7. Intonational variation in Portuguese: European and Brazilian varieties

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Abstract

This chapter describes the nuclear contours and intonational phrasing patterns of the most common sentence types across varieties of Portuguese. The resulting prosodic analysis is the first contribution to a Portuguese_ToBI proposal that offers a comparative description of four Brazilian Portuguese (Baiano, Mineiro, and the Southeast and South areas of Sulista) and four European Portuguese varieties (Standard European Portuguese, the Northern variety of Oporto and two Southern varieties in Alentejo and Algarve), with the goal of providing a useful foundation for further systematic studies on Portuguese prosody. The analysis is based on data from the Interactive Atlas of the Prosody of Portuguese. Differences in the intonation of narrow focus statements, commands and requests, as well as in the distribution of pitch accents, were found to distinguish Brazilian and European Portuguese. The chapter concludes with an overview of the intonational system of Portuguese and its similarities and differences compared with other Romance languages.

Keywords: Portuguese, Brazilian Portuguese, European Portuguese, intonation, intonational phrasing, Portuguese_ToBI.
7.1 Introduction

An understanding of the intonation system in any language requires a description of the inventory of pitch accents and edge tones, and the meanings they convey in context or usage. The view that the phonological categories of intonation have morpheme-like meanings is common within the Autosegmental Metrical framework (Pierrehumbert and Hirschberg 1990, Hayes and Lahiri 1991, Gussenhoven 2004, Ladd 2008a, among others). Across languages and language varieties, knowing the extent to which the intonational inventory may differ provides crucial information with consequences for phonological theory, typological studies, language teaching and speech communication applications. In this chapter, we examine the nuclear contours and intonational phrasing patterns of the most common sentence-types across varieties of Portuguese from a Romance perspective, on the basis of a common methodology. Pitch accent distribution is also compared across Portuguese varieties and sentence-types. To our knowledge, this is the first large scale in-depth study of intonational variation in Portuguese. The empirical basis for this study comes from the Interactive Atlas of the Prosody of Portuguese speech database, and the analysis presented is developed within the Autosegmental Metrical framework, as in the other chapters of this book. The resulting prosodic analysis is the first contribution to a Portuguese_ToBI proposal that offers a comparative description of varieties of European and Brazilian Portuguese, and may provide a useful foundation for further studies on Portuguese prosody.

The first part of the chapter presents a brief overview of the varieties of Portuguese established on the basis of non-prosodic variation (section 7.1.1), summarizes the main features of the language with respect to stress and prominence, prosodic structure and intonational phrasing, and reviews recent literature on the intonation of Portuguese (sections 7.1.2 to 7.1.7). Section 7.2 deals with the methodology followed including data collection and analysis. In the core part of the chapter (Section 7.3), the intonation of five main sentence-
types – statements, yes-no questions, wh-questions, imperatives and vocatives – is compared in eight Portuguese varieties: four European varieties (Standard European Portuguese, a Northern variety and two Southern varieties) and four Brazilian varieties (along the eastern coast, from Bahia to Rio Grande do Sul). The expression of focus is also considered, as well as the difference between information-seeking and confirmation-seeking questions, commands and requests, and two types of vocatives – the greeting call and the insistent call. Pitch accent distribution for the different sentence-types across varieties is examined (Section 7.4). The chapter concludes with a discussion of the reported findings in the light of the main properties of the Portuguese intonation system, taking into account similarities and differences across Portuguese varieties and between these and other Romance languages.

7.1.1 Varieties of Portuguese

Until recently, most research on the dialectology of Portuguese has focused on segmental phonetic differences and varying lexical choices. For European Portuguese (hereafter EP), the analysis of the continental varieties proposed in Cintra (1971), which has been accepted by most scholars and is used to the present day, distinguishes between two main groups: Northern varieties and Central-Southern varieties (Figure 7.1). The two groups are differentiated by a cluster of phonetic features, with Northern EP displaying the most conservative traits, like the absence of phonological distinction between /v/ and /b/, the presence of /ʃ/, the apical realization of the dental-alveolar fricative (i.e. [ʂ], [ʐ]), or the preservation of /ow/ (Cintra 1971, Segura and Saramago 2001). Some of these features are common to Spanish, like the absence of /v/ or the presence of /ʃ/ and /ʂ/. Standard EP, which corresponds nowadays to a Central-Southern variety, is described in Cintra (1971) as the result of a process of incorporation of innovations and Southern features into the varieties spoken by Northern people as they extended their territory to the South (from the 13th
century onwards). Both Northern varieties and Center-Southern varieties are further divided into two groups each: for Northern varieties, Transmontano and Alto-minhoto, and Baixo-minhoto, Duriense and Beirão; for Center-Southern varieties, Littoral Center, and Interior Center and South.

Figure 7.1 Main varieties of EP, based on Cintra (1971) and Segura and Saramago (2001). The urban locations where the varieties studied in this chapter are spoken are signalled on the map.

For the purposes of the present chapter, four EP varieties have been selected for investigation: the Standard variety and three non-standard varieties, respectively from Oporto in the North and Alentejo and Algarve in the South, which represent regional forms of the standard. Standard EP (SEP), as spoken in Lisbon, joins the Littoral Center group as it shows the preservation of the diphthong /ej/ (realized phonetically as [ɐj]), whereas in the Interior
Center and South group the diphthong is reduced to /e/. The two Southern varieties, as spoken in Castro Verde, Alentejo (hereafter ALE) and Albufeira, Algarve (hereafter ALG), belong to the Interior Center and South group. Finally, the Northern variety as spoken in Oporto (hereafter POR) represents the Northern varieties group (see Figure 7.1). The four varieties considered are all spoken in urban locations: Lisbon, the capital; Oporto, the major city in the North; and two smaller towns in the interior (ALE) and the southern coast (ALG). These four EP varieties were the first to be collected and studied within the Interactive Atlas of the Prosody of Portuguese project (Frota, coord. 2012-2014).

Since the pioneering work by Nascentes (1953), Brazilian Portuguese (BP) varieties have been traditionally divided into two major groups: the Northern varieties, including Amazónico and Nordestino, and the Southern varieties, comprising Baiano, Mineiro, Fluminence and Sulista (Figure 7.2). The main feature differentiating the two major groups is the degree of openness of pretonic vowels, which are low in the North and mid in the South (Nascentes 1953; Cardoso 1986). In the present chapter, four BP varieties were investigated, all from the Southern varieties group, covering an area along the Eastern coast from Bahia to Rio Grande do Sul. Importantly, they have been reported to differ segmentally in various aspects, such as in the realization of intervocalic /t/ and the palatalization of /t,d/ before /i/ (e.g., Ilari and Basso 2009). These four varieties include all the data it was possible to collect and analyze within the Interactive Atlas of the Prosody of Portuguese project by June, 2013. They represent Baiano, as spoken in Salvador, Bahia (BH), Mineiro, as spoken in Belo Horizonte, Minas Gerais (MG), and Sulista, covering the Southeast area and the South area of the Sulista group, respectively as spoken in São Paulo (SP) and Porto Alegre, Rio Grande do Sul (RGS). The South of the Sulista area is known to display particular features, like the absence of /t,d/ palatalization and the presence of posttonic [o, e]. The four BP varieties
studied are all spoken in urban locations and represent regional forms of Brazilian Portuguese.

Figure 7.2 Main varieties of BP, according to Nascentes (1953). The urban locations where the varieties studied in this chapter are spoken are signalled on the map.

Knowledge of the prosodic variation of Portuguese is scant, sketchy, and results from recent developments in the study of Portuguese varieties (see sections 7.1.2 to 7.1.6). It is not known how intonational variation, which was already hinted at by Nascentes in the 1950s for Brazilian Portuguese (more ‘chanted’ in the North, more ‘relaxed’ in the South), and is a matter of common hearsay for European Portuguese (more ‘chanted’ in the South, rather ‘dull’ in Lisbon), systematically relates to the varieties previously described on the basis of non-prosodic variation. We therefore use the previous descriptions as a starting point for the study of intonational variation.
7.1.2 Stress, prominence and rhythm

Understanding intonation requires a description of other prosodic features involved in the organization of speech, namely stress and prominence patterns. For example, pitch accents typically associate with prominent syllables in languages which have stress (Ladd 2008a), and the distribution of tonal events may interact with rhythm (Frota, Vigário and Martins 2002, Dilley and McAulley 2008). In this section, general information on word stress, prominence patterns and rhythm in Portuguese is given.

Word stress in Portuguese may fall on one of the three last syllables in the word (enclitics excluded). For EP, most accounts of word stress agree that morphological information plays a major role in constraining stress location: stress falls on the last vowel of the stem in non-verbs, and on the last vowel of the verbal theme or on the tense marker/theme vowel in verbs (Mateus and Andrade 2000). Unlike in EP, word stress location in BP has been argued to be weight sensitive in non-verbs: stress falls on the word final syllable if it is heavy, and otherwise on the penult syllable (Wetzels 2007, among others). Under stress clash, only in BP may word stress location move its position; in EP the clash is resolved by extra lengthening of the stressed syllable instead (cf. Abousalh 1997, for BP; Frota 2000, for EP).

EP and BP also differ with respect to the distribution of secondary stresses: in BP, as in most other Romance languages, it usually follows a binary pattern, whereas in EP it is mainly a prosodic word initial phenomenon (Collischonn 1994, Frota and Vigário 2000, Vigário 2003a). Vowel reduction, which is a stress-related phenomenon, also distinguishes EP from BP: in EP, the seven vowel stressed system is reduced to four vowels in unstressed position (two of which are usually deleted); in BP, only moderate posttonic reduction occurs (Câmara Jr. 1970, Mateus and Andrade 2000, Vigário 2003a).
Phrasal prominence patterns in Portuguese are mostly Romance-like, since, by default, phrasal prominence is rightmost, that is, the final prosodic word in the phrase is the head and thus bears the nuclear pitch accent (Frota 2000, Tenani 2002). Under narrow or contrastive focus, phrasal prominence falls on the focused constituent, but different strategies tend to be used in the two varieties: in EP, focus prominence has no effect on prosodic phrasing and is signaled by a special pitch accent (Frota 2000); in BP, the EP strategy coexists with a phonological phrasing marking strategy where a prosodic boundary is inserted after the focused word (Fernandes 2007a, 2007b). Shifting the nuclear pitch accent from the default position is thus a common strategy for focus marking in Portuguese (Frota 2000, Fernandes 2007b). In this respect, Portuguese is different from other Romance languages (e.g., Catalan and Spanish, this volume) in the role that accent placement and accent type play in the expression of focus.

