Intonational phonology of Catalan and its dialectal varieties

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2.1 Introduction

2.1.1 Geographical distribution of the Catalan language

Catalan is a Romance language that is spoken by about 10 million people in a region that lies within four adjacent European states, Andorra, Italy, France, and Spain.\(^1\) Fig. 2.1 shows a map of the geographical areas where Catalan is spoken, subdivided into its major and traditionally accepted dialects (Veny 1982): Central Catalan and Northwestern Catalan (spoken in Catalonia, Aragon, and Andorra), Valencian Catalan (Valencian region), Balearic Catalan (Balearic Islands), Northern Catalan (in the Roussillon region of southern France, roughly equivalent to the current département of Pyrénées-Orientales), and Algherese Catalan (in the city of l’Alguer, Sardinia).

Breaking down the total number of roughly 10 million Catalan speakers by geographic area, Catalonia and the Valencian region provide the great majority, with 5,703,000 and 2,952,000 respectively, followed by the Balearic community with 735,000 speakers. The remaining territories provide much smaller figures, with 61,000 speakers in Andorra, 142,000 speakers in southern France, and 24,000 in the city of l’Alguer (Sardinia, Italy) (data from Pons and Sorolla 2009). With respect to its legal status, Catalan is the official language in Andorra; within Spain it is co-official.

\(^1\) The data comes from the Enquesta dels usos lingüístics a Catalunya 2003, coordinated by J. Torres and updated by Pons and Sorolla (2009) and Querol (2010).
together with Spanish and considered the native autochthonous language) in the autonomous regions of Catalonia, Valencia, and the Balearic Islands (Occitan is also co-official in the region of Catalonia); within Italy it is co-official with Italian and Sardinian in Sardinia; and in France it is co-official with French only in the département of Pyrénées-Orientales.

Fig. 2.1 Map of the six major Catalan dialects, including the 70 locations where recordings were carried out
2.1.2 Basic prosodic properties of Catalan

In the last few decades, Catalan has been intensively analyzed from a prosodic point of view. With respect to its accentual properties, Catalan is a stress-accent language in which lexically stressed syllables generally serve as the main landing site for phrasal pitch accents. Word stress is always realized in one of the last three syllables of the morphological word, and it can occur further to the left in verbal forms with enclitics (e.g. *està emportant-se-me-la* [əs.'tam.pur.'tan.sə.mə.lə] ‘(s)he is taking it away from me’). Nominal words ending in a vowel tend to have penultimate stress (e.g. *casa* [ˈka.zə] ‘house’) and words ending in a consonant tend to have final stress (e.g. *veritat* [βə.ɾi.'tat] ‘truth’). In a survey (Prieto 2006), of 15,000 words extracted from a child-focused speech corpus, 35% were monosyllables, 49% were disyllables, and 13% were trisyllables. The remaining 3% of the data corresponded to longer words. Within the monosyllabic group, the majority of words (around 63%) were of the CVC type and the rest (37%) of the CV type. Among the disyllabic forms, 63% were trochees (e.g. *casa* [ˈka.zə] ‘house’) and 37% iambs (e.g. *cavall* [kə.'ɾaʎ] ‘horse’). Finally, among the trisyllabic forms, 72% were amphibracs (e.g. *pi.lota* [pi.'lɔ.ta] ‘ball’).

At the phrasal level, the last content word in the intonational phrase receives the nuclear accent (or main phrasal stress). In Catalan, as in other Romance languages, the nuclear accent falls at the end of the sentence (Nuclear Stress Rule: Halle and Vergnaud 1987). Shifting the nuclear accent to a non-final constituent seems not to be a common strategy in Catalan to mark focus. Instead, Catalan resorts to syntactic strategies such as dislocation of the non-focal material (e.g. *L’he posat* [a dins l’armari]F, *el paquet*), clefting (e.g. És [a dins l’armari]F, *que he posat el paquet*) or constituent fronting (e.g. *[A dins l’armari]F he posat el paquet*) (Vallduví 1992; Domínguez 2002).

Prenuclear stressed syllables tend to receive a pitch accent. There are exceptions to this general property of dense accentuation in Catalan. For example, Catalan speakers typically resolve stress clash situations by destressing and/or de-accenting the first accent involved in the clash (*deu nens* [ˈdew.'nens] > *deu nens*, [ˈdew.'nens] ‘ten children’ Oliva 1992). Prieto et al. (2001) proved that Catalan speakers can hardly distinguish between sets of homophonous sequences formed by a sequence of two adjacent stressed syllables (such as *camí net* [kə.mi.'net] ‘clean path’, in a clash situation) and sequences formed by an unstressed syllable followed by a stressed syllable (such as *caminet* [kə.mi.'net] ‘small path’), demonstrating that weakening or complete de-accenting is used as a general strategy of stress clash resolution. On the other hand, certain types of sentential structure such as parentheticals and dislocated sentences are characterized by de-accenting (Ortega-Llebaria et al. 2010); sentence-medial de-accenting has also been reported for interrogative sentences (e.g. *Que has tastat el conill amb all-i-oli?* ‘Have you tasted rabbit with aioli sauce?’—see Prieto 2002a).
It is also possible for unstressed syllables to become stressed and/or accented. The appearance of emphatic stresses or pitch accents is conditioned by speech style, being more frequent in news broadcasts and public discourse (lectures, speeches, etc.), and in emphatic speech in general (e.g. \(\text{és increïble} [\text{es.'zn.kra.'ib.bla}]\) ‘it is incredible’; \(\text{la manifestació} [\text{l.a.'ma.nil.fos.t.o.'sjo}]\) ‘the rally’). A recent study of radio speech by Nadeu and Hualde (2012) has shown that emphatic stresses in Catalan are typically realized as high tones associated with unstressed syllables, and that the most common pattern observed is binary or rhythmic (\(\text{les institucions} [\text{l.a.zins.'ti. tu.'sjons}]\) ‘the institutions’), with emphatic stress occurring two syllables before the primary stress.

