P-ToBI: main issues and application to four varieties of EP
Overview

- Variation in EP
- Previous work on EP prosody
- Prosodic features of SEP
  - Phrasing
  - Intonation
    (i) tonal density per sentence type
    (ii) intonational typology (NPAs and boundaries)

- Preliminary data on two Southern varieties
  - Production
    (i) parameters analysed
      intonational typology
      tonal density/sentence type specific tonal events
    (ii) results and main questions

- Perception
  Experiment 1: pragmatic meaning
  Experiment 2: sentence type

- Sum up
Variation in EP (continental)

- **Southern varieties**
  - Trás-os-Montes and Alto Minho
  - Baixo Minho (Braga is already analysed – cf. NEP data and results), Douro and Beiras

- **Central-Southern varieties**
  - Littoral Centre
  - Interior Centre and South
  - Areas with peculiar features

Previous work on EP prosody

- Viana (1987):
  - the first work on the intonation on EP that combines the goal of providing a phonological description with the goal of presenting phonetic evidence for the intonational categories;
  - the first one to deal with the formation of prosodic domains in EP although there is no clear phonological and/or phonetic evidence for the domains proposed.

- In the 90s:
  - several authors have mainly described the intonation of declaratives (Frota 1993, 2000; Falé 1995; Vigário 1997, 1998; Frota & Vigário 2000);
Previous work on EP prosody

- Last decade:
  - emergence of crucial analyses considering typology of pitch accents and edge tones, association and alignment of tonal events with the segmental string and scaling (Frota 1997b, 2000, 2002a, b, 2003; Grønnnum & Viana 1999; Frota et al. 2007);
  - the effects of focus; prosodic phrasing above the word level (Frota 2000, 2002c);
  - PW and the phrasing between the word and the PhP (Vigário 2003).

- More recently:
  - extension of the analysis to other sentence types, namely intonation of questions, imperatives and calling contours, and to different varieties of Portuguese (Frota 2002b; Frota & Vigário 2000, 2007; Tenani 2002; Vigário & Frota 2003; Fernandes 2007; Cruz 2010);
Prosodic features of SEP

- **Phrasing** - Intonational Phrase (IP) is the strongest constituent of the prosodic hierarchy (Vigário 1998, Frota 2000, 2003). Differently from the Phonological Phrase (PhP) – immediately below IP – the IP is the domain for:

  - *sandhi* phenomena (fricative voicing, vowel deletion, etc.);
  - pre-boundary lengthening;
  - its edge is the locus for potential occurrence of pauses;
  - minimal tune:
    (i) only the IP-head must be pitch-accented (NPA) and only its right-edge requires tonal boundary marking;
    (ii) its left edge is optionally signalled by an initial H tone.
Prosodic features of SEP

- **IP mapping (syntax-prosody):** IPs are mapped from root sentences, thus subjects, verbs and objects are usually grouped together in the same IP [(SVO)], except for long subjects (+ than 8 syllables), which tend to form a single IP [(S)(VO)] – Elordieta et al. 2005.

- **Tonal density:** only 17-27% of IP-internal stressed syllables are pitch accented – corpus of utterances with 3 to 8 PWs (Vigário & Frota 2003).

- **Intonational typology (nuclear contours)**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Declarative</th>
<th>Wh- question</th>
<th>Yes-No question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Broad Focus</td>
<td>Narrow Focus</td>
<td>Broad Focus</td>
</tr>
<tr>
<td>SEP</td>
<td>H+L*L̂i</td>
<td>H*L̂</td>
<td>H+L<em>L̂ or L</em>Hi</td>
</tr>
</tbody>
</table>

*Table 1* – Declarative and Question nuclear contours (with broad and narrow focus) in SEP.
Prosodic structure (relevant to intonation)

- Dissociation between boundary type (constituent) and BI (level of phrasing): 1 level of constituency (but possibly 2 of phrasing, in compound phrases) ≠ Cat_ToBI: 2 levels of constituency (and phrasing – ip and IP).

