side up to the C that contains another head outside the maximal projection of X.
 (ii) ϕ construction: Join into an n-ary branching ϕ all Cs included in a string delimited by the definition of the domain of ϕ.
 (iii) ϕ restructuring (optional): a nonbranching ϕ which is the first complement of X on its recursive side is joined into the ϕ that contains X.
  See Guimarães (1998) for a reanalysis of ϕ construction and restructuring in terms of c-command, using stress shift data from BP.
[5] Since asterisks will be used for syntactic ungrammaticality, "#" in (5) and in the discussion below will be used to mark prosodic ungrammaticality.

(6) [caFE QUENte] $_\phi$[queima a boca] $_\phi$>[CAfé QUENte] $_\phi$[queima a boca] $_\phi$
     coffee hot   burns the mouth
     'Hot coffee burns one's mouth.'   (Sândalo &Truckenbrodt 2002)

(7) [caFE QUENte] $_\phi$[queima] $_\phi$ > #[CAfé QUENte] $_\phi$[queima] $_\phi$
     coffee hot   burns
      'Hot coffee burns.'   (Sândalo &Truckenbrodt 2002)

With this general picture in mind, consider the contrast between (8a), where stress shift is allowed, and (8b),where it is not.

(8) a. o josé maria canTOU HOje   > o josé maria CANtou HOje
        the José Maria   sang   today
        'José Maria sang today.'

    b. o josé maria conTOU HOje   > #o josé maria CONtou HOje
        the José Maria told   today
        'José Maria told (it) today.'

According to Nespor & Vogel's (1986) algorithm, (8a) and (8b) should have the same prosodic parsing and allow restructuring, as shown in (9a) and (9b) below, respectively. In consonance with Abousalh's (1997) proposal, this should create the appropriate context for stress shift to occur. The prosodic ungrammaticality of (8b) is therefore unexpected. Notice further that (9a) and (9b) both have two phonological phrases with two prosodic words; in fact, they even have the same number of syllables. Thus, the ungrammaticality of (8b) cannot be attributed to Sândalo & Truckenbrodt's (2002) eurhythmic factor.

(9)a.[. . x][. x .] [. x] [x .] ϕ restructuring [. . . . x .][. . x .] ϕ
     [. . x][. x .] [. **x**] [**x** .] C   [. . x] [. x .][. **x**] [**x** .] C
      o josé maria cantou hoje   o josé maria cantou hoje

    b. [. . x][. x .] [. **x**] [**x** .] ϕ restructuring [. . . x .] [. . **x** .] ϕ
       [. . x][. x .] [. **x**] [**x** .] C   [. . x][. x .] [. **x**][**x** .] C
        o josé maria contou hoje   o josé maria contou hoje

Notice further that syllable weight is not a relevant factor. Stress shift is possible in (10) and impossible in (11), regardless of the weight of the syllable that bears the moved stress (heavy in (10a) and (11a) and light in (10b) and (11b)):

(10) a. # o josé maria PERdeu HOje.
　　　　the josé maria lost　　today
　　　　'José Maria lost (it) today.'
　　 b. a　saia nova SERviu HOje.
　　　　the skirt new fit　　today
　　　　'the new skirt fit today.'

(11) a. # o　josé maria LEvou HOje.
　　　　the josé maria took　　today
　　　　'José Maria took (it) today.'
　　 b. o josé maria CHOrou HOje.
　　　　the josé maria cried　　today
　　　　'José Maria cried today.'

Based on previous work (see Santos 2002), I will argue that contrasts such as the one in (8) can be adequately captured by taking empty syntactic categories into account. More specifically, I will propose that a null object in (8b) breaks the adjacency between the verb and the adverb, preventing stress shift from occurring. Before presenting the analysis proper, I will first provide a brief overview of null objects in BP.

3. Empty categories and stress shift in Brazilian Portuguese

Raposo (1986) shows that null objects in European Portuguese (EP) cannot appear inside syntactic islands, as illustrated in (12), with a relative clause, and in (13), with a sentential subject.

(12) *[$_{island}$ o rapaz que trouxe __ mesmo agora　　da　　padaria]
　　　　　the boy who brought right now　　from the pastry shop
　　　　　era o　　teu　　afilhado.
　　　　　was the your godson
　　'the boy who brought (it) right now from the pastry shop was your godson.'

(13) * [$_{island}$ que a IBM venda __ a　　particulares]　surpreende-me.
　　　　　that the IBM sell　to private costumers　surprises me.
　　'that IBM sells (it) to private costumers surprises me.'

Given that islands block movement from within them, the fact that constructions with null objects in EP are sensitive to island configurations indicates that the relevant empty category in the object position is derived by movement. Raposo's proposal is that the null object in EP is a trace left by movement of a null operator coindexed with a null topic.