Another important distinction between the prosody of EP and BP is the rhythm type at utterance level. Within an approach to linguistic rhythm whereby differences among languages are taken to result from language-specific phonological and phonetic properties (Dauer 1983, Nespor 1990), both EP and BP have been acoustically shown to display mixed rhythms, the latter combining syllable and mora-timing properties and the former syllable and stress-timing properties (Frota and Vigário 2001). However, both varieties seem to be perceived as syllable-timed on the basis of temporal properties alone (as experimentally shown using filtered speech – Frota, Vigário and Martins 2002). Only when intonation is present are EP and BP distinctively perceived, showing that intonation plays a key role in the prosodic difference between EP and BP.
7.1.3 Intonational inventory

Most previous research on the intonation of Portuguese within the Autosegmental-Metrical framework has concentrated on the description of declarative utterances, and has mainly covered data from single varieties, focusing on the Lisbon variety for EP and the S. Paulo and Rio de Janeiro varieties for BP. The analysis of other sentence types and of different varieties with the goal of providing a description of the Portuguese inventory of pitch accents and edge tones, especially by using comparable data and methods, is a fairly recent research endeavour (Frota 2002a, 2014; Frota and Vigário 2000, 2007; Tenani 2002; Vigário and Frota 2003; Fernandes 2007a, 2007b; Moraes 2008; Truckenbrodt, Sândalo and Abaurre 2009; Mata and Santos 2010; Vigário and Fernandes-Svartman 2010; Cruz and Frota 2011, 2012). In this section, we summarize the main contributions from previous research towards a description of the Portuguese intonational inventory.

A thorough intonational phonology analysis of Standard EP is provided in Frota (2014). Ten different tunes were established, on the basis of contextual meaning driven analysis of nuclear contours and their realization patterns (see Table 7.1). Bitonal nuclear accents predominate in SEP, which combine with either simple or complex boundary tones. Tonal alignment is a phonological dimension, as shown by the distinction in meaning between H+L* and H*+L (cf. Frota 2012). By contrast, rising and peak accents seem to be phonetic variants of the same phonological pitch accent (L+)H*. In statements with an early nucleus, the postnuclear stretch shows pitch range compression, but no deaccenting. Intonational meaning distinctions can be conveyed either by contrasting pitch accents, by contrasting boundary tones, or a combination of both. H+L* is by far the most common nuclear pitch accent, used in neutral declaratives, wh-questions, neutral yes-no questions, and final topic phrases. In SEP, tonal patterns are not truncated nor compressed; instead, the segmental string is extended to cope with tonal realization (see section 7.1.6).
The Northern variety of EP studied in Vigário and Frota (2003) and Frota and Vigário (2007), which is the variety spoken in Braga (a city in the interior North), differs from SEP in using L* instead of H+L*. In addition, truncation seems to be possible in this variety. The two Southern varieties studied by Cruz and Frota (2011, 2012) display a different behaviour: the one from the interior (ALE) shares with the Northern variety the use of L*, whereas in the southern coast variety (ALG) mainly bitonal accents are used, liked in SEP. Unlike in the other varieties studied, in ALG focus in yes-no questions is not conveyed by a pitch accent or a boundary tone difference.

Similarly to SEP, H+L* L% is the nuclear contour in Brazilian Portuguese declaratives (Frota and Vigário 2000, Tenani 2002, Fernandes 2007b), as well as the nuclear contour used in wh-questions and commands (Moraes 2008). Narrow/contrastive focus is manifested intonationally either by H*+L, as in European Portuguese, or by a rising accent followed by a low phrasal boundary, and postfocal material exhibits pitch range compression (Fernandes 2007a, 2007b; Truckenbrodt et al. 2009). Unlike in SEP but similarly to other EP varieties, yes-no questions display a rising-falling contour. Bitonal nuclear accents seem to be the only nuclear pitch accent format available in BP, and the low boundary tone prevails. Intonational meaning distinctions are thus mainly conveyed by contrasting pitch accents (Moraes 2008).

Table 7.1 Inventory of tune types in Portuguese.

<table>
<thead>
<tr>
<th>Meaning/usage</th>
<th>SEP</th>
<th>Northern EP</th>
<th>Southern EP</th>
<th>BP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Braga</td>
<td>Interior</td>
<td>Coast</td>
</tr>
<tr>
<td>Declarative</td>
<td>H+L* L%</td>
<td>L* L%</td>
<td>L* L%</td>
<td>H+L* L%</td>
</tr>
<tr>
<td>Declarative</td>
<td>H*+L L%</td>
<td>Not studied</td>
<td>H*+L L%</td>
<td>H*+L L%</td>
</tr>
<tr>
<td>(focused)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuation</td>
<td>L*+H H%</td>
<td>L* H%</td>
<td>Not studied</td>
<td>Not studied</td>
</tr>
</tbody>
</table>
An overview of the Portuguese inventory of nuclear contours is given in Table 7.1.

Despite the still incomplete (and sometimes preliminary) descriptions of the nuclear contours shown by varieties other than SEP, it seems clear that both systemic as well as semantic differences (in the sense of Ladd 2008a) characterize Portuguese varieties. In other words, across varieties within Portuguese differences are found in the inventory of phonologically distinct tunes and in the meaning attributed to a given tune. Building on the account of the intonation system of Standard European Portuguese (Frota 2014) and on the observations across varieties summarized in Table 7.1, our goal is to describe the main tune types for each of the eight Portuguese varieties examined in this chapter and thus contribute to an understanding of the Portuguese intonation system as a whole.
7.1.4 Intonational phrasing

Varieties of Portuguese have been shown to differ in the size of intonational phrases. Specifically, Standard EP is characterized by longer intonational phrases, which may consist of more than nine prosodic words, whereas the Northern variety of Braga tends to show shorter phrases typically with less than three prosodic words (Frota 2014). The differing intonational phrasing patterns are mostly due to the independent phrasing of the subject phrase in the Northern variety, contra the phrasing of the subject phrase together with the verb phrase in SEP (Frota and Vigário 2007). Recent observations suggest that Southern varieties may show either the longer phrases of SEP or the shorter phrases found in the North (Cruz and Frota 2013). The longer intonational phrases that characterize SEP (and possibly other European Portuguese varieties) constitute a distinguishing trait in the Romance space, as Romance languages typically exhibit intonational phrasing patterns with shorter prosodic phrases (D’Imperio et al. 2005, Elordieta, Frota and Vigário 2005).

Standard EP has been analyzed as having only one level of prosodic constituency relevant for intonational structure: the intonational phrase (root sentences are usually mapped into a intonational phrase, and parentheticals, explicative phrases, tags, topics and vocatives form a intonational phrase on their own – see Frota 2000). In SEP, there is no evidence for phrase accents, or for a prosodic phrase smaller than the intonational phrase whose edges are tonally marked (Frota 2000, 2002b). A similar claim has been made for Brazilian Portuguese (Tenani 2002, Moraes 2008). However, unlike in the European varieties of Portuguese studied so far, in BP narrow focus may be manifested by the presence of a low phrase boundary associated to the right edge of the phonological phrase that contains the focused element (Fernandes 2007a, Tenani and Fernandes-Svartman 2008).
7.1.5 Pitch accent distribution

One of the distinguishing properties of Standard EP, in particular among Romance languages, is the sparse distribution of pitch accents within the intonational phrase (Frota 2000, 2014). Indeed, this is one of the features, together with the distribution of secondary stresses and the mixed rhythmic pattern (see section 7.1.2 above), as well as the size of prosodic phrases (section 7.1.4), that makes SEP prosody atypical in the Romance space. The sparseness of pitch accents results from the combination of longer phrases with the domain targeted for pitch accent distribution (in the sense of Hellmuth 2007, who proposed that languages may select different levels of the prosodic hierarchy as the domain for pitch accent distribution).

Descriptively, pitch accents in SEP mostly occur near the edges of intonational phrases, and phrase-internal prosodic words are frequently unaccented (Frota 2000). The relevant domain for pitch accent distribution in SEP is thus the intonational phrase. Other varieties of Portuguese show a richer distribution of pitch accents, either because the size of the phrases is smaller and/or the domain governing pitch accent distribution is lower in the prosodic hierarchy. For example, in the Northern variety of Braga not only are intonational phrases smaller but most phrase-internal prosodic words get a pitch accent (Vigário and Frota 2003); and in the data reported so far for the Southern variety of ALG most phrase-internal prosodic words get a pitch accent although phrases are longer (Cruz and Frota 2013). In BP, almost every prosodic word is pitch accented (Frota and Vigário 2000, Tenani 2002, Fernandes 2007b, Tenani and Fernandes-Svartman 2008, Vigário and Fernandes-Svartman 2010).

Apart from showing a pitch accent in the stressed syllable, in BP an additional tonal event may occur in pre-tonic syllables in longer words (Frota and Vigário 2000, Tenani 2002, Vigário and Fernandes-Svartman 2010). This tonal event can be attracted to a syllable bearing secondary stress, and contributes to the Low-High alternating tonal pattern typically present in descriptions of BP intonation. Taken together, the presence of one pitch accent per word
and the additional tonal event in longer words are important factors in the prosodic distinction between BP and EP, and in the contribution of intonation to the rhythmic contrast between the two varieties (see section 7.1.2).

By and large, pitch accent distribution sets Standard EP apart from other Portuguese varieties, as well as from other Romance languages (Frota 2002a, Hualde 2002).

