



Tonal Association in Brazilian Portuguese Compounds



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Introduction

- 1. The prosodic units that **must** bear pitch accent (PA) vary crosslinguistically: - Standard European Portuguese -> (i) the head of the intonational phrase (I) always bears PA; (ii) other PWs, including the heads of phonological phrases (ϕ) , are often not assigned PA, except in I-initial position – e.g. Frota 2000, Elordieta, Frota & Vigário 2005
 - Spanish and Cairen Arabic → every PW tends to bear PA e.g. Elordieta, Frota & Vigário 2005, Hellmuth 2007
- 2. In at least some languages where a weak PW within ϕ may bear a PA, compounds formed of more than one PW have been reported to allow only one PA, assigned to the stressed PW of the compound (e.g. English, Dutch and Swedish – Ladd 1996, Gussenhoven 2004, Bailey 1990)

Vigário (2009, to appear) proposes that in these languages the domain for PA assignement is the Prosodic Word Group (PWG) instead of the PW, as depicted in (1)

PWs PWw T* green house

(the PA goes to the head of the PWG, corresponding in these languages to the initial PW)

- 3. Tonal assignment in Brazilian Portuguese (BP):
- the head of every φ tends to bear a PA (Frota & Vigário 2000, Tenani 2002, Fernandes 2007a, b)
- instances of PWs with PA within ϕ in non-head position have also been reported (Fernandes 2007a, b, Tenani & Fernandes-Svartman 2008) - optional initial (H) tones also reported in these studies; crucially, initial tones are sensitive to the distance between the beginning of the word and primary stress:

professor (2 pretonic σs)

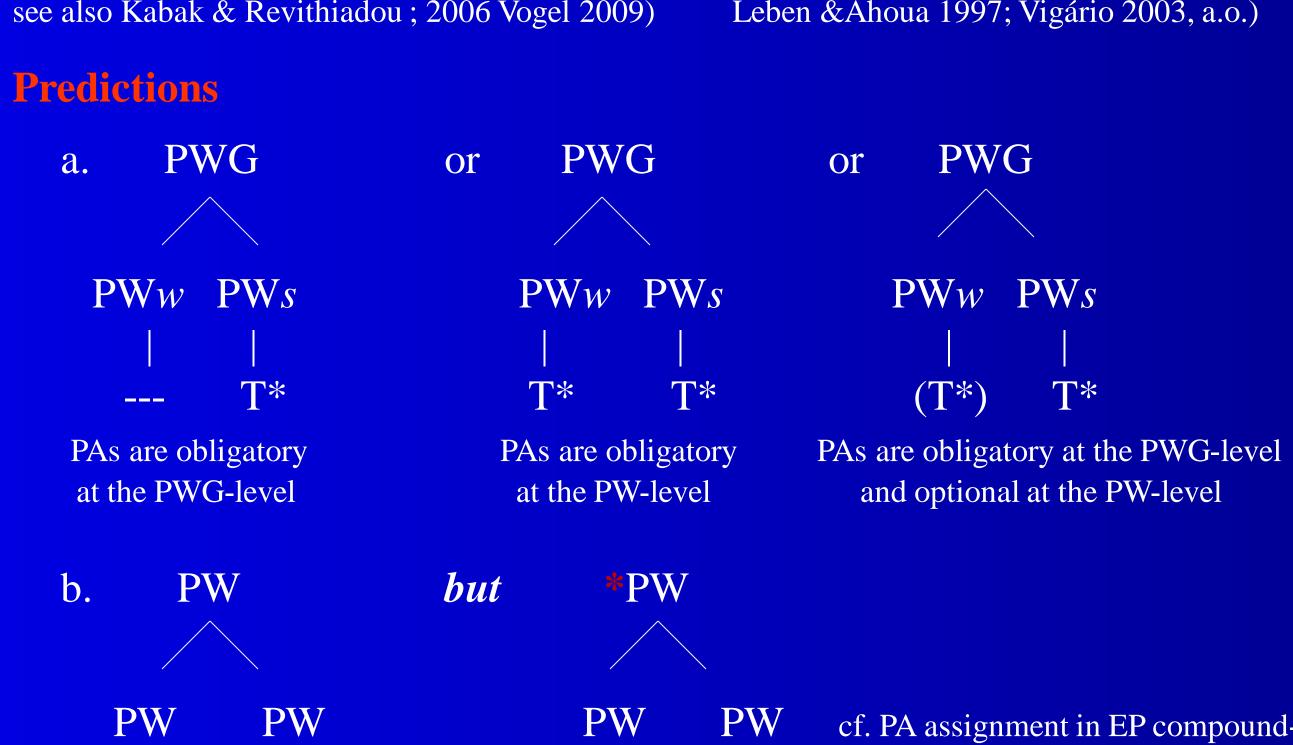
governador (3 pretonic σs)