In BP, on the other hand, sentences such as (12) and (13) are fully acceptable. This leads Galves (1989) to propose that null objects in BP are actually null pronouns (*pro*) generated in situ, which do not need a null operator to license them.[6] Assuming that this analysis is essentially correct, the representation of (8b) in BP should be as in (14), with a *pro* in the object position.

(14) o josé maria conTOU *pro* HOje.

Given the structure in (14), I propose that the prosodic ungrammaticality of (15) is attributed to the empty category *pro*, which occurs between the verb and the adverb, blocking the adjacency between the two primary stresses and preventing stress shift from occurring.

(15) # o josé maria CONtou *pro* HOje

Similar behavior can be observed in the sentences in (16), where the null object also blocks stress shift.

(16)a. # a maria rita REleu *pro* ONtem
        the Maria Rita reread   yesterday
        'Maria Rita reread (it) yesterday.'
    b. # o josé maria POdou *pro* ONtem
        the José Maria pruned   yesterday
        'José Maria pruned (it) yesterday.'
    c. # a ana maria PEgou *pro* HOje
        the Ana Maria picked today
        ' Ana Maria picked (it) up today.'
    d. # o josé carlos LEvou *pro* HOje
        the José Carlos took   today
        'José Carlos took (it) today.'

However, based solely on this discussion, we cannot conclude anything regarding traces, that is, whether they behave like *pro* or not. One way to test if stress shift takes into account the type of empty category in object position is to create contexts in which the two categories – pro and trace – can be clearly identified. Again, we will look at islands. Consider, for instance, the constructions involving focalized expressions in the beginning of the sentence in (17).

(17) a. * só o bolo   a   Maria passou mal [$_{island}$ depois de comer __ hoje]
            only the cake the Maria felt   badly   after of eat   today
            'only the cake, Maria felt sick after eating (it) today.'
      b. * só o bolo eu conheci a cozinheira [$_{island}$ que assou __ ontem]

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only the cake I   met the cook   who baked   yesterday.
'only the cake, I met the cook who baked (it) yesterday.'

c. * só esse livro eu tive a confirmação [$_{island}$ de que o Carlos

only this book I had the confirmation   of that the Carlos

perdeu___ hoje]

lost   today.

'only this book, I had the confirmation that Carlos lost (it) today.'

d. * só essas modificações [$_{island}$ o João fazer __ ontem]   foi

only those modifications   the João do yesterday   was

surpreendente.

surprising.

'only those modifications for João to do (them) yesterday was surprising.'

If the focused elements were generated in situ and there were a pro in the object positions inside the islands, the sentences in (17) should be acceptable, would not involve movement. On the other hand, if the focused elements reach their position by moving from inside the island, we would expect the sentences to be unacceptable. The fact that the latter is the case indicates that focalization in BP involves movement and not resumptive pronouns (see Cinque, 1990 for relevant discussion).

Once it is possible to establish that focus involves movement and, therefore, the relevant empty categories in (17) are traces, we can extend this conclusion to sentences that involve focus but do not contain islands, as in (18), and use them to investigate whether or not traces block stress shift.

(18) a. [nem   a   unha]$_i$ a   Maria cortou t_i hoje.

not even the fingernail the Maria cut   today

'not even her fingernails, did Maria cut today.'

b. [nem   o comprimido] $_i$ o João tomou t_i ontem.

not even the medicine   the João took   yesterday

'not even the medicine did João take yesterday.'

c. [só o comprimido]$_i$ o   João acha   que tomou t_i hoje.

only the medicine   the João thinks   that took   today.

'only the medicine, did João think that (he) took today.'

d. [só esse livro]$_i$ o   João disse que a Maria comprou t_i ontem.

only these book the joão said that the Maria bought   yesterday.

'only these book did João say that Maria bought yesterday.'

As we can observe in (19a) – (19d), stress shift is allowed, which leads us to conclude that traces are not "seen" as intervening between the two stresses.

(19) a. [nem a unha]$_i$ a Maria corTOU t_i HOje

[nem a unha]$_i$ a Maria CORtou t_i HOje

b. [nem o comprimido]$_i$ o João toMOU t_i ONtem
  [nem o comprimido]$_i$ o João TOmou t_i ONtem
c. [só o comprimido]$_i$ o João acha que toMOU t_i HOje
  [só o comprimido]$_i$ o João acha que TOmou t_i HOje
d. [só esse livro]$_i$ o João disse que a Maria comPROU t_i ONtem
  [só esse livro]$_i$ o João disse que a Maria COMprou t_i ONtem

To sum up, *pro* blocks stress shift, but traces do not. Independent evidence for this proposal is provided by topic constructions. The first thing worth mentioning is that constructions involving topics in BP are insensitive to islands, as illustrated in (20). This indicates that, at least in the constructions where islands are involved, the topic is generated in situ and there is a *pro* in the relevant object position, as represented in (21). As predicted, the sentences in (21) do not allow stress shift, due to the intervention of *pro*.