7.1.6 Phonetic implementation of intonation

In previous studies on Portuguese intonation, several factors have been shown to constrain the phonetic realization of tonal contours, namely their alignment patterns. Most descriptions so far were based on Standard EP data, although a few cross-variety observations were reported.

The alignment patterns of high tones are affected by their proximity to a prosodic edge. Initial peak displacement was described for SEP (Frota 2000, 2002b), following a tendency for late initial peak placement found in many other languages (e.g., Silverman and Pierrehumbert 1990, for English; Prieto, van Santen and Hischberg 1995, for Spanish). Early peak alignment was also found when a prosodic edge follows, particularly in the case of the H*+L nuclear accent (Frota 2002b). Although early alignment in this particular case may also be seen as resulting from a tonal crowding effect, no other instances of tonal crowding effects were reported for SEP. Due to the sparse pitch accent distribution that characterizes the Standard variety, tonal crowding situations usually only arise in nuclear contours. However, in such circumstances tune-text accommodation is obtained by extending the segmental string, and not by adjusting the tonal string (Frota 2002a, 2014).

Varieties of Portuguese may differ in their alignment tendencies. Realizational differences in alignment were reported for low starred tones in SEP and the Northern variety of Braga, with the low aligning later in the Northern variety (Vigário and Frota 2003).
Furthermore, varieties of Portuguese may also differ in the strategies used for tune-text accommodation. In the Northern variety, tonal crowding may lead to truncation of the last tone in the nuclear contour (truncation of L in L* HL%, the yes-no question contour - Vigário and Frota 2003), whereas in Southern varieties, as in SEP, it is the segmental string that is extended to cope with tonal realization (by means of vowel lengthening or vowel epenthesis – Cruz 2013).

7.1.7 Summary
Although prosodic variation in Portuguese was not a major focus of research until recently and previous studies on the subject are limited, it seems evident that Portuguese varieties may differ in several dimensions of variation: inventory of pitch accents and boundary tones, patterns of intonational phrasing, pitch accent distribution, and issues of tonal realization. In the present chapter, we will focus on the first three dimensions, while taking into account the fourth in the proposed analysis of intonation contours. Beyond these differences, it seems also clear that Portuguese varieties share a basic prosodic system: right-headed prosodic phrases with which events in the tonal string relate; two main types of tonal events, namely pitch accents and boundary tones; and one level of prosodic constituency relevant to intonational structure, i.e. boundary tones typically mark intonational phrase edges. This proposal will be tested in the present chapter.

7.2 Methodology
The empirical basis for this investigation is the data collected within the Interactive Atlas of the Prosody of Portuguese project (InAPoP – Frota, coord. 2012-2014). For the purposes of this chapter, for each region we used data from three educated women aged between 20 and 45, responding to the Portuguese version of the Discourse Completion Task (henceforth DCT
– see Blum-Kulka, House and Kasper 1989, Billmyer and Varghese 2000, Félix-Brasdefer 2010), which was adapted from the questionnaire initially used for Catalan (Prieto 2001, Prieto and Cabré 2007-2012). The DCT was used for all languages included in this book, and therefore the elicitation methodology for the core set of the Portuguese data analyzed in this chapter is common to that applied to all nine languages described in this volume.

The InAPoP project aims at providing a detailed description of prosodic variation in Portuguese, including prosodic phrasing, intonation and rhythm. The speech database collected results from a multitask corpus (reading, DTC, map task and conversation) produced by female speakers. For each region studied, subjects were video-recorded (in the case of EP) or audio-recorded (in the case of BP) *in loco*, by native speakers of the variety (either one of the authors or a researcher accompanied by a local collaborator who contacted subjects and interacted with them). Audio was extracted from the video files (using AoA Audio Extractor Basic, version 2.3.5), and the audio files were then segmented per utterance and labeled. The speech data were orthographically and phonetically transcribed, and prosodically analyzed. Praat (Boersma and Weenink 2012) was used for file segmentation and prosodic analysis. For each sound file, prosodic analysis included a tonal tier and a boundary level tier where prosodic constituency relevant to intonation was represented.

Due to lexical and syntactic differences between European and Brazilian varieties, one European and one Brazilian Portuguese version of the DCT were constructed. These versions included the 31 different situations common to all discourse completion tasks used in this book, plus six new ones added to obtain utterances of different sizes and/or with nuclear words of different length. This survey of situations was orally presented by an interviewer and occasionally supported by images. An example from the European Portuguese DCT is provided in (1). Subjects responded to the DCT three times in different orders of presentation of the 37 items. A total of 24 interviews were conducted, with a total of 2664 utterances.
collected (24 subjects x 37 situations x 3 orders of presentation). The Portuguese versions of the DCT can be accessed online from the *Interactive Atlas of the Prosody of Portuguese web platform* (Frota and Cruz 2012-2014), as well as sound examples from the DCT for all the regions together with their respective prosodic analysis. The sound files for the examples used in this chapter can be found on the OUP companion website for this book.

(1) Interviewer: Sabes o que aconteceu a estes dois?
‘Do you know what happened to them?’
(Eles) Casaram
‘(They got) Married’

As the DCT did not include enough items with varying number of syllables before and after the nuclear syllable, the core set of data analyzed was extended and checked with additional data from other tasks in the corpus (namely the reading task and the map task), especially in the case of varieties whose intonation was here examined for the first time. Thus, an additional set of 330 utterances from the reading task and the map task were analyzed. The description presented in the next section focuses on a qualitative analysis of the predominant nuclear contours found across subjects within a given sentence-type, for each of the eight varieties examined.

7.3 Main intonation contours across eight varieties of Portuguese

The intonation of five main sentence-types – statements, yes-no questions, wh-questions, imperatives and vocatives – was compared across Portuguese varieties. The expression of focus was also considered, as well as the difference between information-seeking and confirmation-seeking questions, commands and requests, and two types of vocatives (the
greeting call and the insistent call). We draw on the account of the intonation system of Standard European Portuguese proposed in Frota (2014), and on the observations across varieties summarized in Table 7.1 above. Furthermore, we employ as a starting point the nuclear contour realization shapes given by Frota (2014), and adapted in Table 7.2.

Table 7.2 Realization of main nuclear contours in SEP: prenuclear (in white), nuclear (light grey), postnuclear (in white), and boundary (dark grey) syllables. Falling/Low accents in first row; Rising/High accents in second row. The ‘…’ indicate that there is more material between pitch accent and boundary (i.e., the pitch accent is an early nucleus).

One of the central goals of the present volume is to provide a unitary analysis of the same prosodic contrasts that exist across Romance languages (see Chapter 1). Therefore, the analysis of a specific language/variety, which is necessarily driven by system-internal considerations, should also take into account the ability to do cross-language comparisons. Our aim is to capture the intonation system of each Portuguese variety, and thus prosodic transcription, used as an analytical tool, should give us the categorical entities that compose that system.
7.3.1 Statements

In this section, the intonation of statements is described, and it is examined whether and how nuclear contours encode the semantic/pragmatic information of focus across Portuguese varieties.

7.3.1.1 Broad focus statements

Broad focus statements are uttered as all-new sentences generally produced with neutral declarative intonation (see the example in (2) taken from the European Portuguese discourse completion task, as all other examples in section 7.3).

(2)  [Interviewer: Olha para o desenho e diz-me o que a mulher faz. ‘Look at the picture and tell me what she is doing.’]

Bebe uma limonada

‘(She) Drinks a lemonade’

In this sentence-type, the nuclear contour is characterized by a final fall through the stressed syllable of the nuclear word, with the peak just preceding this syllable and the low target attained within the stressed vowel. The pitch remains low until the end of the utterance. This description holds for all Portuguese varieties, European and Brazilian, with the exception of the Southern Interior European variety ALE, where the nuclear syllable is all low (Fig. 7.3 to 7.5) and the falling accent is a less frequent option. In the Northern variety of Oporto the two types of contour occur, with similar distributions (the reading data confirmed this pattern of results). The dominant nuclear pitch accent for neutral statements in

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1 The figures showing F0 contours display examples taken from the DCT materials, unless otherwise stated.
Portuguese is thus H+L*, confirming previous analyses. ALE shows an L* nuclear accent, which was also found in POR, similarly to previous findings for the Northern Interior variety of Braga (see section 7.1.3). In all cases, a low boundary tone, L%, completes the nuclear contour.

Figure 7.3 Waveform, spectrogram and F0 contour of the broad focus statement Bebe uma limonada ‘(She) drinks a lemonade’ produced by a speaker of ALG (EP, Central-Southern variety, coast). Here as elsewhere the stressed syllable of the nuclear word is shown in bold.
Figure 7.4 Waveform, spectrogram and F0 contour of the broad focus statement *Ela bebe uma limonada* ‘She drinks a lemonade’ produced by a speaker of ALE (EP, Central-Southern variety, interior).

![Waveform, spectrogram and F0 contour of the broad focus statement](image)

Figure 7.5 Waveform, spectrogram and F0 contour of the broad focus statement *Bebe uma limonada* ‘(She) drinks a lemonade’ produced by a speaker of BH (BP, Baiano).

7.3.1.2 Narrow focus statements

Broad focus statements contrast with narrow/contrastive focus statements, in which a particular constituent is focalized and thus the all-new reading is lost, as illustrated by the examples in (1) and (3), respectively for broad and contrastive focus. Narrow focus refers to the pragmatic use of focus as identification (information focus) and correction (contrastive focus). In previous work on Portuguese (based on SEP and SP), it was shown that narrow focus, whether contrastive or not, was expressed by similar pitch contours (Frota 2000, Fernandes 2007b, Truckenbrodt at al. 2009). In the discourse completion task, which is the main data source for this chapter, only contrastive focus was considered. As shown by the example in (3), focus leads to a corrective interpretation relative to a previous utterance (Krifta 2007).
(3) [Interviewer: E então, o que é que aconteceu aos donos do restaurante? Separaram-se?
‘So, what happened to the restaurant owners? Did they split?’]

(Eles) Casaram
‘(They got) Married’

In this type of sentence, there is a clear divide in our data between European and Brazilian varieties of Portuguese: in the former, a falling nuclear pitch is used, with the peak on the stressed syllable of the focalized word and a following fall (Fig. 7.6); in the latter, narrow focus is produced with a rising accent.