PWG

Goal

- 1. To test the domain for PA assignment in BP, with a special focus on prosodic compounds (words formed of two or more PWs)
 - → Is a PA assigned to both PWs of compounds or to a single PW (the compound's head)?
 - \rightarrow Are PAs obligatory at prosodic levels lower than ϕ ?
- 2. To test 2 competing analysis on the nature of the groupings of PWs within prosodic word compounds: a proper prosodic domain (PWG) or recursive PWs?

PWG PW (Vigário 2009, to appear; (McCarthy & Prince 1994; Booij 1995; see also Kabak & Revithiadou; 2006 Vogel 2009) Leben & Ahoua 1997; Vigário 2003, a.o.)



cf. PA assignment in EP compound-Is: obligatory at the I-level, whether or not I is internal to a compound domain PAs are obligatory (Frota 2000)

Method

- Corpus of sentences with morphosyntactic words composed of 2 (more in the case of acronyms) PWs; 30 isolated sentence read twice by 3 female speakers of BP from Campinas, São Paulo, aged 20-23 (total of 180 sentences=30x2x3)
- 20 of the sentences include morphosyntactic words containing two PWs (e.g. guarda-costas 'bodyguard' ((guarda)_{PW}(costas)_{PW})_{PWG/PW}); the compound constituent varies in sentence position (initial/final) and size (short = 5σ /long= 9σ , including possible clitics) + 7 sentences with acronyms and 3 with proper names composed of two nouns introduced for exploratory purposes
- Sentences read randomly, with 10 additional filler sentences
- Corpus adapted from the *Romance corpus* (Elordieta et al. 2003, Frota et al. 2007): all **SVO** sentences, according to the conditions given in (2) (prosodic compounds in small caps and PW stressed syllables in boldface)

'The bodyguard despised disloyalties'

'The teenagers opened the luggage carrier'

'The vice-dean promotes short contests'

'The German-Asian judged minors'

(2) Short branching SU (4 sentences)

O GUARDA-COSTAS menosprezava deslealdades Short branching O (4 sentences) As jovens abriram o PORTA-MALAS. Short branching SU and O (2 sentences) O VICE-REITOR promove MINI-TORNEIOS. Long branching SU (4 sentences)

O GERMANO-ASIÁTICO julgava menores. Long branching O (4 sentences)

Os homens temiam o MACRO-ENDIVIDAMENTO. 'The men fiered great indebt' Long branching SU and O (2 sentences) O HISPANO-IRANIANO saía do MACRO-ENDIVIDAMENTO. 'The hipanic-iranian escaped a great indebt'

Acronyms with 2, 3 & 4 letters (=PWs), initial and final position (7 sentences) O SMS (ESSE EME ESSE) anima o menino 'The SMS cheers the boy' Initial and final proper names (3 sentences) 'Lara Ramos praised Milena Morais' A LARA RAMOS elogiava MILENA MORAES

• Recorded sentences tonally transcribed by the two authors, separately

• Tonal transcription: F0 contours and spectrograms + perception, using *Praat* (Boersma & Weenink 2009); autosegmental-metrical approach to intonation (e.g. Pierrehumbert 1980, Beckman & Pierrehumbert 1988, Ladd 1996/2008, Jun 2005)

Results

Note: only PAs identified by the two transcribers are considered

- 1. PA distribution in ϕ s containing non-branching PWGs (=non-compound words, e.g. *vírus* 'virus')
- → 100% of the sentences show a PA in the head of I (=final \$\phi/PWG\$ of the sentence), as expected (total number of sentences in this condition=78)
- $(...((menosprezava)_{PWGw} deslealdades)_{PWGs})_{ds})_{I}$