With respect to rhythm, Catalan has been classified as an intermediate language between syllable-timed languages like Italian and Spanish and stress-timed languages like English or Dutch (Nespor 1990; Ramus et al. 1999). One the one hand, Catalan has a greater complexity of syllable structure types than Spanish (e.g. complex word-final coda clusters, Span. \(\text{caballo}, \text{Cat. cavall} \) ‘horse’; Span. \(\text{arco}, \text{Cat. arc} \) ‘arch’) and it also presents systematic vowel reduction phenomena (in unstressed positions, [a, e, e] are pronounced as schwa [ə])—properties which are consistently associated with stress-timed languages. Yet in a recent study, Prieto et al. (2012) show that when syllable structure properties are controlled for, timing patterns for Catalan and Spanish (a syllable-timed language) are very similar, while important differences arise between English vs. Catalan/Spanish. Importantly, while English prominent stressed syllables are significantly longer than unstressed syllables, creating the sensation of the Morse-type rhythmic effect, this is not the case for Catalan and Spanish. This calls into question the status of Catalan as an ‘intermediate language’, and demonstrates that though the phonological properties of the language situate Catalan as a mixed type of language, duration measures reveal that Catalan behaves like Spanish in the relative duration of stressed and unstressed syllables. Further evidence for the syllable-timed status of Catalan is given in Gavaldà-Ferré (2007). Her data reveals a lack of rhythmic distinction between two types of Catalan dialect: Eastern Catalan (Central and Balearic), with a full vowel reduction system, and Western Catalan (Northwestern and Valencian), with a ‘partial’ vowel reduction system.

2.1.3 Review of previous work on Catalan intonation and phrasing

Regarding intonation, the majority of studies (and also the most comprehensive studies) have focused on the analysis of the Central Catalan variety, namely Bonet (1984; 1986), Estebas-Vilaplana (2009), Font-Rotchés (2007), Prieto (2002a), Recasens (1977), Salcioli (1988), Virgili Blanquet (1971), and Feldhausen (2010). Though we find studies of other dialectal varieties (e.g. Crespo-Sendra 2011; Fernández Planas et al. 2006; Fernández Planas 2009; Mascaró i Pons 1986; 1987; Martínez Celldrán et al. 2005a; 2005b; Prieto 2001; Prieto and Pradilla 2004; Prieto and Rigau 2007; Vanrell
there is as yet no balanced descriptive comparison or systematic and comparable analysis of the prosodic variation found in Catalan dialects.

Considerable effort has been devoted to developing a Catalan ToBI analysis within the Autosegmental Metrical framework (e.g. Pierrehumbert 1980; Pierrehumbert and Beckman 1988; Ladd 2008a; Gussenhoven 2004; Jun 2005a; Beckman et al. 2005). The Cat_ToBI proposals have been limited to Central Catalan, which is the standardized or reference variety of the language—see the most recent proposals in the Cat_ToBI Training Materials (Aguilar et al. 2009–11) and in Prieto (2014). Recently, an inter-rater reliability test with Catalan oral data transcriptions has shown that the Cat_ToBI system is reliable for coding various types of oral data in the Central Catalan variety (Escudero et al. 2012).

As for phrasing, there have been a number of studies on read and scripted speech in Catalan, and also recently on spontaneous speech (e.g. Frota et al. 2007; Benet 2011). Previous investigations agree that Catalan shows a distinction between two intonationally defined prosodic constituents, the intonational Phrase (IP) and the intermediate phrase (ip). The first argument for the distinction between an IP and ip is a perceptual one. In Catalan prosodic transcriptions, transcribers reliably distinguish between two levels of degree of perceived disjuncture (see Escudero et al. 2012). While the weaker disjuncture corresponds to a level 3 break index in the Cat_ToBI system, the stronger corresponds to a level 4 break index. From a production point of view, both levels are characterized by pre-boundary lengthening, although less strongly realized in ip than IP domains; IP domains are also characterized by the presence of final pauses. Moreover, the intonational phrase is the domain of application of sandhi rules such as vowel deletion, vowel coalescence, gliding, and fricative voicing (see Cabré and Prieto 2005). With respect to intonational marking, the intonational phrase is the domain for the minimal tune consisting of at least one pitch accent plus the boundary tone(s). Like the intonational phrase, the intermediate phrase is tonally marked after its final pitch accent, but the inventory of boundary tones that appear in this position are of a different (but partially overlapping) class. Frota et al. (2007) examined the phonetics and phonology of prosodic boundaries in SVO declarative sentences in five Romance languages, among them Catalan, and found that the dominant boundary tones in statements (located at the end of the first intermediate phrase) was the continuation rise H- or the sustained pitch !H-. By contrast, intonational phrase-final edges were generally signaled by a low boundary tone (L%), but a wider inventory of boundary tone combinations is possible there. Benet (2011) reported the same patterns for a corpus of spontaneous speech. Similarly, continuation rises and sustained pitch have been reported in alternative questions, enumerations, and at the right edge of left-dislocations (but not at the left edge of left-dislocations; e.g. Astruc 2005; Feldhausen 2010). Finally, the presence of H- phrase boundaries can serve for sentence disambiguation in Catalan (e.g. Prieto 1997).
Finally, note that Catalan differs from French or Occitan in that it does not display any evidence for the Accentual Phrase (AP) constituent, with the possible exception of Northern Catalan. The AP seems to be relevant in the phrasing system of this dialect, which is in contact with French and constitutes a natural transition towards Occitan. In French and in Occitan, the AP may group more than one lexical word plus the accompanying clitics, and it is characterized by the presence of an obligatory final pitch accent and an optional initial rise, which have a demarcative function (see, in this volume, Chapter 3 for French and Chapter 6 for Occitan). By contrast, in all other dialects of Catalan, intermediate phrases generally group two or three prosodic words, and there is no in-between constituent presenting initial nor final demarcative tonal features.

2.1.4 Aims of the chapter

This chapter will describe the intonation patterns which characterize the six main dialects of the Catalan language. It will be the first to offer a balanced prosodic description of the six Catalan dialects that constitute the Catalan-speaking territory. The analysis presented will be based on an extensive dialectal corpus that is available online (see §2.2). A more detailed cross-dialectal analysis of the data has been recently compiled in L’entonació dels dialectes catalans [The Intonation of Catalan Dialects] (Prieto and Cabré 2013).

The prosodic analysis undertaken in this chapter will be framed in the Autosegmental Metrical framework, and specifically in the Cat_ToBI proposal by Prieto (2014). Even though this proposal was based on the standard variety of Catalan, namely Central Catalan (see Fig. 3.1), this chapter will show that dialectal variation within Catalan can be transcribed using the same basic phonological inventory of pitch accents proposed before (H*, L+H*, L+¡H*, L+<H*, L*, L*+H, and H+L*), with the addition of the H*+L and the ¡H+L* pitch accents, which are only used in some varieties (see §2.4 for a summary of the intonational units used in this chapter).