Figure 7.6 Waveform, spectrogram and F0 contour of the narrow focus statement Casaram-se
‘(They got) married’ produced by a speaker of POR (EP, Northern variety, coast). In the orthographic tier, narrow focus is signalled by capitals.

In most Brazilian varieties (BH, MG and SP), the rising nucleus shows a low tone realized into the stressed syllable and a following rise (Fig. 7.7); in RGS, by contrast, there is a rise through the stressed syllable into a peak realized within this syllable (Fig. 7.8). The
narrow focus statement tune has a low boundary in all Portuguese varieties (L%), with the exception of RGS where the melody steps down from the accentual peak into a high downstepped boundary (!H%). Thus RGS, in the extreme South of the Sulista variety, shows a pitch accent and boundary tone different from the other Brazilian varieties.

Figure 7.7 Waveform, spectrogram and F0 contour of the narrow focus statement *Casaram* "(They got) married" produced by a speaker of BH (BP, Baiano).

Figure 7.8 Waveform, spectrogram and F0 contour of the narrow focus statement *Não, se*
casaram ‘No, (they got) married’ produced by a speaker of RGS (BP, Sulista). In the orthographic tier, narrow focus is signalled by capitals.

By and large, the present findings are consistent with previous reports based on read speech data from SEP and SP (see section 7.1.3 and Table 7.1 above).²

In contradiction statements, a contrastive focus reading is produced on the constituent that holds the contradiction, as exemplified in (4). As a general rule for all Portuguese varieties, contradiction statements share the same nuclear contour as contrastive focus statements. This is shown in Fig. 7.9, for the Brazilian variety of RGS, and in Fig. 7.10 for Standard EP.

(4) [Interviewer: Tu tens a certeza de que os teus amigos vão para Lima, mas a tua amiga pensa que vão para Bogotá. Diz-lhe que não, que vão para Lima. ‘You are positive that your friends are going to Lima, but she thinks they go to Bogotá. Tell her she’s wrong, they go to Lima.’]  
(Não) Eles vão para Lima  
‘(No) They go to Lima (not to Bogotá)’

² We found little evidence for the focus phrasing strategy that was previously reported to be one of the ways of cuing focus in BP (i.e., a low boundary associated to the right edge of the phonological phrase that contains the focused element), together with the pitch accent strategy (see sections 7.1.2 and 7.1.4), due to limitations of the DCT materials where focus was almost always final (but see Fig. 7.19). A L*+H L- pattern was also found in the Map Task data from MG, Brazil.
Figure 7.9 Waveform, spectrogram and F0 contour of the contradiction statement *Não, eles vão para Lima* ‘No, they go to Lima’ produced by a speaker of RGS (BP, Sulista). In the orthographic tier, narrow focus is signalled by capitals.

Figure 7.10 Waveform, spectrogram and F0 contour of the contradiction statement *Não. Vão para Lima* ‘No. (They) go to Lima’ produced by a speaker of SEP (EP, Standard variety). In the orthographic tier, narrow focus is signalled by capitals.
In statements with an early focus, the postnuclear stretch shows pitch range compression, but no deaccenting, both in European and Brazilian varieties. The absence of deaccenting in the postnuclear contour had already been reported for EP: a postnuclear accent on the last stressed syllable of the intonational phrase was found with the same shape and alignment pattern as H+L*, but with reduced range (Frota 2000, 2002a, 2014; Cruz and Frota 2012). If the early nucleus is too far away from the last stressed syllable of the intonational phrase, postfocal pitch range compression may lead to extreme reduction of H+L*, which is no longer realized by a distinct fall. In our data, Brazilian varieties show a similar behavior, with a reduced postnuclear H+L* accent, as illustrated in Fig. 7.11.

![Waveform, spectrogram and F0 contour of the narrow focus statement with an early nucleus](image)

Figure 7.11 Waveform, spectrogram and F0 contour of the narrow focus statement with an early nucleus *Claro que é do Guilherme* ‘Of course it is Guilherme’s’ produced by a speaker of MG (BP, Mineiro). In the orthographic tier, narrow focus is signalled by capitals.

Thus a unified analysis of nuclear intonation in narrow contrastive focus statements seems possible. In all European varieties examined, focus is expressed by means of the H*+L L% nuclear contour; in Brazilian varieties, focus is expressed by a rising accent and two
contours were observed, $L^*+H$ $L%$ and $L+H^* \!H%$, the latter being specific to RGS in the extreme South of the country. It can be concluded that in Portuguese the intonational meaning distinction between all-new and narrow contrastive focus statements is mainly conveyed by contrasting pitch accents. However, the pitch dimensions used in the distinction are different: in European varieties, the contrast is between $H^*+L$ and $H+L^*$ (or $L^*$), that is it explores the dimension of tonal alignment; in Brazilian varieties, the contrast is between falling and rising pitch accents, using the dimension of pitch direction.

7.3.2 Yes-no questions

In this section, we examine the intonation of yes-no questions, which are string-identical to declarative sentences in Portuguese. Portuguese thus belongs to the large group of languages that marks the sentence-type distinction between statements and yes-no questions only by prosodic means. Four pragmatically different types of yes-no questions were analyzed – information-seeking, confirmation-seeking, echo, and counterexpectational yes-no questions – across the eight varieties under study.

7.3.2.1 Information-seeking yes-no questions

Neutral yes-no questions are information-seeking questions, where the information asked by the speaker is new, i.e. unknown to him/her at the time of asking the question. Thus information-seeking yes-no questions are all-new questions, that can be seen as the question counterpart of all-new statements. They trigger a yes/no response (in the case of the ‘yes’ response, the answer using only the verb is most common in Portuguese, cf. Brito 2003). An example is provided in (5).
Most Portuguese varieties show a rising nuclear accent in neutral yes-no questions with the rise starting during the second half of the accented syllable (or close to the end of it) and being completed after the accented syllable (Fig. 7.12 and 7.13). The exception is Standard EP, with a falling nuclear accent identical to that found in neutral statements (Fig. 7.14). In SEP, the rising pattern does not occur, whereas in the other varieties of EP the falling pattern may be found, although less frequently both within and between speakers (these observations where confirmed in the reading and map task data).

Figure 7.12 Waveform, spectrogram and F0 contour of the information seeking yes-no question Tem compota? ‘(Do you) Have compote?’ produced by a speaker of RGS (BP, Sulista).
A boundary rise characterizes neutral yes-no questions in all European varieties, whereas in Brazilian varieties the accentual rise may continue into the edge of the sentence, as illustrated by the example from Rio Grande do Sul in Fig. 7.12, or be followed by a fall, as
shown by the example from São Paulo in Fig. 7.15. It should be noted that even in tonal crowding situations, such as when the nuclear syllable is the final syllable of the utterance (as in Fig. 7.23, section 7.3.2.3 below), the boundary fall is realized, although it may be slightly undershot. Interestingly, final falling pitch seems to be more common in the South (S. Paulo and Minas Gerais), partially confirming previous observations on the geographical distribution of question contours made on phonetic grounds (Silva 2011), as well as previous analysis of BP based on the Rio de Janeiro variety (Moraes 2008; see also Table 7.1). As for EP, a bitonal rising boundary (LH%) is proposed for SEP, given that the rise is confined to the boundary syllable (Fig. 7.14). This is consistent with earlier findings of a detailed study of question intonation with nuclear words of different stress patterns, including antepenultimate stress (Frota 2002a).

Figure 7.15 Waveform, spectrogram and F0 contour of the information seeking yes-no question *Mas não passa por nada?* ‘But do I not pass near anything?’ produced by a speaker of SP (BP, Sulista), during the Map Task.

The difference between information-seeking yes-no question and neutral statements is thus conveyed by a combination of contrasting nuclear accent and boundary tone, in most Portuguese varieties: H+L* L% for statements, and L*+H H% for questions. In SEP,
however, interrogation is signaled by tonal boundary marking only (H+L* LH%), supporting previous analysis of yes-no question intonation in Standard EP (Frota 2002a). By contrast, in the Brazilian varieties that show a final fall, interrogation is conveyed by a pitch accent contrast only (H+L* L% for statements, L*+H L% for questions). Under this analysis, in these Brazilian varieties the yes-no question tune is similar to the narrow focus tune, also analyzed as L*+H L%. It is an open issue for future research whether a prosodic difference may be found between the two sentence-types, either in tonal implementation (pitch range and/or timing), or in duration properties.

7.3.2.2 Echo yes-no questions
Neutral echo yes-no questions (partially) repeat the previous discourse, usually a statement, with the goal of clarifying if the speaker has perceived it correctly. They trigger a yes/no response, like neutral yes-no questions. An example is given in (5).

(6) [Interviewer: Dizem-te as horas, mas não percebes bem. Pensas que te disseram que são nove. ‘You were told the time, but you didn’t hear it well. You think it’s nine o’clock, but you’re not sure.’]
São nove (horas)?
‘Is it nine (o’clock)’
Figure 7.16 Waveform, spectrogram and F0 contour of the echo yes-no question *São nove*?

‘Is (it) nine?’ produced by a speaker of RGS (BP, Sulista).

The intonation of neutral echo questions is very similar to that of neutral yes-no questions, as most Portuguese varieties use the same nuclear contour for both types of yes-no questions. This is the case for all Brazilian varieties, with SP and MG exhibiting the L*+H L% tune, and BH and RGS the L*+H H% tune (the latter is shown in Fig. 7.16). The European varieties either show the same nuclear contour in both types of questions, as in POR and ALG (L*+H H%), or a rising contour where the accentual low is kept but the nuclear accent is not rising or falling, and the rising pitch occurs only at the boundary (L* LH%). The latter type is found in ALE and in SEP, and is illustrated in Fig. 7.17. The boundary rise is tentatively represented with LH%, for consistency with the common use of the bitonal boundary in SEP to signal interrogation. However, this proposal needs to be put into test in future work addressing echo questions in the L* varieties. The common feature that characterizes neutral echo questions, as well as neutral yes-no questions, in all European varieties is thus rising pitch, whether the rise is of an accentual or boundary kind.
Besides expressing the need to clarify a previously heard utterance, echo questions can convey a counterexpectational meaning. Counterexpectacional yes-no questions are a non-neutral form of interrogation where some information is already shared by speaker and interlocutor. However, in this case the speaker is challenging or doubting the information that is shared, and the bias is usually towards a negative answer (as in example (7)). Importantly, the piece of information that is challenged is the focus of the question, and thus counterexpectational questions can be seen as the question counterpart of narrow/contrastive focus statements. In (7), for example, the focus of the question may be ‘Manel’ (‘It’s rather unexpected that Manel will be the one winning the elections, and not someone else’), or ‘president’ (‘Manel can have many other jobs, but certainly not president of the Town Hall’).