**Figure 1** – Neutral declarative (with parenthetical) in SEP (Frota 2010, Workshop on Cat_ToBI).
Prosodic variation in EP: NEP (Braga)

- Studies on prosodic variation in EP are still incipient. Besides Standard European Portuguese (SEP), only a Northern variety from the region of Braga (NEP) was investigated by Vigário & Frota (2003). The authors have compared both varieties and they have shown that:
  - the two varieties are intonationally different (although narrow focus remains to be analyzed in NEP);

<table>
<thead>
<tr>
<th>Variety</th>
<th>Declarative</th>
<th>Wh- question</th>
<th>Yes-No question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Broad Focus</td>
<td>Narrow Focus</td>
<td>Broad Focus</td>
</tr>
<tr>
<td>NEP</td>
<td>L* Li</td>
<td>----</td>
<td>L* H·Li</td>
</tr>
<tr>
<td>alternative</td>
<td>----</td>
<td>----</td>
<td>H+L* Hi</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 – Declarative and Question nuclear contours (with broad focus) in NEP.

- intonational phrasing is a further dimension of variation – in NEP declaratives usually form 2 IPs [(S) (VO)];
- there is a prosodic similarity between NEP and Spanish (and other Romance languages).
Preliminary data on 2 Southern varieties: Production

- Geographical distribution:
  - Beja district (1 area → Castro Verde)
Preliminary data on 2 Southern varieties: Production

- Geographical distribution
  - Faro district (1 area → Albufeira)
Preliminary data on 2 Southern varieties: Production

- Our goals:
  - to provide a description of the intonation of...
    - declaratives (with broad and narrow focus);
    - yes-no questions (with broad and narrow focus);
    - wh-questions;
    - calling contours;
  
  2 Southern varieties (ALE – Alentejo and ALG – Algarve)

- Parameters analysed:
  - intonational typology
  - tonal density per sentence type
  - specific tonal events
Preliminary data on 2 Southern varieties: Production

- Speakers:
  - 2 from ALE
  - 2 from ALG
  - 25-35 years old

- Corpus (Frota 2000; D’Imperio, Elordieta, Frota, Prieto & Vigário 2005): 34 sentences (33 IPs/85 PhPs) read in random order (3x) manipulated in terms of:
  - sentence type;
  - pragmatic mean (broad and narrow focus);
  - length;
  - stress position in the nuclear word controlled for both types of questions.

<table>
<thead>
<tr>
<th>Sentence Type</th>
<th>Length</th>
<th>Pragmatic Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declarative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-branching</td>
<td>SSS</td>
<td>Broad and Narrow Focus</td>
</tr>
<tr>
<td>Non-branching</td>
<td>LLL</td>
<td></td>
</tr>
<tr>
<td>Non-branching</td>
<td>SLL</td>
<td></td>
</tr>
<tr>
<td>Non-branching</td>
<td>LSS</td>
<td></td>
</tr>
<tr>
<td>Non-branching</td>
<td>LLS</td>
<td></td>
</tr>
<tr>
<td>L double branch</td>
<td>N-AP-PP SS</td>
<td></td>
</tr>
<tr>
<td>L double branch</td>
<td>N-AP-PP LL</td>
<td></td>
</tr>
<tr>
<td>L double branch</td>
<td>N-AP-PP SL</td>
<td></td>
</tr>
<tr>
<td>L double branch</td>
<td>N-AP-PP LS</td>
<td></td>
</tr>
<tr>
<td>L double branch</td>
<td>N-AP-PP LN-AP-PP</td>
<td></td>
</tr>
</tbody>
</table>
Preliminary results on 2 Southern varieties: Production

Declarative with broad focus

**Figure 2** - Declarative with broad focus (long subject) in ALE. ‘The Brazilian girl megalomaniac boyfriend looked at the dark-haired women’.

**Figure 3** - Declarative with broad focus (long subject) in ALG. ‘The Brazilian girl megalomaniac boyfriend looked at the dark-haired women’.