The chapter is organized as follows. Section 2.2 is devoted to explaining the methodology used for gathering data. Section 2.3 will present the analysis of the intonational variation found in the realization of the different sentence types covered, namely statements, yes/no questions, wh-questions, requests/orders, and vocatives. Section 2.4 summarizes the main results and compares them to those of other Romance languages. Finally, an Appendix contains dialectal maps summarizing the dialectal variation found in the nuclear configurations.

2.2 Methodology

The empirical basis of this investigation is a large-scale intonation survey collected in 70 different medium-size localities covering the main dialectal areas of Catalan:
Central (15 locations), Northwestern (18 locations), Valencian (18 locations), Balearic (13 locations), Northern (5 locations), and Algherese (1 location) dialects (see Fig. 2.1). Two speakers were interviewed in each locale, with the exception of l’Alguer, where a total of 7 speakers were recorded. The fact that a number of locations were interviewed within the same dialectal areas has been an important source of information to identify consistent patterns of intonational variation. Participants surveyed were mostly middle-aged educated women (with at least a high-school education) aged between 25 and 45. Due to the sociolinguistic situation of Catalan in France and Italy, where it is experiencing a numeric intergenerational decline, in the city of l’Alguer (in Sardinia) 4 older women and 3 men were recorded. Similarly, for Northern Catalan the speakers were older and men also had to be included.

Participants received the Catalan version of the common questionnaire used for all Romance languages included in this volume, which was based on Prieto (2001).² The questionnaire is based on the Discourse Completion Task (henceforth DCT), an inductive method which has been applied for many years in research on pragmatics and sociolinguistics (e.g. Blum-Kulka et al. 1989; Billmyer and Varghese 2000; Félix-Brasdefer 2010) and also recently on prosody (e.g. Prieto and Roseano 2010), with good results. The questionnaire consists of the common 31 situations chosen for all languages included in this volume, each intended to elicit a particular type of utterance and pragmatic meaning. For example, to obtain an information-seeking question, informants are given the following discourse context: “You go into a shop you have never been in before and ask the shop assistant if they sell tangerines.” The questionnaire was adapted to each dialect, and was administered by a native speaker (i.e. one of the authors or a local collaborator with the project). A total of 145 interviews were conducted, with a total of 4,495 sentences analyzed (145 speakers × 31 situations). As mentioned above, the Catalan version of the questionnaire, as well as the oral materials for the 70 locations, can be found on the webpage of the Interactive Atlas of Catalan Intonation (Prieto and Cabré 2007–12). A selection of the materials for 6 locations can be found in the Interactive Atlas of Romance Intonation (Prieto et al. 2010–14). Finally, the sound files included in the figures in this chapter will be found on the OUP companion website: www.oup.co.uk/companion/frota_prieto.

The target sentences were analyzed in Cat_ToBI over the course of two years. The prosodic transcription was performed by all members of the group, who met regularly for transcription discussions. In this chapter, we offer both a qualitative and a geolinguistic analysis of the prosodic contours obtained. Systematic cross-dialectal results are shown in the Appendix in the form of geolinguistic maps. The maps represent the distribution of nuclear pitch configurations obtained for a

² The reader can access the Catalan version of the questionnaire, as well as the questionnaire used for the other Romance languages in this volume, in the Interactive Atlas of Romance Intonation (Prieto et al. 2010–14).
handful of DCT situations across the 70 Catalan locations. The different pitch configurations are represented through the use of differing shades of gray or fill patterns. In cases where the two speakers differed in their intonational pitch contours, a choice was made by comparing them with those of nearby locations. In this chapter, a given intonational trait is considered to be dialectal when results prove the consistency of its appearance in a given region, as well as its absence in other regions. Since the relationship between intonational contours and pragmatic meanings is non-univocal, the fact that we obtain different contours for a given context cannot always be interpreted as a dialectal difference. In some cases, a given situation was interpreted by some speakers with an added pragmatic nuance (e.g. the broad-focus statements, which in some isolated responses contain an added meaning of obviousness). Moreover, since the original Catalan questionnaire contained a total of 47 situations that covered similar discourse contexts, this allowed for comparison with other sentences with similar pragmatic meanings. Finally, the fact that six of the authors are native speakers of one of the four major Catalan dialects (Central Catalan, Northwestern Catalan, Valencian Catalan, and Balearic Catalan) helped in the evaluation of whether the intonational choice was due to a dialectal difference or to a slight pragmatic interpretation difference.

2.3 Intonation

2.3.1 Statements

2.3.1.1 Broad-focus statements In all Catalan dialects, broad-focus statements are characterized by the presence of rising prenuclear pitch accents and a low final boundary tone. Depending on the dialect, the prenuclear accents are either late rising (L+<H*), as in Central, Northwestern, Valencian, and Majorcan, or early rising (L+H*), as in Algherese and Northern Catalan. In the former, early rising and late rising accents are phonologically distinct within a given variety, as in these dialects focus accents are early rising accents (see the arguments provided for Central Catalan for the contrast between L+H*and L+H* in Prieto et al. 2005). The nuclear configuration also varies across dialects: while most dialects (Central, Northwestern, Valencian, and Majorcan) realize the nuclear configuration as a L* L%, Algherese and Northern Catalan typically produce a sharply falling nuclear configuration H+L* L%.

Fig. 2.2 shows an example of the pitch contour of a broad-focus statement in Northwestern Catalan with the sentence La Maria menja mandarines ‘Maria is eating tangerines’. As we can see, the prenuclear late rising pitch movements (L+<H*) are associated with the stressed syllables -ri- and men-, whereas the nuclear accent associated with the stressed syllable -ri- is low L* and followed by a L% boundary tone. This is the pattern found in most of the Catalan dialects, as illustrated in
Map 2.1 in the Appendix with the results for the same broad-focus statement, *La Maria menja mandarines* 'Maria is eating tangerines', produced by a speaker of Northwestern Catalan (Lleida).

Fig. 2.2 Waveform, spectrogram, and F0 contour of the broad-focus statement *La Maria menja mandarines* ‘Maria is eating tangerines’, produced by a speaker of Northwestern Catalan (Lleida).

2.3.1.2 Narrow-focus statements  In contrast with broad-focus statements, in which all information contained in the sentence is new with respect to the background, narrow-focus statements carry new information in which a particular constituent is focalized with respect to the background (e.g. *My daughter’s name is Marina*, in response to the question *What’s your daughter’s name*?). Prosodically, this type of sentence does not differ greatly from broad-focus statements.

One specific type of narrow-focus statement is the so-called contrastive-focus statement, which refers to a sentence that expresses the direct rejection of an alternative (i.e. “It is B, and not A”) (Gussenhoven 2007a). The DCT interview
used in the present study contained the discourse context illustrated in (1) to elicit contrastive focus.