(7) [Interviewer: Ao contrário do que se esperava, o Manel está a aparecer à frente em todas as sondagens para a presidência da Câmara. Tu reages e perguntas, admirado, se o
Manel vai ser presidente. ‘Against all odds, Manel is number one in the poll about the elections for president. Surprised, you ask whether Manel is going to be elected president’

O Manel vai ser presidente?

‘Manel is going to be president?’

Unlike for neutral echo questions, which basically share the same nuclear contours as information-seeking yes-no questions, counterexpectational yes-no questions show a specific intonational marking in most Portuguese varieties. In Brazilian Portuguese, the dominant nuclear accent is the rising accent also found as the nucleus of all the other types of yes-no questions (L*+H), the distinguishing trait being the boundary tone: the varieties with a final rise in the other question types, tend to mark counterexpectational questions with a falling boundary (BH and RGS); conversely, the varieties with a final fall in the other question contours, tend to signal counterexpectational questions with a high boundary. These two types are respectively illustrated by the L*+H HL% nuclear contour in Fig. 7.18 and the L*+H H% nuclear contour in Fig. 7.19.
Figure 7.18 Waveform, spectrogram and F0 contour of the counterexpectational yes-no question *Manel vai ser presidente?* ‘Manel is going to be president?’ produced by a speaker of BH (BP, Baiano), with the focus on *Manel*.

Figure 7.19 Waveform, spectrogram and F0 contour of the counterexpectational yes-no question *Mas o Manuel vai ser presidente?* ‘But Manel is going to be president?’ produced by a speaker of MG (BP, Mineiro), with the focus on *Manuel*. 
In RGS, which is a variety of the HL% type, the nuclear accent may either be the rising accent used in all Brazilian varieties or the falling accent, H+L* (see Fig. 7.20, for an example of the latter). In either case, the specific intonational mark of the counterexpectational meaning is the falling boundary.³

Figure 7.20 Waveform, spectrogram and F0 contour of the counterexpectational yes-no question *Manel vai ser presidente?* ‘Manel is going to be president? produced by a speaker of RGS (BP, Sulista), with focus on *Manel* and *presidente*.

As counterexpectational questions may show an early nucleus, two other properties of the intonation of focus are patent in the examples above: as in statements, a postfocal accent is also present in the question contour (Fig. 7.18 and 7.19); a low edge tone may follow the

³ An alternative analysis would be considering that this question type is signalled by the HL% boundary in all Brazilian varieties, and that in MG and SP the final L% may be truncated. Although the limited dataset from the present study that directly speaks to this issue suggests that this is not case, more data is needed (especially with antepenultimate stress words in nuclear position) before a final conclusion can be drawn.
focal accent (Fig. 7.19), along the lines of previous accounts of early focus in statements (see section 7.1).

Counterexpectational yes-no questions are also distinguished from the other yes-no question types in two varieties of European Portuguese: the Standard variety and ALE. This type of question was previously described in Frota (2002a) for SEP, where it was shown that L*+H is the nuclear pitch accent used (instead of H+L*, that characterizes neutral questions), and HL% the tonal boundary in the late focus cases and LH% (the usual tonal boundary that characterizes questions in SEP) in the early focus cases (see also Table 7.1 above). Our findings confirm the previous account, as shown by the early focus example in Fig. 7.21. As in statements, in early focus yes-no questions a postnuclear accent is present, although postfocal pitch range compression may lead to phonetic reduction of this accent, especially when it is quite far from the nucleus.

![Figure 7.21 Waveform, spectrogram and F0 contour of the counterexpectational yes-no question with an early nucleus](image)

Figure 7.21 Waveform, spectrogram and F0 contour of the counterexpectational yes-no question with an early nucleus *Estás-me a dizer que o Mário vai concorrer para presidente?* ‘Are you telling me that Mário is running for president?’ produced by a speaker of SEP (EP, Standard variety). In the orthographic tier, narrow focus is signalled by capitals.
In ALE, the other variety that exhibits a particular contour for counterexpectational yes-no questions, both a falling nuclear accent and boundary tone are used (Fig. 7.22). In the intonation system of ALE, the distinguishing feature of counterexpectational yes-no questions is the complex HL% boundary.

Figure 7.22 Waveform, spectrogram and F0 contour of the counterexpectational yes-no question *Manel vai ser presidente?* ‘Manel is going to be president? produced by a speaker of ALE (EP, Central-Southern variety, interior), with focus on *presidente*.

In the other two Portuguese varieties, POR in the North and ALG in the extreme South, the counterexpectational yes-no question tune is similar to the neutral yes-no question tune, i.e. L*+H H%. It is an issue left for future research whether any prosodic difference may be found between the two sentence-types, namely in their phonetic implementation (recent observations for ALG in Cruz and Frota 2012 suggest a difference in the amplitude of the rise, with a higher peak in the focused question, that calls for further investigation).
To summarize, the counterexpectational meaning seems to be the only pragmatic variant of yes-no questions analyzed that shows a specific intonational marking in most varieties of Portuguese. In all Brazilian varieties, and also in ALE (EP), the tonal marker is the boundary tone. In Standard EP, by contrast, the tonal marker is the pitch accent type, just as in the case of the difference between statements with broad and narrow/contrastive focus.

7.3.2.3 Confirmation-seeking yes-no questions

Confirmation-seeking yes-no questions are non-neutral questions where information is already shared by speaker and interlocutor, and the former usually expects a positive answer from the latter, that is a confirmation of shared information. Unlike information-seeking yes-no questions, confirmation-seeking ones are biased as to the expected response, as shown in (8).

(8) [Interviewer: Sabes que lá fora está muito frio. Uma pessoa agasalhada entra e confirma se tem frio. ‘You know that it’s pretty cold outside. Someone with a coat comes in and you check if he/she is cold’]

Tens frio?
‘Are (you) cold?’

There are no differences in nuclear contour between confirmation-seeking yes-no questions and information-seeking yes-no questions within varieties of Portuguese. In other words, each variety uses the same tune for the two pragmatically different types of questions. Thus the Brazilian varieties that have the L*+H H% tune for neutral yes-no questions (and for neutral echo questions) also employ it in confirmation-seeking questions (BH and RGS); and the Brazilian varieties characterized by having a final fall in information-seeking and
neutral echo yes-no questions, also show the L*+H L% tune in confirmation-seeking questions (MG and SP). Examples of the latter type are given in Fig. 7.23 (where L% appears whether the nuclear word has penult or final stress).

Figure 7.23 Waveform, spectrogram and F0 contour of the confirmation-seeking yes-no questions *Tens frío?* ‘(Are you) cold?’ (top panel) and *Choveu?* ‘(Did it) rain?’ (bottom panel), produced by speakers of SP (BP, Sulista).
The same general pattern holds for European varieties. Fig. 7.24 shows an example of a variety with the \( L^*+H \) \( H^\% \) tune, which is the most common pattern in EP. The exception, as described in section 7.3.2.1 for information-seeking questions, is SEP, with the \( H+L^* \) \( LH^\% \) tune (Fig. 7.25).

Figure 7.24 Waveform, spectrogram and F0 contour of the confirmation-seeking yes-no question *Tens frio? ‘Are (you) cold?’ produced by a speaker of ALE (EP, Central-Southern variety, interior).

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4 On the basis of a corpus of child directed speech, Mata and Santos (2010) report on a variety of nuclear accents in confirmation-seeking yes-no questions in SEP, including \( H+L^* \). However, in our adult directed speech data, only \( H+L^* \) was found. One reason for the different findings might be the nature of the corpus, with child directed speech having specific intonational properties and/or peculiar pragmatic functions (Fernald 1989, among others).
Figure 7.25 Waveform, spectrogram and F0 contour of the confirmation seeking yes-no question *Tens frio? ‘Are (you) cold?’ produced by a speaker of SEP (EP, Standard variety).

In short, the Portuguese language distinguishes yes-no questions from statements by means of intonation, but does not systematically use intonational marking to signal pragmatic differences within yes-no questions in the case of information-seeking, echo and confirmation-seeking questions. Only counterexpectational questions show a specific intonational marking in most varieties of Portuguese.

7.3.3 Wh-questions

Wh-questions are characterized by containing a question word, which not only identifies the utterance as a question, but also specifies the focus of the question (i.e. what the question is about). In Portuguese, question words typically appear at the beginning of the sentence. However, wh-questions with the question word *in situ* are also possible, either with the regular interpretation of a wh-question or with the interpretation of an echo question (asking about information given in the previous discourse which was not clearly perceived or
understood). In this section, we only describe the intonation of wh-questions with the question word appearing at the left edge of the sentence.

7.3.3.1 Information-seeking wh-questions

Wh-questions are commonly information-seeking. The information asked by the speaker is new to him/her and is identified by the question word. The answer to the question usually contains the information the speaker was enquiring about, unless the listener is not able to provide that information. An example of a wh-question is given in (9).

(9) Que horas são?

‘What time is it?’