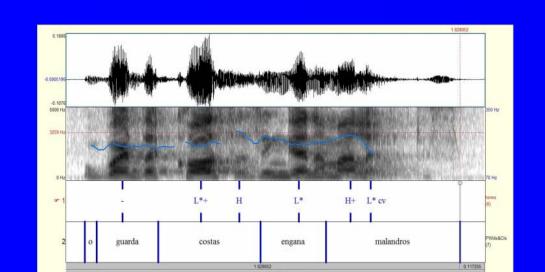
→ 97.2% of the sentences show a PA in the head of \$\phi\$s in I-initial position (total number of sentences in this condition=72)

 $((As jovens_s)_{\phi_W} (abriram_s)_{\phi_W}...)_I$

- \rightarrow 86% of ϕ s in I-internal position are pitch accented NB: Only 5.3% of the sentences in this condition were marked by **both** transcribers without PA; also: all \(\phi \) in this condition are non-branching, which may explain the drop in PA assignment/transcription (total number of φs in this condition=150)
- $((...)_{\phi_W} (promove_s)_{\phi_W} (...)_{\phi_S})_I$

- → Most importantly, 100% of non-branching PWGs in ϕ weak **position** bear a **PA** (total number of PWGs in this condition=30)
- $(...(julgava_w menores_s)_{\phi s})_I$

- 2. Initial H(+L) in non-branching PWGs (1st or 2nd σ of PW) \rightarrow 28% of the PW with 3 pretonic σs (plus possible clitics) (N=120); only 2 cases out of 126 tokens with 1 pretonic σ and 3 out of 42 tokens with 2 pretonic σ s
- 3. PA distribution in \$\psi\$s containing branching PWGs (=compound words,
- like *mini-torneios*) by position and size condition
- 3.1. **I-initial** position & **short** branching PWG
- \rightarrow the head of PWG=head of ϕ always bears PA (N=24)
- → the non-head of PWG only bears PA in 8.3% of the sentences (N=24) NB: distance from the beginning of PWG $/\phi$ /I to the head of the PWG/ ϕ =4 σ



 $((O guarda_w - costas_s)_{PWGs})_{\phi}$

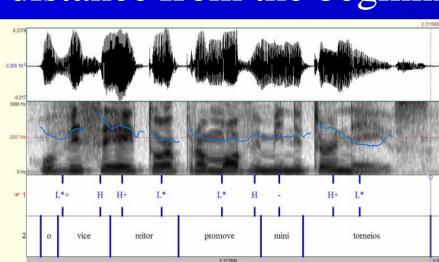
Figure 1. F₀ contour of the sentence *O guarda-costas engana malandros* 'the bodyguard deceives rogues', produced by speaker N.

Results (contd.)

at the PW-level

- 3.2. I-initial position & short branching PWG & double-branching condition (both SU and O formed of branching PWGs)
- \rightarrow the head of PWG=head of ϕ always bears PA (N=12)
- \rightarrow the non-head of PWG bears PA in 92% of the sentences (N=12) !Reversed pattern!

NB: distance from the beginning of PWG $/\phi$ /I to the head of the PWG/ ϕ =5 σ



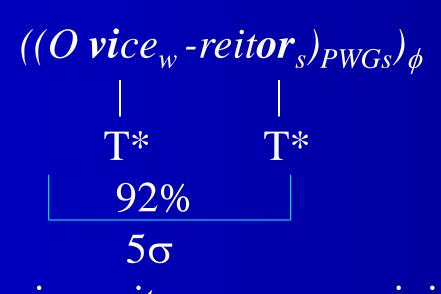


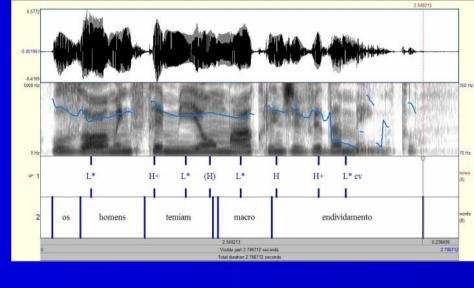
Figure 2: F₀ contour of the sentence O vice-reitor promove mini-torneios 'the vice-dean promotes short contests', produced by speaker K.