(1) DCT discourse context to elicit contrastive-focus statements

**INTERVIEWER:** You enter a store where there is a woman who is a little hard of hearing. She hasn’t heard you very well, and, after you tell her that you would like a couple of oranges, she asks you if it was lemons that you wanted. You tell her no, what you want is oranges.

**INTENDED RESPONSE:** No! TARONGES, vull! ‘No! I want ORANGES! (and not lemons!’)

Languages use different strategies to convey narrow contrastive focus. According to Elordieta (2007), languages can mark contrastive focus (a) by means of intonation, (b) via syntactic movement optionally combined with prosodic mechanisms to ensure prominence, or (c) by using specific morphemes also optionally combined with syntactic displacement and/or prosodic marking. Catalan uses either (a) or (b) to convey narrow contrastive focus. Word-order changes are generally used for focus marking, together with accompanying intonational strategies (Vallduví 1992; Estebas-Vilaplana 2009). The results of our survey show that, although the canonical sentence order in Catalan has the focus constituent in sentence-final position, a general strategy for indicating contrastive focus in the majority of Catalan dialects is...
to move the focus to sentence-initial position (e.g. *No! TARONGES, vull! ‘I want ORANGES! (and not lemons)*).

Regardless of the syntactic preferences of the speaker, the intonation contour associated with the focused element is the same in all dialects except Northern Catalan and Algherese. Figs 2.4 and 2.5 show the two main patterns found in Catalan. The first example (Fig. 2.4) is a case of focus fronting (*No! TARONGES, vull! ‘No! I want ORANGES!’*) produced by a speaker of Northwestern Catalan. The intonation contour associated with the focused element *TARONGES* is a rising pitch accent \( L+H^* \) associated with the stressed syllable \(-ron-\), followed by a low boundary tone \( L\% \) associated with the phrase-final syllable \(-ges-\). The second example (Fig. 2.5) is a case of in situ focalization (*Vull TARONGES, madama! ‘I want ORANGES, madam!’*) produced by a speaker of Northern Catalan. In this case, what marks the contrastive focus is not as much a falling nuclear pitch accent \( H^*+L \) followed by a low boundary tone \( L\% \) as a rising movement associated with the initial syllable of the focalized element *TARONGES*, namely the initial accent \( LHi \). This strategy has also been described in French and Occitan (see Chapters 3 and 6 of this volume). In both examples, the postfocal prosodic phrases *vull ‘I want’ and madama ‘madam’* display a very compressed pitch range. For a recent study on the realization of contrastive- and broad-focus sentences in Catalan, Spanish, and Italian, see Vanrell et al. (2013b).

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**Fig. 2.4** Waveform, spectrogram, and F0 contour of the narrow-focus statement *No! TARONGES, vull! ‘No! I want ORANGES!*, produced by a speaker of Northwestern Catalan (Lleida)
Map 2.2 shows the dialectal distribution of the target nuclear pitch configurations found in the responses to discourse contexts eliciting contrastive focus. The results show that the majority of dialects express contrastive focus through the nuclear configuration $L+H^* L\%$ with expanded pitch range, with the exception of Northern Catalan and Algherese. Algherese expresses it through the use of a rising–falling pitch configuration $H^*+L L\%$. In Northern Catalan, contrast is expressed like in French and in Occitan, namely by means of a rising initial accent associated with the initial syllable of the first lexical word of the element under focus, and pitch remains high until the nuclear configuration, which is falling ($H^*+L L\%)$.

2.3.1.3 Epistemically biased statements In the majority of Catalan dialects, the intonation of certain types of statement can be a linguistic tool to convey different types of epistemic biases on the part of the speaker. The DCT survey included situations that elicited certain types of sentence that expressed stance and attitude towards beliefs, such as the communication of obviousness or doubt, as well as direct contradiction of a preceding move in the conversation. Discourse markers that mark these epistemic biases tend to appear in these utterances, such as clar ‘clearly’, home ‘man’, òbviament ‘obviously’ in the case of obvious statements, potser, per ventura ‘perhaps’ in the case of uncertainty statements, and no ‘no’ in the case of contradiction statements.

Fig. 2.5 Waveform, spectrogram, and F0 contour of the narrow-focus statement *Vull TARONGES, madama! ‘I want ORANGES, madam!’,* produced by a speaker of Northern Catalan (Opol)
Fig. 2.6 Waveform, spectrogram, and F0 contour of the statement of the obvious *D’en Jaume!* ‘Jaume’s!’, produced by a speaker of Central Catalan (Girona)

Fig. 2.6 shows the intonation contour of the statement of the obvious (*Home*), *d’en Jaume!* ‘It is Jaume’s, of course!’ The nuclear pitch contour consists of a rising nuclear pitch accent L+H* followed by a complex L!H% boundary tone. This contour has also been documented in all Catalan dialects except in Algherese and Northern Catalan, which display the pitch contour typically associated with narrow focus. Interestingly, this L!H boundary contour has also been reported to appear frequently at the right edge of clitic-left dislocations in Catalan (Feldhausen 2010). It might well be that left-dislocations may reflect some notion of obviousness because they are (contextually) given and speakers might want to reflect in conversation that they are being referred to. Experimental evidence reported in Vanrell (2011) demonstrates that Catalan has a phonological contrast between the L+H* L!H% pitch contour (associated with obviousness meanings) and the L+H* LH% pitch contour (associated with echo questions, see §§2.3.2.2 and 2.3.4.2).

The melody shown in Fig. 2.7, on the other hand, encodes a contradictory opinion on the part of the speaker, and is characterized by a nuclear falling tone H+L* followed by a complex boundary movement HL%.