Information-seeking wh-questions, just like broad focus statements, are produced with the H+L* nuclear accent in all Portuguese varieties. In ALE (EP), L* also occurs, similarly to neutral statements. These findings extend previous accounts of wh-question nuclear contours (see Table 7.1) to other varieties of Portuguese. The statement-like intonation of wh-questions is not limited to the nuclear accent. In most renditions, wh-questions show a L% boundary, as statements, as shown in Fig. 7.26. However, wh-questions may also show the final rising F0 typical of yes-no questions in many varieties of Portuguese (which may add additional politeness to the question). An example is provided in Fig. 7.27.
Figure 7.26 Waveform, spectrogram and F0 contour of the information seeking wh-question

*Que horas são?* ‘What time is it?’ produced by a speaker of ALG (EP, Central-Southern variety, coast).

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<td>L%</td>
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Figure 7.27 Waveform, spectrogram and F0 contour of the information seeking wh-question

*Que horas são?* ‘What time is it?’ produced by a speaker of RGS (BP, Sulista).

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The presence of statement-like intonation in wh-questions is not surprising, given that intonational marking of the utterance as a question is redundant due to the question word. On the other hand, wh-questions are questions and may thus be (redundantly) signaled by the intonational marker for interrogation in a given variety. This possibility had also been previously described for Standard EP (Frota 2002a).

7.3.3.2 Echo wh-questions

In echo wh-questions the speaker wants to clarify what was previously heard, and thus repeats the wh-question that was asked before, as in example (10).

(10) [Interviewer: Perguntaram-te onde vais, mas não sabes se percebeste bem. Confirma se te perguntaram isso. ‘You’ve been asked where you’re going, but you’re not sure. Check if that was what they’ve asked you.’]  
(Perdigue) Onde vou?  
‘(Did you ask) Where do I go?’

The intonation of echo wh-questions displays a whole rising contour, across Portuguese varieties. This contour shows the properties of L*+H H%, described in section 7.3.2. It is thus very different from the wh-question contour, and approximates to the echo yes-no question contour. Fig. 7.28 shows an example from RGS (BP), that contrasts with the wh-question in Fig. 7.27, but presents the same nuclear contour as the echo yes-no question in Fig. 7.16 above.
Figure 7.28 Waveform, spectrogram and F0 contour of the echo wh-question *Tu quer saber onde eu vou?* ‘Did you want to know where (do) I go? produced by a speaker of RGS (BP, Sulista).

The similarity between the intonation of echo wh-questions and yes-no questions may have a functional explanation: echo wh-questions, like echo yes-no questions, are interrogations about the previous discourse (whether it was a question or a statement that was previously uttered). The presence of the question word identifies the sentence as a wh-question, while the whole rising contour makes it clear that the sentence is not a request for the information identified by the question word, but simply a clarification request about what was previously said, thus a echo question.

7.3.4 Imperatives

In Portuguese, imperative sentences are usually verb initial, the verb tends to appear in the 2\(^{nd}\) person, and the imperative mood is used. This sentence-type, although including many variants, is thus characterized by morphosyntactic markers that distinguish it from statements (Matos 2003). Imperative sentences may be used to express various pragmatic values. This section describes the intonation of imperatives conveying commands and requests.
7.3.4.1 Commands

An example of an imperative sentence expressing a command is given in (11).

(11) [Interviewer: Estás no parque com a tua neta, e ela afasta-se. Manda-a vir para junto de ti. ‘You’re in the park with your granddaughter and she moves away from you. Tell her to come to you.’]

Vem cá.

‘Come here.’

The intonation of commands splits Portuguese varieties into two groups: the European and the Brazilian group. In European varieties, the H*+L L% contour is used, as illustrated in Fig. 7.29 for a one word utterance and Fig. 7.30 for a multiword utterance. This use of the focus accent (H*+L) in commands had been previously found in similar contexts in SEP (Frota 2014; see also Table 7.1) and is now extended to the other EP varieties studied. Although commands with either a late or an early nucleus on the verb were reported in Frota (2014), in the data analyzed in this chapter all commands produced show right-edge prominence, that is a late nucleus.
Figure 7.29 Waveform, spectrogram and F0 contour of the command *Anda. Anda* ‘Come. Come (here)’ produced by a speaker of ALE (EP, Central-Southern variety, interior).

Figure 7.30 Waveform, spectrogram and F0 contour of the command *Anda para aqui* ‘Come here’ produced by a speaker of POR (EP, Northern variety, coast).

In Brazilian varieties, a falling nuclear contour is also found, but it is the neutral statement contour instead, H+L* L%, as shown in Fig. 7.31. The use of this contour in
commands was described in Moraes (2008) for the Rio de Janeiro variety and is now
documented in data from four other BP varieties. In RGS, the neutral statement accent H+L* 
tends to be followed by a high boundary tone, instead of the low boundary (Fig. 7.32). It 
remains to be shown whether the H% boundary conveys an added pragmatic value, or it is a 
regional feature (interestingly, RGS was also the BP variety where wh-questions tended to 
display H%).

Figure 7.31 Waveform, spectrogram and F0 contour of the command *Vem cá. Volta aqui*

In the intonation system of either European or Brazilian Portuguese, as described so far, there is no intonational marking particular to commands: in EP, commands share the same contour as narrow focus statements; in BP, they share the same contour as neutral statements and wh-questions. However, commands are usually morphosyntactically marked, and the combination of this marking with the intonational features described may unambiguously identify a command as different from a neutral statement, a focused statement, a wh-question, or even a request, as we will see in the next section.

7.3.4.2 Requests
As imperative sentences, requests are not morphosyntactically different from commands, but pragmatically different. Commands tend to be firm, harsh, and mandatory, whereas requests are gentle, persuasive and discretionary. Example (12) shows an imperative sentence expressing a request:
(12) [Interviewer: Queres ir ao cinema com um amigo. Ele diz-te que tem de trabalhar, mas tu sabes que ele pode deixar o trabalho para mais tarde. Queres convencê-lo. ‘You’d like to go to the cinema with your friend. He tells you he has to work, but you know that he can work later. You try to convince him to go with you.’]

Vem lá.

‘Come-on.’

The main feature of requests in EP varieties is the low contour in the nuclear syllable, illustrated in Fig. 7.33. This contrasts sharply with the high fall that characterizes commands (Fig. 7.30). Requests are thus analyzed as having an L* L% nuclear contour in European Portuguese, along the lines of previous proposals for SEP (Table 7.1).

![Waveform, spectrogram and F0 contour of the request Anda lá, vem ‘Come-on, come’ produced by a speaker of POR (EP, Northern variety, coast).](image)
The intonational properties of requests are more complex in Brazilian varieties, as depicted in Fig. 3.34. Although they also tend to show a low contour in the nuclear syllable, the low is immediately preceded by a peak (as in por favor ‘please’). This abrupt jump from high to low is not found in EP, where the peak gets associated to a prenuclear stressed syllable (Fig. 7.33), if one is available, or to the left-edge of the utterance if none is present (cf. Frota 2014). Also, the abrupt jump in pitch cannot be seen as an instance of the bitonal falling accent H+L*: the realization of H+L* is characterized by a fall that occurs through the stressed syllable, which is very unlike the pitch jump found in requests (see section 7.3.1.1). Thus the peak preceding L* seems to be a tonal event on its own, that is part of the melody of requests, and that in Fig. 7.34 can be interpreted as a %H. An additional property of the request tune in BP, patent in the second intonational phrase in Fig 7.34, is a rise-fall at the right edge. The rise-fall is usually accomplished by a rising accent followed by a Low boundary. Given the complex properties of requests in BP, further research is needed to clarify whether this set of properties holds in all varieties, or the HL melody is more common in some and the LHL melody in others.

Figure 7.34 Waveform, spectrogram and F0 contour of the request Por favor, vamos ‘Please, come’ produced by a speaker of SP (BP, Sulista).
Across Portuguese varieties, imperative intonation seems to be conveyed by nuclear pitch accent choice and not by final boundary marking. Moreover, lengthening of the nuclear syllable is a concomitant feature of imperative intonation, especially evident in requests.

7.3.5 Vocatives

This section describes the intonation of calling in Portuguese varieties. We examine two particular pragmatic meanings, that were previously shown to be expressed by different types of calling contours in Standard EP (Frota 2014): the greeting call or initial call, and the insistent or impatient call that is uttered when there is no response to the first call. As will be seen below, Portuguese varieties differ in whether and how the two pragmatic variants are distinguished prosodically.

7.3.5.1 Initial call

The greeting call, also known as vocative chant, is usually uttered in a context such as the one presented in (13):

(13) [Interviewer: Queres que a Marina venha para que o jantar possa ser servido. Chama-a. ‘Marina has to come so that dinner may be served. Please call her’.]

Marina

‘Marina’ (a girl’s name)

All European Portuguese varieties show the sustained pitch contour of the greeting call, characterized by high pitch on the nuclear syllable and a downward step into the postnuclear syllable, after which the pitch level is sustained until the end of the contour. Fig. 7.35 and Fig. 36 provide two examples of the sustained pitch contour, respectively from a Northern and a
Southern variety. The peak is always realized within the nuclear vowel, but the beginning of the rise to the peak may align to the left edge of the nuclear syllable, or start before during the pre-tonic. This variable pattern of alignment, which is also found in the insistent call (see section 7.3.5.2 below), suggests the optional presence of a low prefix to the nuclear peak, as argued for SEP in Frota (2014). In other words, H* is the crucial feature and the realizations with or without the L prefix are phonetic variants of the same nuclear accent. The step down in pitch occurs between the nuclear and the postnuclear syllables, and pitch is sustained during the postnuclear stretch. We thus analyze the melody of the greeting call in EP as (L+)H* !H.

Figure 7.35 Waveform, spectrogram and F0 contour of the greeting call Marina ‘Marina’ produced by a speaker of POR (EP, Northern variety, coast).
Figure 7.36 Waveform, spectrogram and F0 contour of the greeting call *Marina* ‘Marina’ produced by a speaker of ALE (EP, Central-Southern variety, interior).