**ALE** -> **L* Li** (= NEP)

**ALG** -> **(H+)L* Li**

(≠ SEP e ≠ NEP)
Preliminary results on 2 Southern varieties: Production

Figure 4 – Declarative with broad focus (long subject) in SEP (Viana & Frota 2007). ‘The daughter-in-law of mother talked about the boyfriend’.

SEP -> H+L* Li
Preliminary results on 2 Southern varieties: Production

Figure 5 – Yes-No question with broad focus in ALE (N). ‘Has she gone to see de sea?’

ALE -> L* Li
(= neutral declarative)

Figure 6 – Yes-No question with broad focus in ALG (H). ‘Has she gone to see de sea?’

ALG -> L*+H HLi
(≠ SEP -> H+L* LHi)
Preliminary results on 2 Southern varieties: **Production**

Yes-No question with broad focus

- Nuclear contours and boundary tones

- NEP: L* H L%
- SEP: H+L* L H%
- ALE: L* L%
- ALG: L*+H H L%
Preliminary results on 2 Southern varieties: **Production**

**Figure 7** – Wh- question in ALE (N). ‘When do you go to the cinema?’

**Figure 8** – Wh- question in ALG (H). ‘When do you go to the cinema?’

**ALE**

ALE -> (H+)L* Li
(≠ SEP -> H+L* Li)

**ALG**

ALG -> H+L* Li
(= SEP -> H+L* Li)
Preliminary results on 2 Southern varieties: Production

Wh-question

- Nuclear contours and boundary tones

- NEP

- SEP

- ALE

- ALG
Preliminary results on 2 Southern varieties: Production

Declarative with narrow focus

**Figure 9** – Declarative with narrow focus in ALE (N). ‘The Bolivian girl MEMORIZED dilemmas’.

**Figure 10** – Declarative with narrow focus in ALG (C). ‘The Bolivian girl MEMORIZED dilemmas’.

ALE $\rightarrow$ H*+L

(= SEP $\rightarrow$ H*+L)

ALG $\rightarrow$ H*+L

(= SEP e ALE)
Preliminary results on 2 Southern varieties: Production

**Figure 11** – Focused yes-no question in ALE (D). ‘Did the boys buy SLIDES (for the microscope)?’

**Figure 12** – Focused yes-no question in ALG (C). ‘Did the boys buy SLIDES (for the microscope)?’

ALE -> L*+H HLi

ALE - SEP e = ALG

ALG -> L*+H HLi

ALG - SEP e = ALE
Preliminary results on 2 Southern varieties: Production

**Figure 13** – Calling contour in ALE (D). ‘John!’

**Figure 14** – Calling contour in ALG (C). ‘John!’

- ALE -> H* !Hi
  (= SEP e = ALG)

- ALG -> H* !Hi
  (= SEP e = ALE)
## Preliminary results on 2 Southern varieties: Production

- **Tonal density per sentence type**

### Table 3

<table>
<thead>
<tr>
<th>%PA/PW</th>
<th>N</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declarative</td>
<td>95%</td>
<td>117%</td>
</tr>
<tr>
<td>Yes-No question</td>
<td>44%</td>
<td>0%</td>
</tr>
<tr>
<td>Wh- question</td>
<td>48%</td>
<td>19%</td>
</tr>
</tbody>
</table>

**Table 3** – Pitch Accent distribution per sentence type, in ALE. PA = excluding nuclear PAs and initial peaks.

### Table 4

<table>
<thead>
<tr>
<th>%PA/PW</th>
<th>C</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declarative</td>
<td>87%</td>
<td>87%</td>
</tr>
<tr>
<td>Yes-No question</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>Wh- question</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Table 4** – Pitch Accent distribution per sentence type, in ALG. PA = excluding nuclear PAs and initial peaks.