2.3.2 Yes/no questions

2.3.2.1 Information-seeking yes/no questions Information-seeking yes/no questions (also called neutral polar questions) are those in which the speaker is asking about something without any epistemic presupposition or expectation about the potential
response. The DCT survey uses the contextual discourse shown in (2) to elicit information-seeking questions:

(2) DCT discourse context to elicit information-seeking questions

**Interviewer:** You enter a store that you have never been in before and ask if they have tangerines.

**Intended response:** *Teniu mandarines?* ‘Do you have tangerines?’

Catalan yes/no questions display a rich dialectal variation which relates to the type of intonation contour, the presence of the sentence-initial interrogative particle *que* ‘that’, and its semantic/pragmatic properties. The Catalan conjunction *que* ‘that’ can head information-seeking (i.e. non-expectational or non-presuppositional) polar questions under certain conditions in Central, Northwestern, and Balearic dialects (e.g. *Que plou?* ‘Is it raining?’, *Que vindran a Ciutadella?* ‘Are they coming to Ciutadella?’). Its frequency of use depends on the specific dialect (e.g. within Balearic Catalan, while Minorcan yes/no questions are almost systematically headed by *que*, this is rather rare in Majorcan Catalan), and also on the potential pragmatic meanings that it conveys. In Central Catalan, for example, the optional use of this particle has been related to the marking of pragmatic differences related to proximity relations in discourse (Prieto and Rigau 2007; Astruc et al. in press). By contrast, in other dialects such as Valencian, Northern Catalan, and Northern Central Catalan
varieties, the presence of the interrogative particle *que* is restricted to counterexpec-
tational or confirmatory meanings (see §2.3.2.2). Interestingly, Algherese uses the
interrogative particle *a* as an optional marker for information-seeking questions (e.g.
*A vindràs?* ‘Will you be coming?'), which are always produced with the ¡H+L* L%
tonation pattern. The optional use of this particle is probably an influence of the
Sardinian language (e.g. Chapter 9, this volume).

In general, information-seeking yes/no questions headed by the particle *que* have a
predominantly falling intonation pattern H+L* L%, a pattern which is characteristic
of dialects of Catalan such as Central, Northwestern, Algherese, and the Balearic
varieties. Yet such correspondence is not very strict: for example, Minorcan Catalan
neutral polar questions headed by *que* can have a falling–rising nuclear pitch contour
(see Map 2.3 in the Appendix).

Map 2.3 shows the dialectal distribution of the pitch contours found for informa-
tion-seeking questions. Two main areas are depicted: the dialectal varieties that use
predominantly falling pitch patterns (Northwestern, Balearic, Algherese, and some
varieties of Central Catalan) and the dialectal varieties that use predominantly rising
pitch patterns (Northern and Valencian Catalan, and parts of Central Catalan).

Fig. 2.8 illustrates the falling intonation pattern with an example from North-
western Catalan. The falling contour starts with a rise to a high pitch which continues
up until the onset of the nuclear accented syllable. Then the pitch falls during the last
accented syllable in the prosodic phrase (¡H+L*) and is followed by a low boundary
tone (L%) which reaches the bottom of the speaker’s range. The alignment patterns
of H+L* nuclear falls in Central Catalan yes/no questions have been analyzed in
detail by Prieto (2009).

Fig. 2.9 illustrates the rising pitch pattern with an example produced by a Valen-
cian Catalan speaker. The rising intonation pattern can be characterized as follows.
The first stressed syllable of the utterance is pronounced with a rising accent, with
alignment properties differing as a function of the dialect (mainly L+<H* in Valen-
cian Catalan, L+H* in Northern Catalan, and L*+H in Central and Northwestern
Catalan), and the last stressed syllable receives a low nuclear accent (L*) followed by
a final rise (H%). In Central and Northwestern Catalan, the prenuclear pitch accent
L*+H which appears in questions is phonologically contrastive with the rising pre-
nuclear pitch accent L+<H* in statements (for an example of prenuclear L*+H in
Central Catalan, see Fig. 2.11).

Besides the partition into dialects that predominantly use the rising vs. the falling
intonational contours, Map 2.3 also reveals the presence of other intonation contours,
which appear with very limited scope. First, a falling–rising nuclear configuration H+L*
H% has been documented in the three localities in Menorca, showing a sub-dialectal

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3 For more information on the dialectal variation of yes/no questions headed by *que*, see Prieto and
Rigau (2007), Martínez Celdrán et al. (2005a), and Fernández Planas (2009).
Fig. 2.8 Waveform, spectrogram, and F0 contour of the information-seeking question *Teniu taronges?* ‘Do you have oranges?’, produced by a speaker of Central Catalan (Berga)

Fig. 2.9 Waveform, spectrogram, and F0 contour of the information-seeking question *Tenen mandarines?* ‘Do you have tangerines?’, produced by a speaker of Valencian Catalan (Dénia)
distinction within Balearic Catalan. Second, cases of L+H* H% have been reported in Northern Catalan (e.g. Saorra), in line with what is documented in the contact language, French (Chapter 3 in this volume), and in the neighboring Occitan (Chapter 6).

Finally, it is important to note that some of the dialects characterized by the falling H+L* L% tonal configuration have been shown to have a phonological distinction between two types of H+L* L% nuclear pitch pattern. Recent experimental work by Vanrell (2011) and Vanrell et al. (2013a) on Balearic Catalan has shown the need to propose a phonological contrast between a H+L* L% nuclear pitch pattern and an ¡H+L* L% pitch pattern (with an extra-high leading tone). In this dialect, information-seeking yes/no questions are realized with the ¡H+L* L% pitch pattern, and wh-questions and confirmation yes/no questions are realized with the H+L* L% pitch pattern. An example of the contrast between information- and confirmation-seeking yes/no questions is given in Fig. 2.13. Even though the need for this distinction in other dialects has yet to be proven experimentally, similar configurations have been documented in Northwestern Catalan and Algherese Catalan.

2.3.2.2 Echo yes/no questions  Echo questions are questions that are used to signal a failure to understand the previous move in a conversation and thus typically repeat (or ‘echo’) information just mentioned in the discourse (e.g. Speaker A: He parlat amb el president ‘I have spoken to the president’; Speaker B: (Disu que) has parlat amb el president? ‘(You say that) you have spoken with the president?’). Even though echo questions can express a genuine failure to understand the utterance, in face-to-face conversation they most often convey some type of counterexpectational meaning such as surprise, incredulity, disapproval, and even outrage. All these meanings indicate that the situation contradicts the speaker’s expectations.

In this section, we will report on the prosodic realization of these two types of biased question. In the DCT survey, repeat echo question were elicited with the discourse context shown in (3):

(3) DCT discourse context to elicit echo questions

**INTERVIEWER:** Someone tells you the time, but you didn’t hear them very well. You think that they said one o’clock. You ask them again if they said it was one.

**INTENDED RESPONSE:** *(Has dit que) és la una? ‘(Did you say) it’s one o’clock?’*

The discourse context in (4) was used to elicit echo questions with a counterexpectational or incredulity meaning.

(4) DCT discourse context to elicit incredulity questions

**INTERVIEWER:** You are told that your friend Jaume has decided to run for mayor. You can’t believe it, and you ask for confirmation.