The sustained pitch contour is also the dominant pattern across BP varieties, illustrated here with a greeting call from Bahia (Fig. 7.37). The only difference found with respect to the European pattern is the prevalence of the Low prefix, suggesting that the Brazilian contour includes a real bitonal accent, L+H*. Only in RGS, in the extreme South, a distinct greeting call contour is found (Fig. 7.38). In RGS, the nuclear syllable is low, and a rise-fall pattern characterizes the postnuclear stretch.
In short, all varieties of Portuguese display a similar sustained pitch contour for the greeting call, with the exception of RGS, in Brazil. A further common trait of the greeting call in Portuguese is syllable lengthening: the nuclear syllable and particularly the boundary syllable are lengthened. It is unclear whether this extended duration is a phonetic property
associated with the realization of the contour, or a phonological feature. Interestingly, in the
case of EP it has been shown to block posttonic phonetic vowel reduction and vowel deletion,
which otherwise occur in posttonic position (Frota 2014). Moreover, boundary syllable
lengthening goes hand in hand with the spreading of !H% in the postnuclear stretch, as
previously observed in Frota (2014) for SEP. Future research examining the perception of
calling contours should clarify the status of duration in the prosodic representation of this
utterance type.

7.3.5.2 Insistent call

Unlike the greeting call, the insistent call is pragmatically adequate in a context like the one in (14).

(14) [Interviewer: Passaram dez segundos e ela ainda não veio. Volta a chamá-la. ‘Ten
seconds have gone and she has not come yet. Call her again.’]

Marina

‘Marina’ (a girl’s name)

However, the pragmatic difference is not intonationally marked in all varieties of
Portuguese. In addition, the insistent call shows a wider range of prosodic variation across
varieties than the greeting call.

Most European varieties distinguish between the two calling contours. The falling pitch
in the postnuclear stretch (shown in Fig. 7.39), instead of the sustained pitch (see Fig. 7.35),
is the differing feature, whereas the nuclear rise shows the same properties (an optional low
prefix and a peak, (L+)H*). The intonational marker of the difference is thus the boundary
tone: !H% in the greeting call, and L% in the insistent call. Moreover, the duration properties
of the two contours are also distinct. In the insistent call, the boundary syllable is not lengthened as in the greeting call.

![Waveform, spectrogram and F0 contour of the insistent call](image)

Figure 7.39 Waveform, spectrogram and F0 contour of the insistent call *Marina* ‘Marina’ produced by a speaker of POR (EP, Northern variety, coast).

In the ALE variety, however, the sustained pitch contour is used for both types of calls, as shown by the examples in Fig. 7.36 above and Fig. 7.40. Nevertheless, a more detailed analysis suggests that peak height and lengthening of the postnuclear syllable may differentiate the two types of call: in the insistent call, the nuclear peak is higher and the postnuclear syllable shows extra lengthening.
Brazilian varieties are divided between those that have distinct melodies for the two calling contours – MG and SP –, and those that use the same melody – BH and RGS. In the former, the sustained pitch contour contrasts with the low boundary contour, as in most European varieties. In the latter, two types of contours occur. BH is like European ALE in using the sustained pitch contour for both types of calls (compare Fig. 7.37 above with Fig. 7.41). By contrast, in RGS the L* HL% contour is used (see Fig. 7.38 and Fig. 7.42). In these varieties, other properties seem to differentiate the two pragmatic readings, although in opposing ways: in BH, extra syllable lengthening is used in the insistent call; in RGS, it is the greeting call that tends to show longer durations, together with expanded pitch range.
Figure 7.41 Waveform, spectrogram and F0 contour of the insistent call *Marina* ‘Marina’ produced by a speaker of BH (BP, Baiano).

Figure 7.42 Waveform, spectrogram and F0 contour of the insistent call *Marina* ‘Marina’ produced by a speaker of RGS (BP, Sulista).

In BP, the insistent call may thus present three distinct tunes: a high boundary tune in the North (!H), and two falling boundary tunes in the Center and Southern regions (L% and...
The specificity of RGS is that the rise is not accentual, like in all the other varieties, but part of the boundary pitch movement.

By and large, LH!H or LHL are the melodic shapes of the calling contours in Portuguese. Across varieties, these melodic shapes may show systematic differences in how tonal events are organized in the tune, and associated to the text. When a given variety uses the same melody for both types of calling contours, duration seems to play a role in differentiating them. Lengthening effects are an accompanying feature of vocatives that needs to be better understood.

7.3.6 Intonational variation in Portuguese: summary

In Table 7.3, the main tune types attested in Portuguese varieties are summarized. The typical meanings for each tune type are given in Table 7.4. Bitonal nuclear accents predominate in Portuguese (especially H+L* and L*+H), and combine with both simplex (low, high) and complex (falling, rising) boundary tones, the latter showing a more restricted distribution.

Table 7.3 Nuclear contours in varieties of Portuguese (shading means that a tune is observed in a given variety.)

<table>
<thead>
<tr>
<th>Nuclear contours</th>
<th>EP</th>
<th>BP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POR SEP ALE ALG</td>
<td>BH MG SP RGS</td>
</tr>
<tr>
<td>H+L* L%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H+L* LH%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H+L* H%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H+L* HL%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H*+L L%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The variation found in the Portuguese intonational inventory is characterized both by systemic and semantic differences. Different varieties may show different inventories of phonologically distinct tunes (Table 7.3). For example, the H*+L accent was found only in EP, not in BP (although it was previously reported to be a less common way to express narrow focus in BP – see section 7.1). Conversely, L*+H L% was found only in BP, not in EP. H+L* HL% is a tune specific to particular varieties (ALE in EP and RGS in BP). Different varieties may also show differences in the meaning/use attributed to a given tune (Table 7.4). H+L* L% is used for neutral statements and wh-questions in both EP and BP, but also for commands only in BP. In the Brazilian varieties of BH and RGS, L*+H H% conveys the meanings associated to various types of yes-no questions, but crucially not the counterexpectational meaning. In MG and SP, the same tune is used only for counterexpectational yes-no questions, and not for the other yes-no question pragmatic types. Although the sustained pitch contour is only used for the vocative chant in most varieties, the same contour is also used for the insistent call in ALE (EP) and BH (BP).

| Tune |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| L*+H L% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L*+H LH% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L*+H H% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L*+H HL% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L+H* L% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L+H* !H% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L* L% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L* LH% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| L* HL% |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |

\[a\]L*+H LH% only occurs in early nucleus cases.
Table 7.4 Typical meanings for each tune type.

<table>
<thead>
<tr>
<th>Nuclear contours</th>
<th>EP</th>
<th>BP</th>
</tr>
</thead>
<tbody>
<tr>
<td><em><em>H+L</em> L%</em>*</td>
<td>Broad Focus Statement</td>
<td>Broad Focus Statement</td>
</tr>
<tr>
<td></td>
<td>Wh-Question</td>
<td>Wh-Question</td>
</tr>
<tr>
<td><em><em>H+L</em> LH%</em>*</td>
<td>Information-Seeking Yes/No-Q</td>
<td>Confirmation-Seeking Yes/No-Q</td>
</tr>
<tr>
<td></td>
<td>(SEP)</td>
<td>(SEP)</td>
</tr>
<tr>
<td><em><em>H+L</em> H%</em>*</td>
<td>---</td>
<td>Command (RGS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wh-Question (RGS)</td>
</tr>
<tr>
<td><em><em>H+L</em> HL%</em>*</td>
<td>Focused Yes/No-Question (ALE)</td>
<td>Focused Yes/No-Q (RGS)</td>
</tr>
<tr>
<td><em><em>H</em>+L L%</em>*</td>
<td>Narrow Focus Statement</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Command</td>
<td></td>
</tr>
<tr>
<td><em><em>L</em>+H L%</em>*</td>
<td>---</td>
<td>Narrow Focus Statement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Information-Seeking Yes/No-Q (MG, SP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Echo Yes/No-Question (MG, SP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confirmation-Seeking Yes/No-Q (MG, SP)</td>
</tr>
<tr>
<td><em><em>L</em>+H LH%</em>*</td>
<td>Focused Yes/No-Question (SEP)</td>
<td>---</td>
</tr>
<tr>
<td><em><em>L</em>+H H%</em>*</td>
<td>Information-Seeking Yes/No-Q</td>
<td>Information-Seeking Yes/No-Q (BH, RGS)</td>
</tr>
<tr>
<td></td>
<td>Echo Yes/No-Question</td>
<td>Echo Yes/No-Question (BH, RGS)</td>
</tr>
<tr>
<td></td>
<td>Confirmation-Seeking Yes/No-Q</td>
<td>Confirmation-Seeking Yes/No-Q (BH, RGS)</td>
</tr>
<tr>
<td></td>
<td>Focused Yes/No-Question</td>
<td>Focused Yes/No-Question (MG, SP)</td>
</tr>
<tr>
<td></td>
<td>Echo Wh-Question</td>
<td>Echo Wh-Question</td>
</tr>
<tr>
<td><em><em>L</em>+H HL%</em>*</td>
<td>Focused Yes/No-Question (SEP)</td>
<td>Focused Yes/No-Q (BH, RGS)</td>
</tr>
<tr>
<td><em><em>L+H</em> L%</em>*</td>
<td>Insistent Call</td>
<td>Insistent Call (MG, SP)</td>
</tr>
<tr>
<td></td>
<td>Request</td>
<td>Request</td>
</tr>
<tr>
<td><em><em>L+H</em> !H%</em>*</td>
<td>Greeting Call</td>
<td>Greeting Call</td>
</tr>
<tr>
<td></td>
<td>Insistent Call (ALE)</td>
<td>Insistent Call (BH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Narrow Focus Statement (RGS)</td>
</tr>
<tr>
<td><em><em>L</em> L%</em>*</td>
<td>Request</td>
<td>Request</td>
</tr>
<tr>
<td></td>
<td>Broad Focus Statement (ALE, POR)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wh-Question (ALE)</td>
<td></td>
</tr>
<tr>
<td><em><em>L</em> LH%</em>*</td>
<td>Echo Yes/No-Question</td>
<td>---</td>
</tr>
<tr>
<td><em><em>L</em> HL%</em>*</td>
<td>---</td>
<td>Greeting Call (RGS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insistent Call (RGS)</td>
</tr>
</tbody>
</table>

From the perspective of intonational meaning, the following sentence types show little or no variation across Portuguese varieties, that is, the same tune was used with the same meaning: broad focus statements, wh-questions and echo wh-questions. By contrast, yes-no
question types are the ones showing more variation, since the same meaning is associated with many different tunes.