**ALE** ≈ 1 PA per non-nuclear PW (NEP e ≠ SEP)

**ALG** -> sparse distribution in questions (= SEP), but dense in declaratives (NEP e = ALE)
Preliminary results on 2 Southern varieties: Production

There is a variety specific tonal event (Lp), which signals the left edge of the last PhP of the IP (even when a sentence is composed by 2 IPs). It may also occur in the left edge of both the penult and the last PhPs of the IP.

Specific tonal event (Lp).

ALE ≠ SEP e ≠ NEP

No evidence for Lp occurrence.

ALG = SEP e ≠ ALE

Figure 2 - Declarative with broad focus (long subject) in ALE (D). 'The Brazilian girl megalomaniac boyfriend looked at the dark-haired women'.
Preliminary results on 2 Southern varieties: from production to perception

- Declarative:
  L* Li (ALE)
  (H+)L* Li (ALG)
- Yes-No question:
  L* Li (ALE)
  L*+H HLI (ALG)

  SEP: will it be difficult to distinguish between declaratives and yes-no questions produced by speakers from ALE?

- Decl. with narrow focus:
  H*+L (ALE, ALG e SEP)
- Focused yes-no question:
  L*+H HLI (ALE, ALG e SEP)

  SEP: will it be difficult to distinguish between neutral and yes-no questions produces by speakers from ALG?
Preliminary results on 2 Southern varieties: Perception

- Methodology
  - 29 sentences (wh- questions were excluded), randomized (3x);
  - 13 listeners from SEP;
  - 2 experiments.

  **Experiment 1:**
  - Listeners were indirectly asked to distinguish between broad and narrow focus: they had to choose the most adequate written context - neutral (A) or contrastive (B) - for each sentence they listened to. A and B did not correspond always to the same pragmatic meaning.

  **Experiment 2:**
  - Listeners were directly asked to distinguish between declaratives and questions: A (declarative), B (interrogative), C (I don’t know).
Preliminary results on 2 Southern varieties: Perception

- **Experiment 1: pragmatic meaning (broad vs. narrow focus)**

<table>
<thead>
<tr>
<th>Variety/Speaker</th>
<th>Focus</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decl. %</td>
<td>Interr. %</td>
</tr>
<tr>
<td>ALE_N</td>
<td>194</td>
<td>122</td>
</tr>
<tr>
<td>ALE_D</td>
<td>312</td>
<td>64</td>
</tr>
<tr>
<td>ALE_total</td>
<td>506</td>
<td>186</td>
</tr>
<tr>
<td>ALG_C</td>
<td>176</td>
<td>50</td>
</tr>
<tr>
<td>ALG_H</td>
<td>185</td>
<td>67</td>
</tr>
<tr>
<td>ALG_total</td>
<td>361</td>
<td>117</td>
</tr>
</tbody>
</table>

**Table 5** - % of correct responses given by SEP listeners on Experiment 1.

- neutral sentences are easier recognized than focused sentences (focus is not identified in ALG);
- both pragmatic meanings are easier detected in declaratives.
Preliminary results on 2 Southern varieties: Perception

- **Experiment 2: sentence type (declarative vs. question)**

<table>
<thead>
<tr>
<th>Variety/Speaker</th>
<th>Declarative</th>
<th></th>
<th></th>
<th></th>
<th>Interrogative</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus%</td>
<td>Neutral %</td>
<td>Total %</td>
<td>Focus%</td>
<td>Neutral %</td>
<td>Total %</td>
<td>Focus%</td>
<td>Neutral %</td>
</tr>
<tr>
<td>ALE_N</td>
<td>330</td>
<td>94%</td>
<td>361</td>
<td>93%</td>
<td>691</td>
<td>93%</td>
<td>82</td>
</tr>
<tr>
<td>ALE_D</td>
<td>346</td>
<td>99%</td>
<td>389</td>
<td>100%</td>
<td>735</td>
<td>99%</td>
<td>186</td>
</tr>
<tr>
<td>ALE_total</td>
<td>676</td>
<td>96%</td>
<td>750</td>
<td>96%</td>
<td>1426</td>
<td>96%</td>
<td>268</td>
</tr>
<tr>
<td>ALG_C</td>
<td>346</td>
<td>99%</td>
<td>389</td>
<td>100%</td>
<td>735</td>
<td>99%</td>
<td>188</td>
</tr>
<tr>
<td>ALG_H</td>
<td>347</td>
<td>99%</td>
<td>388</td>
<td>99%</td>
<td>735</td>
<td>99%</td>
<td>182</td>
</tr>
<tr>
<td>ALG_total</td>
<td>693</td>
<td>99%</td>
<td>777</td>
<td>100%</td>
<td>1470</td>
<td>99%</td>
<td>370</td>
</tr>
</tbody>
</table>