**INTENDED RESPONSE:** *En Jaume, es presenta per a alcalde?! ‘Jaume’s running for mayor?!’*
Map 2.4 shows the distribution of the intonation patterns found for the expression of echo questions elicited with the discourse context in (3). As can be seen, almost all dialects (Northern Catalan, Northwestern Catalan, Central Catalan, and Valencian Catalan) use the rising intonation pattern L* H%. If we compare the results shown in Map 2.4 with the results in Map 2.3 (information-seeking questions), we observe that dialects such as Central and Northwestern Catalan have a stronger tendency to use the rising intonation pattern for echo questions than for information-seeking questions. Moreover, the use of the dialectal variant of L* H%, L+H* H%, appears in the sub-dialectal area called Tortosí, which is a frontier region between Northwestern and Valencian Catalan. As for the use of the falling intonation patterns, only Balearic Catalan and Algherese use the falling pitch contours for echo questions (a H+L* L% contour with expanded pitch range in Majorcan and Minorcan Catalan and a H*+L L% contour in Algherese). A fourth type of nuclear pitch contour is L+¡H* L%, which has been documented in some locations across different dialectal areas. The contour starts with a low pitch that continues until the last stressed syllable in the utterance, which is pronounced with an extra-high L+¡H* pitch accent. This nuclear configuration has also been documented extensively for echo wh-questions (see §2.3.4.2). Borràs-Comes (2012) and Borràs-Comes et al. (2013) carried out a set of perception experiments which showed that, at least for Central Catalan, there is a need for a phonological contrast between L+H* L%, which is the common realization of contrastive focus, and L+¡H* L%, as a common realization of echo questions.

Figures 2.10–2.12 illustrate three of the intonation patterns found for echo questions. Fig. 2.10 shows the falling intonation pattern with the echo question Que són la una? ‘Is it one o’clock?’ produced by a speaker of Balearic Catalan. Fig. 2.11 shows the rising intonation contour of the echo question M’has dit la una? ‘Did you say it was one o’clock?’ produced by a speaker of Central Catalan. Finally, Fig. 2.12 shows the variant of the rising intonation contour L+H* H% with the echo question M’has dit que és la una? ‘Did you say it is one o’clock?’ produced by a speaker of Northwestern Catalan (Tortosí area).

Map 2.5 shows the distribution of the intonation patterns found for the expression of incredulity questions elicited with the discourse context in (4). The intonation patterns used, as well as their distributional patterns, are very similar to the ones obtained for echo questions (see Map 2.4). In general, Central Catalan and Northwestern Catalan use the rising pattern for expressing this meaning, in contrast with information-seeking yes/no questions and confirmation-seeking questions (see Map 2.5). Typically, the prosodic difference between the two types of echo question (understanding echo questions vs. surprise/incredulity echo questions) lies in the fact that the latter are produced with a wider pitch range and sometimes with a creaky or whispery voice. Recent experimental evidence gathered by Crespo-Sendra (2011) has shown a consistent pitch range distinction between information-seeking
Fig. 2.10 Waveform, spectrogram, and F0 contour of the echo question Que són la una? ‘It’s one o’clock?’, produced by a speaker of Balearic Catalan (Es Migjorn Gran)

Fig. 2.11 Waveform, spectrogram, and F0 contour of the echo question M’has dit la una? ‘Did you say [it was] one o’clock?’, produced by a speaker of Central Catalan (Vic)
and incredulity questions in Central and in Valencian Catalan, which is analyzed as a gradual phonetic distinction.

As for the expression of incredulity or counterexpectational questions, as mentioned before, some Catalan dialects use interrogative particles to mark these utterances. For example, in Minorcan Catalan (a variety of Balearic), counterexpectational questions are usually headed by the disjunctive conjunction o ‘or’ (O vindrás a Barcelona? No m’esperava que mos acompanyassis ‘Are you coming to Barcelona? I didn’t think you were coming with us’). Even though questions headed by o did not show up in our results, they display a specific intonation contour characterized by a L+¡H* L% nuclear accent (see Prieto and Rigau 2007).

2.3.2.3 Confirmation-seeking yes/no questions Confirmation-seeking yes/no questions are questions in which the speaker expresses some type of presupposition or knowledge about the answer. In Catalan, a strong presuppositional take on the answer is typically expressed by a confirmation question headed by a question marker followed by the conjunction que. Catalan dialects display a great lexical variety of such markers (Oi/no/eh que no vindràs? ‘You’re not coming, are you?’). The latter sentences reveal that the speaker is expecting a negative answer; correspondingly, if the sentences were not negated the expected answer would be positive (Oi/no/eh que vindràs? ‘You’re coming, are you?’). Yet there are other types of confirmation question in which the speaker shows he has some knowledge or
hypothesis about the potential answer, without being certain about it. To obtain this type of confirmation question, the DCT survey used the following discourse context:

(5) DCT discourse context to elicit confirmation questions

**Interviewer:** You phone the home of your friend Maria but she’s not there. Later you call again but her father answers. You ask her father if she is there.

**Intended response:** *Que ja hi és, la Maria?* ‘Did Maria arrive yet?’

The results in Map 2.6 for the intonation of the confirmation question (*Que) ja hi és, la Maria?* ‘Did Maria arrive yet?’ show some coincidences with the dialectal distribution found for information-seeking questions (see Map 2.3). The main difference between the two maps lies in the fact that the falling pitch contour appears more frequently for confirmation than for information-seeking questions in the Central Catalan and Northwestern Catalan dialectal areas. On the other hand, Valencian and Northern Catalan maintain their tendency to use the rising intonation pattern.

In the case of Balearic Catalan, both information-seeking and confirmation questions are produced with a falling pitch pattern. Yet the prosodic difference between the two lies in the form of the nuclear pitch accent of the sentence, which has been investigated by Vanrell et al. (2013a) for Majorcan Catalan. While information-seeking questions are produced with a nuclear falling pitch accent with an extra high (or upstepped) leading tone ¡H+L* L% (Fig. 2.13, upper panel), confirmation questions are produced with a nuclear falling pitch accent with a non-upstepped leading tone H+L* L% (Fig. 2.13, lower panel). The two sentences illustrated in Fig. 2.13 were produced by the same speaker from Llucmajor. Note that the difference in pitch height of the leading tone H associated with the pretonic syllable *-da-* in *Mandarines* between the two sentences is of 7.2 semitones (more than half an octave in musical terms). This same pattern has been documented for the other two Balearic Islands, Minorca and Ibiza, and also for Northwestern and Algherese Catalan.