(20) a. esse casaco, o João chamou a atenção [$_{island}$ depois que ele vestiu __
      this coat   the João called the attention   after that he put on
      hoje].
      today.
      'this coat, João called the attention after he put (it) on today.'
  b. esses ipês, a Maria conversou com o homem [$_{island}$ que podou __
      these trees, the Maria talked   with the man   who pruned (it)
      ontem].
      yesterday.
      'these trees, Maria talked with the man who prunned yesterday.'
  c. esse cargo,   eu tive a confirmação [$_{island}$ de que o Carlos perdeu __
      that position, I had the confirmation   of that the Carlos lost
      ontem].
      yesterday.
      'that position, I had the confirmation that Carlos lost (it) yesterday'

(21) a. # esse casaco, o João chamou a atenção [$_{island}$ depois que ele
      VEStiu *pro* HOje].
  b. # esses ipês, a Maria conversou com o homem [$_{island}$ que POdou
      pro ONtem].
  c. # esse cargo eu tive a confirmação [$_{island}$ de que o Carlos PERdeu
      pro HOje].

Interestingly, when no islands are involved, topic constructions do allow stress shift, as shown in (22), with simple sentences, and in (23), with embedded clauses.

(22) a. [esse casaco]$_i$ o João VEStiu __$_i$ HOje.
      this coat,   the João put on   today.
      'this coat, João put on today.'

b. [esses ipês]ᵢ a Maria CORtou __ᵢ ONtem.
those trees the Maria cut   yesterday.
'those trees Maria cut yesterday.'

c. [esse cargo]ᵢ o Carlos PERdeu __ᵢ ONtem
that position the Carlos lost   yesterday.
'that position, Carlos lost yesterday. '

(23) a. [esse casaco]ᵢ o João disse que VEStiu __ᵢ HOje.
this coat   the João said that put on   today.
'this coat, João said that (he) put on today.'

b. [esses ipês]ᵢ a Maria disse que CORtou __ᵢ ONtem
those trees, the Maria said that cut   yesterday.
'those trees, Maria said (she) cut yesterday.'

c. [esse cargo]ᵢ eu acho que   o Carlos PERdeu __ᵢ ONtem
that position, I think that the Carlos lost   yesterday.
'that position, I think that Carlos lost yesterday. '

What the data in (22) and (23) show is that, once no islands are involved, movement is a possibility; if the topic indeed moves to the left periphery of the sentence, its trace does not block stress shift.[7]

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[7] As Leo Wetzels (personal communication) brought to my attention, given that temporal adverbs such as *nunca* 'never', *hoje* 'today', or *ontem* 'yesterday' can be independent intonational phrases, the data in (21) could be interpreted as suggesting that what *pro* actually does is block restructuring of intonational phrases; if that were so, the relevant stressed syllables in (21) would be in two different phonological phrases and stress shift should not apply.

A way to rule out this alternative would be to check if there are phonological processes that occur within the intonational phrase level but do not take *pro* into account. Unfortunately, this specific test cannot be made because there is no phonological process in Brazilian Portuguese whose domain is within the intonational phrase (see Tenani, 2002, for instance, for this conclusion with respect to sandhi, haplology, fricative voicing, and tapping). However, the data in (i)-(ii) below, for instance, independently show that the intervention effect triggered by *pro* does not hinge on the specific properties of temporal adverbs. The monosylabic words *lá* 'there' in (i) and *cru* 'raw' in (ii) cannot be intonational phrases on their own (unless they are contrastively focus) and must be within the same phonological phrase as the preceding verb. The contrast in each pair of sentences shows that what matters for stress shift is indeed whether the syntactic empty category is a *pro* or a trace.

(i)   nem   o livroᵢ a maria DEIxou *t*ᵢ LÁ
not even the book the maria let   there
'not even the book, Maria let there.'
esse livro   a Maria conversou com o   homem que DEIxou *pro* LÁ.
that book   the Maria talked   with the man   who let   (it) there
'that book, maria talked with the man who let there.'

(ii)   nem   esse tomateᵢ a maria COmeu *t*ᵢ CRU
not even that tomatoe the maria ate   raw
'not even that tomatoe, Maria ate raw.'

4. Case-Features and Stress shift in BP

The discussion above reminds us of *wanna*-contraction in English, the most known prosodic phenomenon that takes empty categories into account:[8]

(24) who do you want *PRO* to kiss *t* ?   >   who do you wanna kiss *t* ?
(25) who do you want *t* to kiss you?   > # who do you wanna kiss you?