**Table 6** - % of correct responses given by SEP listeners on Experiment 2.

- **declaratives are easier detected** than questions (there are problems with the recognition of questions produced in ALE, but the percentage of correct responses is still big);
- the distinction between sentence types does not depend on the pragmatic meaning.
Summary

- **Production:**
  - Nuclear contours per sentence type:

<table>
<thead>
<tr>
<th>Tipo frásico</th>
<th>ALE</th>
<th>ALG</th>
<th>NEP</th>
<th>SEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declarative with broad focus</td>
<td>L* Li</td>
<td>(H+)L* Li</td>
<td>L* Li</td>
<td>H+L* Li</td>
</tr>
<tr>
<td>Declarative with narrow focus</td>
<td>H*+L</td>
<td>H*+L</td>
<td>---</td>
<td>H*+L</td>
</tr>
<tr>
<td>Neutral yes-no question</td>
<td>L* Li</td>
<td>L*+H HLi</td>
<td>L* H Li</td>
<td>H+L* LHi</td>
</tr>
<tr>
<td>Wh- question</td>
<td>(H+)L* Li</td>
<td>H+L* Li</td>
<td>L* Li</td>
<td>H+L* LHi</td>
</tr>
<tr>
<td>Focused yes-no question</td>
<td>L*+H HLi</td>
<td>L*+H HLi</td>
<td>---</td>
<td>L*+H HLi</td>
</tr>
<tr>
<td>Calling contour</td>
<td>H* !Hi</td>
<td>H* !Hi</td>
<td>---</td>
<td>H* !Hi</td>
</tr>
</tbody>
</table>

- **Tonal density per sentence type:**
  - ALE: ≈ 1 PA/non-nuclear PW in all sentence types;
  - ALG: sparse pitch accent distribution in questions but dense in decl.

- **Specific tonal event:**
  - ALE: Lp (left edge of the last PhP of the IP);
  - ALG: no evidence for Lp occurrence.
Summary

- **Perception (SEP):**

  **Pragmatic meaning:**
  - **broad focus:** easier detected than narrow focus [*predicted by production in ALG]*;
  - looking at each pragmatic meaning, **declaratives** are easier recognized than questions.

  **Sentence type:**
  - **declaratives** are easier identified than questions [*predicted by production in ALE]*;
  - the distinction between sentence types does not depend on the pragmatic meaning.
ToBI per sentence type, across varieties

Declarative with broad focus

<table>
<thead>
<tr>
<th>SEP</th>
<th>ALG</th>
<th>ALE</th>
<th>NEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>H+L*</td>
<td>L%</td>
<td>(H)+L*</td>
<td>L%</td>
</tr>
</tbody>
</table>

Declarative with narrow focus

<table>
<thead>
<tr>
<th>SEP</th>
<th>ALG</th>
<th>ALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>H+L*</td>
<td>L%</td>
<td>H*+L</td>
</tr>
</tbody>
</table>

Wh- question

<table>
<thead>
<tr>
<th>SEP</th>
<th>NEP</th>
<th>ALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>H+L*</td>
<td>L%</td>
<td>(H)+L*</td>
</tr>
</tbody>
</table>
ToBI per sentence type, across varieties

Neutral yes-no question

Focused yes-no question

Calling contour
Muito obrigada!
Graciés!
Acknowledgements

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- To Marina Vigário for her precious comments and suggestions.
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