### 2.3.3 Wh-questions

#### 2.3.3.1 Information-seeking wh-questions

Wh- interrogatives are utterances that ask for a specific piece of information. In Catalan, as in other Romance and Germanic languages, wh-questions are headed by wh-words such as *qui* ‘who’, *què* ‘what’, or *on* ‘where’, among many others, showing that wh-movement to the left periphery applies in this language. However, there are some circumstances in which wh-movement does not operate, such as echo questions (*Que t’han dit què?* ‘You were told what?’) or multiple wh-expressions (*Qui fa què en els centres educatius?* ‘Who does what in the education centers?’). From a syntactic point of view, the fact that the wh-element occupies the left periphery of the sentence entails the right dislocation of the subject, which is generally phrased separately (e.g. *Què menja, la Maria?* ‘What does Maria eat?’). The focus in wh-questions is on the wh-word, which is marked by
Fig. 2.13 Waveform, spectrogram, and F0 contour of the information-seeking question *Teniu mandarines?* ‘Do you have tangerines?’ and the confirmation question *Teniu mandarines?* ‘Do you have tangerines?’, produced by the same speaker of Balearic Catalan (Majorcan, Llucmajor)
its position but not prosodically, since the most prominent accent is located at the rightmost position of the phrase. In Catalan, differences in pitch accent choice are the alternative to de-accenting in the Germanic languages.

The discourse context in (6) was used to elicit information-seeking wh-questions across the 70 Catalan localities:

(6) DCT discourse context to elicit information-seeking wh-questions

**INTERVIEWER:** You are about to travel to Paris and you want to buy a gift for someone there that you do not know very well but on whom you want to make a good impression. You ask a friend what they would get if they were in your situation.

**INTENDED RESPONSE:** Què li portaries? 'What would you get him/her?'

Map 2.7 in the Appendix shows the dialectal distribution of the nuclear pitch configurations of the wh-questions elicited by the discourse context shown in (6). There is a clear dialectal partition with respect to the intonation used for information-seeking wh-questions. On the one hand, Central Catalan, Northwestern Catalan, Northern Catalan, and part of Balearic Catalan typically produce wh-questions with a H* L% nuclear configuration. An example of this type of pitch contour is illustrated in Fig. 2.14, and was produced by a speaker of Central Catalan. The wh-word is produced with a H* pitch accent and is followed by a high plateau which

![Waveform, spectrogram, and F0 contour of the information-seeking wh-question Què li portaries? 'What would you get him/her?', produced by a speaker of Central Catalan (Santa Coloma de Farners)]
is maintained until the last accented syllable of the prosodic phrase, which is pronounced as H*. After this, it falls to the baseline of the speaker at the end of the utterance (L%).

On the other hand, the pitch configuration H+L* L% was documented in Valencian, Algherese, and some parts of Balearic Catalan. This type of pitch contour is illustrated in Fig. 2.15, as produced by a speaker of Valencian Catalan. In this case, the pitch rises until the last pretonic syllable in the sentence, then falls during the nuclear accented syllable and finally continues low until the end of the utterance (H+L* L%).

Three other pitch contours were documented for wh-questions, with a more limited geographical distribution (see Map 2.7). First, the L* L% nuclear configuration, which coincides with the intonation contour used for broad-focus statements, has been documented in some localities. Second, a L* HL% pitch configuration, which uses the contour used for requests (see §2.3.5.2). Finally, a rising pitch contour, a H+L* H% pitch configuration, has been documented in some localities. The pitch contour in Fig. 2.16 illustrates the falling–rising nuclear pitch contour H+L* H% most probably functioning as a politeness marker, like in Italian and Portuguese (see Chapters 5 and 7 in this volume).

2.3.3.2 Echo wh-questions  Echo wh-questions typically have the discourse function of repeating a wh-question uttered in the immediately preceding conversational move. As in the case of yes/no questions, this discourse function can also have an added meaning of surprise and incredulity. The following discourse context was used
to elicit this sort of confirming echo wh-question. This type of question in fact naturally requires a yes or no answer. Thus, even though the question has the form of a wh-question, it elicits a polarity answer.

(7) **DCT discourse context to elicit echo wh-questions**

**Interviewer:** Someone asks you where you are going, but you don’t think you have understood them very well. You try to clarify what they have just asked.

**Intended response:** *(M’heu demanat) que on anava?* ‘Did you ask me where I was going?’

The results in Map 2.8 show that echo wh-questions are generally associated with a melody that is quite distinct from that of information-seeking wh-questions (see Map 2.7) and can be related more closely to that of echo yes/no questions (see §2.3.2.2 and Map 2.4). Central, Northern, Valencian, and some parts of Minorcan and Ibizan Catalan produce these sentences with a predominantly rising intonation pattern of the type L* H% (again, the Tortosí region produces a distinct version of this rising pitch pattern, namely L+H* H%). On the other hand, Majorcan and Algherese Catalan produce these sentences with a falling intonation pattern H+L* L%. The circumflex L+H* L% pitch contour is more widespread than it was in the case of the echo yes/no questions (see Fig. 2.17). Finally, the L+H* LH% pitch contour (Fig. 2.18) appears sporadically in some parts of Northwestern, Central, and Balearic Catalan.
Fig. 2.17 Waveform, spectrogram, and F0 contour of the echo wh-question Què m’has demanat, on anava? ‘What did you ask me? Where was I going?’, produced by a speaker of Central Catalan (Ripoll)

Fig. 2.18 Waveform, spectrogram, and F0 contour of the echo wh-question On vaig? ‘Where am I going?’, produced by a speaker of Central Catalan (Berga)
2.3.4 Imperatives: commands and requests

Imperative utterances are interpreted as directive speech acts, i.e. speech acts intended to get the hearer to perform the action described by the proposition. Their illocutionary strength can range from a strong command to a gentle request, and, as we will see, prosody plays an important role in its conveyance. In Catalan, imperative utterances are usually expressed by verb-initial sentences in the imperative mood (e.g. *Vine ara mateix!* ‘Come here right now!’). In this section we describe the prosodic characteristics of these types of utterance and how they are related to the force of the imperative speech act.

2.3.4.1 Commands

The discourse context used in the DCT questionnaire to obtain strong commands (in this case directed to a child) was the following:

(8) DCT discourse context to elicit strong commands

INTERVIEWER: You are at the park with your niece. She is running and gets further and further from you. You are becoming alarmed because there is heavy traffic on the avenue beside the park. You tell her to come back to where you are.

INTENDED RESPONSE: *Vine!* or *Vine ara mateix!* ‘Come here!’ or ‘Come here right now!’