The classic analysis of contrasts such as the one between (24) and (25) resorts to the Case-marking properties of the empty category intervening between *want* and *to* (see Jaeggli, 1980, for instance). Assuming that the wh--trace in (25) must be Case-marked and that PRO in (24) cannot, the contrast between these two sentences is attributed to the Case-feature of the empty category, that is, only an empty category marked for Case is computed with respected to adjacency.

Given that I have shown in section 3 that *pro* and traces behave differently with respect to stress shift in BP, one wonders whether Case-marking can be what underlies their different behavior. Let us examine this possibility.

So far, all the constructions that allowed stress shift involved Case-marked traces, as exemplified in (18b), repeated here in (26).

(26) [nem o comprimido] $_i$ o João TOmou t_i ONtem.
        not even the medicine   the João took   yesterday
        'not even the medicine did João take yesterday.'

Case-marking is not a necessary required, though. As shown in (27) and (28), traces of A-movement, which are not Case-marked, also allow stress shift.

(27) [a carta da maria]$_i$ cheGOU t_i ONtem
        [a carta da Maria]$_i$ CHEgou t_i Ontem
         the letter of maria   arrived   yesterday.
        'Maria's letter arrived yesterday.'

(28) [o vaso novo]$_i$ queBROU t_i HOje
        [o vaso novo]$_i$ QUEbrou t_i HOje.
         the jar new   broke   today.
        'The new jar broke today.'

        # esse tomate   a Maria conversou com o   homem que COmeu *pro* CRU
        that tomatoe   the Maria talked   with the man   who ate   raw
        'that tomatoe, Maria talked with the man who ate raw'.
[8] For relevant discussion, see Lightfoot (1976), Andrews (1978), Chomsky & Lasnik (1978), Postal & Pullum (1978), Jaeggli (1980), Freidin & Lasnik (1981) e Aoun, Honstein, Lightfoot & Weinberg (1987), among many others.

As for *pro*, it is generally found in Case-marked positions, as illustrated in (20b), repeated here in (29).

(29) # esses ipês, a Maria conversou com o homem [island que POdou *pro*
  these trees, the Maria talked with the man   who pruned (it)
  ONtem].
  yesterday.
  'these trees, Maria talked with the man who prunned yesterday.'

However, Ferreira (2000) shows that *pro* can also appear in Caseless positions, as suggested by the paradigms in (30) and (31).

(30) a. *a babá cuidou esse bebê ontem
   the nanny took care this baby yesterday
  b. a babá cuidou desse bebê ontem
   the nanny took care of this baby yesterday
   'the nanny took care of this baby yesterday.'
  c. esse bebê, a babá cuidou *pro* ontem
   this baby the nanny took care yesterday
   'this baby, the nanny took care of yesterday.'

(31) a. *eu lembrei   esta prova ontem
   I remembered this test   yesterday
  b. eu lembrei   desta prova ontem
   I remembered of this test yesterday
   'I remembered this test yesterday.'
  c. esta prova, eu lembrei *pro* ontem
   this test I remembered yesterday
   'this test, I remembered yesterday.'

(30a-b) and (31a-b) show that the verbs *cuidou* and *lembrei* cannot license an overt object and require the insertion of a dummy preposition, which amounts to saying that they do not Case-mark their objects. In turn, (30c) and (31c) show that *pro* can occupy the relevant Caseless positions. As we should expect by now, stress shift across *pro* in (30c) and (31c) is not an option, as shown in (32).

(32) a. # esse bebê, a babá CUIdou *pro* ONtem
  b. # esta prova, eu LEMbrei *pro* ONtem

The data in (26)-(32) lead to the conclusion that Case is not a relevant factor for stress shift in BP: *pro* always blocks stress shift but traces never do, regardless of whether they are Case-marked or not. Chomsky's (1995) copy theory of movement, according to which traces are deleted copies, can

perhaps provide the necessary means to explain such different behavior. If copy deletion takes place before stress computations, traces are simply not present at the point where stress shift may apply.[9] *pro,* on the other hand, is still present and is computed for adjacency purposes. That is, if this suggestion is on the right track, the different behavior between *pro* and trace is only apparent, because traces would not even have a chance to affect stress computations. I leave further exploration of this suggestion for future work.

5. Conclusions

This paper presents new empirical material for the study of the syntax-
-phonology interface. In particular, it shows that, at least at the point where stress shift is computed, phonology has access to syntactic information regarding the feature composition of empty syntactic categories. I have shown that stress shift in BP is sensitive to distinct empty syntactic categories. More specifically, I have argued that *pro* is computed for adjacency purposes and blocks stress shift and that traces, by contrast, are always invisible for stress computations and never block stress shift.

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[9] See Nunes (1999), who proposes that traces (copies) must be eliminated in the phonological component before Linearization.

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