- 3.3. I-initial position & long branching PWG (including double branching) $(((O germano_w - asiático)_{PWGS})_{\phi w}...)_I$ \rightarrow the head of PWG=head of ϕ
- always bears PA (N=36) → the non-head of PWG bears PA in 61.1% of the sentences (N=36)
 - 61%
- 3.4. **I-final** position & **short** branching PWG (including double branching) \rightarrow the head of PWG=head of ϕ =head of I always bears PA (N=36)
- → the non-head of PWG bears PA in 44.4% of the sentences (N=36)

 $(...(oporta_w-malas_s)_{PWGs})_{\phi s})_I$ 44%

Figure 3. F_0 contour of the sentence As jovens abiram o porta-malas 'the teenagers opened the luggage carrier', produced by speaker K.

- 3.5. **I-final** position & **long** branching PWG (including double branching)
- \rightarrow the head of PWG=head of ϕ =head of I always bears PA (N=36)
- → the non-head of PWG bears PA in 69% of the sentences (N=36)



 $(...((o\ macro_w-endividamento_s)_{PWGs})_{\phi s})_I$ 69%

Figure 4. F_0 contour of the sentence Os homens temiam o macroendividamento 'the men feared great indebt', produced by speaker G.

- 4. Optional PW(G) initial tonal marking
- \rightarrow Initial H(L) may occur in the second member of the prosodic compound $(do\ macro-endividamento)_{PWGs})_{\phi s})_{I}$

http://www.fl.ul.pt/LaboratorioFonetica

Results (contd.)

- \rightarrow H(L) is found in 44% of the cases where PW contains 4 pretonic syllables (N=18) \rightarrow by contrast, H(L) is never found in PWs with 2 pretonic syllables (N=42), and only 2 cases are attested in PWs with 3 pretonic syllables (N=34)
- 5. Acronyms tendency for PAs in alternating syllables \rightarrow final PWs always bear PA and the prenultimate PW most often does not (88%); in 3 and 4 letters acronyms, PAs are aften associated with the antepenultimate PW (58%, and 100% considering data from at least one transcriber)
- 6. Proper names each noun tends to bear a PA (71%)

Discussion

- 1. > Every PWG tends to have a PA (above 90%)
- > Every PW that is the head of a prosodic constituent tends to bear a PA (idem)
- 2. Every PWG that is formed of a single PW (non-branching PWGs) in φ weak position bears a PA (100%) This contrasts with PWs in weak position of branching PWGs, where PA is
- optional, and less frequent when the PWG is shorter (30% when the distance from the beginning of the PWG to the head is less than $5\sigma s$) 3. There is a size effect: PWs in weak position of long branching PWGs attract
- significantly more PAs than those in the same position of short branching PWGs (65% vs 30%) No such effect is found in PWs that bear PWG prominence, wheather branching
- (mini-torneio) or non-branching (abriram), where PAs are obligatory 4. There seems to be a preference for having a PA at the beginning of I (and also
- possibly lower domains) within a 4-syllable-window 5. Initial H(+L) seems to mark PW rather than PWG initial position since it is often
- found at the beginning of the second PW of a branching PWG 6. Different metrics for the occurrence of initial tonal marking: at the beginning of a PWG=1PW (i.e. a non-branching PWG) H(L) is frequent in PWs with 3 pretonic σ s (28%); in PWG internal position H(L) only becomes frequent when the second
- marking of PW=4 pretonic σs 7. PA assignment shows that the internal members of branching PWGs are PW and not demoted constituents: they may bear PA and not just initial tonal marking like long words; the presence of PW initial tonal marking also shows the same

PW has 4 pretonic σ s (44%) \rightarrow initial marking of PWG=3 pretonic σ s; initial

8. Acronyms (unlike proper names) pattern like branching PWGs and show maximal size restrictions: 2 PW=1PWG; >2 PW → split into 2PWGs.

Conclusions

- 1. The domain of obligatory PA assignment in BP is the PWG
- 2. PA is optional at the PW level, and dependent on specific metrics
- 3. A difference in *kind* between the PWs inside a prosodic compound and the node that dominates them
- The prosodic domain that groups prosodic compounds is not a recursive PW, but rather an independent prosodic domain PWG