From a geographic perspective, our findings do not point to the regional areas defined by Portuguese varieties established on the basis of non-prosodic variation (section 7.1.1). The main geographic divide is that between EP and BP, as shown by the differences found in narrow focus statements, commands and requests, and the comparatively more widespread use of falling accents in the former. Within EP, there is no Northern / Central-Southern split, with POR in the North patterning like ALG in the extreme South. Within BP, no three-way division was found between Baiano, Mineiro and Sulista (section 7.1.1). Question intonation shows, instead, a Central pattern with a low boundary versus a Northern and Southern pattern with a high boundary. Baiano, in the North, is characterized by a more pervasive use of high boundary contours.

7.4 Pitch accent distribution across varieties

In previous studies of Portuguese intonation, pitch accent distribution was shown to be a relevant dimension for intonational variation (see section 7.1.5). In this section, the distribution of pitch accents is examined taking into account two factors: the presence/absence of pitch accents in intonational phrase internal position (i.e., excluding the words at the edges of intonational phrases), and the occurrence of accentual-like tonal events in pre-tonic syllables.

Pitch accent distribution (henceforth PAD) was computed across varieties and three main sentence types – statements, yes-no questions and wh-questions – using the DCT data (only intonational phrase internal prosodic words were considered). The results obtained are given in Table 7.5. BP is characterized by a richer PAD than EP. Within BP, PAD is denser in the South. Within EP, the Standard variety is different from all the others due to its sparse
Our findings thus confirm the singularity of SEP within Portuguese varieties, as well as with respect to other Romance languages (Frota 2002a, 2014; Hualde 2002; Vigário and Frota 2003; Vigário and Fernandes-Svartman 2010).

Table 7.5 Pitch accent distribution across varieties of Portuguese. Percentages of pitch accented words across the total of intonational phrase internal prosodic words.

<table>
<thead>
<tr>
<th></th>
<th>EP</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>BP</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POR</td>
<td>SEP</td>
<td>ALE</td>
<td>ALG</td>
<td>Total</td>
<td>BH</td>
<td>MG</td>
<td>SP</td>
<td>RGS</td>
<td>Total</td>
</tr>
<tr>
<td>Statements</td>
<td>50</td>
<td>17</td>
<td>56</td>
<td>46</td>
<td>42</td>
<td>63</td>
<td>57</td>
<td>80</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Yes-no questions</td>
<td>43</td>
<td>29</td>
<td>54</td>
<td>50</td>
<td>43</td>
<td>55</td>
<td>53</td>
<td>70</td>
<td>92</td>
<td>67</td>
</tr>
<tr>
<td>Wh-questions</td>
<td>50</td>
<td>10</td>
<td>25</td>
<td>14</td>
<td>29</td>
<td>50</td>
<td>67</td>
<td>50</td>
<td>59</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>19</td>
<td>49</td>
<td>41</td>
<td>39</td>
<td>56</td>
<td>58</td>
<td>66</td>
<td>64</td>
<td>61</td>
</tr>
</tbody>
</table>

Although PAD had not been previously analyzed by sentence type, our findings show that it contributes to the differentiation between statements and wh-questions in the European varieties (wh-questions showing a sparser distribution). In BP, PAD is dense irrespective of sentence type.

The rich PAD in BP is not only obtained due to the more strict relation between a prosodic word and a pitch accent. In BP, unlike in EP, additional tonal events have been reported to occur in pre-tonic syllables (see section 7.1.5). Our data confirms previous findings, as shown by the examples above in Figs. 7.7, 7.18, 7.19, and 7.23 from different varieties and sentence-types. In these examples, an accentual-like tonal event comprised by high or rising pitch occurs in a pre-tonic syllable irrespective of the distance to the utterance beginning. Whether such tonal events may be connected to the distribution of secondary stresses in BP (see section 7.1.2) is an issue for future research.
Taken together, the facts of PAD just described motivate the contribution of intonation to the perceived rhythmic difference between SEP and BP (SP variety), reported in the literature (Frota et al. 2002; see also section 7.1.2 above).

7.5 Conclusion: The present findings and the intonation system of Portuguese

In this chapter, we examined the intonation contours of the most common sentence-types across eight varieties of Portuguese, on the basis of a common methodology. The comparative analysis of Portuguese varieties highlighted the extent to which they differ intonationally, as well as the properties they share. The latter constitute the basic properties of the intonation system of Portuguese.

Portuguese prosodic structure is characterized by right-headed phrases with which events in the tonal string are related. Across sentence-types and varieties, the nuclear pitch accent occurs at the right edge of the intonational phrase. The exception is sentences with narrow/contrastive focus, that may show an early nucleus. Yet, a form of right-headedness still emerges in these sentences, as a secondary prominence realized by a postfocal accent. In other words, there is no postnuclear deaccenting in Portuguese, similarly to findings on Southern varieties of Italian (Grice 1995, D’Imperio 2002, Grice, D’Imperio, Savino and Avesani 2005, Gili Fivela et al. this volume), or Sardinian (Vanrell et al. this volume).

The intonation system comprises two main types of tonal events: pitch accents and boundary tones. Bitonal accents prevail, and boundary tones, associated to intonational phrase edges, are simple or bitonal. Simple boundary tones are much more productive, whereas complex ones show a more restricted distribution across sentence-types and varieties (see Table 7.3). Portuguese is thus unlike other Romance languages, such as Catalan or Spanish, which display a pervasive use of boundary marking (Prieto 2014, Prieto et al. this volume, Prieto and Roseano 2010, Hualde and Prieto, this volume). In the specific case of BP
varieties, an intonational phrase-internal low boundary associated to the right edge of the phonological phrase that contains the focused element was occasionally found in the data (section 7.3.2).

In Table 7.3, the attested nuclear configurations were presented. There are quite a few gaps in the system of combinations of five pitch accents (H+L*, H*+L, L*+H, L+H*, L*) with five types of tonal boundaries (L%, H%, LH%, HL%, !H%). Some of the gaps seem to be motivated, like the absence of H*+L combined with a tonal boundary other than L%, or the restricted occurrence of !H%. Pragmatically, H*+L behaves as a tonal morpheme encoding narrow/contrastive focus in EP in assertions, that is in utterances expected to end with low pitch (Gussenhoven, 2002). !H% is associated with the sustained pitch contour, which typically occurs in vocatives. Other gaps may be accidental, such as the absence of L+H* HL%, and possibly due to limitations in data coverage. By and large, nuclear contours with monotonal pitch accents or with bitonal boundaries seem to be disfavored in the Portuguese system.

The intonational marking of sentence type and pragmatic meanings can be conveyed both by pitch accents (T*) and boundary tones (T%). The main distinctions expressed by intonational markers are given in (15) below. Across varieties, T* is a more common marker than T%, in line with the more restricted use of contrastive tonal boundaries in Portuguese. There is no intonational marking of pragmatically different types of yes-no questions, with the exception of counterexpectational (i.e., focused) questions, nor of commands or wh-questions.

(15) Intonational marking in Portuguese

a. All-new vs. narrow/contrastive focus statements: T* (EP and BP)

b. Statements vs. yes-no questions: T* T%, T* (BP: MG, SP), T% (EP: SEP)
c. Yes-no questions vs. focused yes-no questions: T% (BP), T* or T* T% (EP)

d. Requests: T*

e. Vocatives: T* T%

Portuguese (and most prominently European Portuguese) seems to be neither a compression language nor a truncation language (in the sense of Ladd 2008a). As previously reported for SEP, tune-text accommodation is obtained by extending the segmental string, not by adjusting the tonal string (Frota 2002a, 2014). In question intonation, for example, a nuclear word with final stress shows the same fall-rise (as in H+L* LH%) or rise-fall (as in L*+H L%) pattern as a word with penultimate stress (see Fig. 7.23). Importantly, in questions the posttonic vowel that is regularly deleted in declarative contours (like [ɨ] in EP) is preserved or an epenthetic vowel is inserted to accommodate the realization of the tune (as in presidente ‘president’, Fig. 7.22, and in vestir[i] ‘wear’, Fig. 7.13). However, previous reports had suggested that truncation was possible in a Northern variety of EP (NEP) not covered in the current study (Vigário and Frota 2003). For Brazilian Portuguese, Moraes and Colamarco (2008) suggested that both compression and truncation are possible in the Rio de Janeiro variety, although the latter is rare (e.g., undershooting of L% in the yes-no question contour). Recent observations on other varieties of BP suggest the presence of truncated patterns in yes-no questions in Central-Southern varieties (Silva, in progress). The extent to which truncation may occur in Portuguese varieties is thus an issue for future research, using materials designed to force tune-text accommodation strategies. Moreover, in our study several other segmental adjustments were shown to contribute to express different meanings, such as nuclear syllable lengthening in imperatives, or the differing duration properties of the two types of vocatives in those varieties where they are not distinguished by tonal shape.
Taken together, these findings suggest an active role of tempo as a cue to prosodic meaning in Portuguese.

The comparative analysis of Portuguese varieties has pointed to three main dimensions of variation: the inventory of nuclear contours, with significant systemic and semantic differences across individual varieties, together with a cluster of features differentiating EP from BP; intonational phrasing, with edge marking of a phrase smaller than the intonational phrase in BP only, and as an optional feature of early focus contours; and pitch accent distribution, which on the one hand singles out BP due to the presence of accentual-like tonal events in pre-tonic syllables, and on the other hand singles out SEP for its pattern of sparse distribution of pitch accents. SEP, the most well-studied Portuguese variety so far, was here shown to display specific features that were not shared by other varieties of Portuguese. This singularity of SEP underlines the need to conduct prosodic studies across language varieties. Indeed, beyond SEP, European Portuguese was found to be intonationally closer to Brazilian Portuguese (although still different), and thus more Romance-like.

Acknowledgments

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