Map 2.9 shows the distribution of nuclear pitch configurations found in the production of commands across Catalan dialects. The results show the use of two main intonation patterns, which are not dialectally distributed. The first of these intonation patterns is \( L^+H^*L\% \), and expresses assertive commands. Fig. 2.19 illustrates this pattern, which is characterized by a rising pitch accent \( L^+H^* \) associated with the accented syllable (\( vi- \)) followed by a \( L\% \) boundary tone associated with the posttonic syllable (\( -ne \)). In general, the pronunciation of these intonation contours confirms previous observations on the characteristic features of imperative intonation: the use of a wider tonal range, an increase in intensity, and a rather fast speech tempo (Prieto 2002a).

The second common intonation pattern illustrated in Map 2.9 is \( L^+H^*HL\% \). Fig. 2.20 illustrates this pitch configuration, which is characterized by a rising pitch movement whose highest part is extended well into the posttonic vowel, followed by a final fall. This intonation contour is associated with a softer command.

Map 2.9 also shows some instances of the rising interrogative pattern \( L^*H\% \), which is sometimes used as a soft command, and some instances of the \( L^*L\% \) intonation pattern similar to that found in broad-focus statements (see §3.1.1) also appears when the target sentence is longer than one word, such as in *Vine aquí!* or *Vine ara mateix!* ‘Come here’ or ‘Come now right now’.

2.3.4.2 Requests

Requests are utterances that are characterized by a stronger degree of persuasion on the part of the speaker, who is trying to induce a response from his
Fig. 2.19 Waveform, spectrogram, and F0 contour of the command Vine! ‘Come here!’, produced by a speaker of Central Catalan (Solsona)

Fig. 2.20 Waveform, spectrogram, and F0 contour of the insistent command Vine! ‘Come here!’, produced by a speaker of Northwestern Catalan (Vall-de-roures)
or her interlocutor(s). The discourse situation used to elicit requests is reproduced in (9):

(9) DCT discourse context to elicit requests

**Interviewer:** You want to go to the movies with a friend. They tell you that they have work that they need to do, but you know that they can leave it for later. What do you say to convince him/her to accompany you?

**Intended response:** Vine...! Please come...!

Fig. 2.10 shows the variation found in the intonation contours obtained as responses to the situation in (9). The most common melodic pattern found in Central Catalan, Northwestern Catalan, and part of Balearic Catalan is $L^* HL\%$, i.e. a low tone aligned with the nuclear accented syllable followed by a complex rising–falling movement associated with the posttonic. In these dialects, and especially in Northwestern Catalan and Balearic Catalan, the more conservative varieties, the pitch contour $L+H^* LHL\%$ also appears as a possibility. This contour, which is characterized by a complex rising–falling boundary movement, expresses a higher degree of insistence on the part of the speaker. Finally, these patterns have rarely been documented for either Northern Catalan or Algherese Catalan. Rather, speakers from these areas most frequently produce requests with intonation contours that are very productive in the dialects, namely the $L+H^* L\%$ pitch pattern in Northern Catalan and the $H+L^* L\%$ pattern in Algherese.

Fig. 2.21 illustrates the most common intonation pattern used to express a gentle request in Catalan ($L^* HL\%$) as produced by a speaker of Valencian Catalan.

Fig. 2.22 shows an insistent request ($L+H^* LHL\%$) which ends in a rise–fall–rise pitch movement. Again, this is the Catalan utterance-final “insistence tune” (see Prieto 2001). It is illustrated with an example produced by a speaker of Northwestern Catalan.

In sum, Catalan prosodically distinguishes between soft requests and commands by pitch accent choice ($L+H^*$ in commands and $L^*$ in requests) and by final boundary marking ($L\%$ vs. $HL\%$). Furthermore, differences in boundary tones can express a variety of illocutionary meanings such as degree of insistence (e.g. $HL\%$ vs. $LHL\%$). Similarly, prosodic features such as duration also signal important pragmatic differences in the degree of involvement and insistence of the speaker (e.g. the stronger the insistence, the longer the duration of the sentence). Thus the illocutionary strength of imperative utterances is expressed through the use of intonation and other prosodic features such as duration and intensity.

2.3.5 Vocatives

Vocatives have the function of calling the interlocutor or interlocutors with the aim of activating or re-establishing the communication channel. The DCT provides two
Fig. 2.21 Waveform, spectrogram, and F0 contour of the request *Vine!* ‘(Please) come along!’, produced by a speaker of Valencian Catalan (Llíria).

Fig. 2.22 Waveform, spectrogram, and F0 contour of the insistent request *Vine!* ‘(Please) come here!’, produced by a speaker of Northwestern Catalan (La Seu d’Urgell).
situations included to elicit vocatives: while (10a) elicits an initial call to a person that is not visible in the scene, (10b) is an insistent greeting call uttered after a first call meets with no response.

(10a) DCT discourse context to elicit first contact calls

INTERVIEWER: You enter the flat of your friend Maria but she is not visible from the hall. You guess that she is up in her room. You call up to her.

INTENDED RESPONSE: Maria!

(10b) DCT discourse context to elicit insistent calls

INTERVIEWER: Ten seconds pass but there is no answer. You decide Maria must be at the very back of the flat so you call her again.

INTENDED RESPONSE: Maria!

2.3.5.1 Initial call Results in Map 2.11 show that initial calls in the situation expressed in (10a) have three main realizations which are documented in all Catalan dialects except in Northern Catalan. First, the most common pitch pattern found in the greeting call is the $L^+H^*\text{ HL}\%$ intonation pattern (see Fig. 2.23). The second most frequent intonation pattern is the so-called ‘vocative chant’, $L^+H^*!H\%$, which, as in other European and most Romance languages, is realized with a sustained mid boundary tone (see Fig. 2.24). Sporadically, speakers called the person by using an interrogative sentence with a rising intonation pattern $L^*H\%$, though this was not a frequent realization. Finally, dialectal traits appear in the case of Northern Catalan and Algherese: while Northern Catalan is characterized by a very systematic use of the $L^+H^*L\%$ pitch contour for greetings, Algherese used the $H^+L^*L\%$ pitch contour.

Fig. 2.23 illustrates the $L^+H^*\text{ HL}\%$ pitch configuration for the vocative Maria! produced by a speaker of Central Catalan. It is characterized by a rising pitch accent on the nuclear syllable, immediately followed by the posttonic stretch, formed by a high plateau and then a fall until the end of the sentence. Note that the phonetic realization of the $\text{HL}\%$ movement is different from the $L\%$ target in that there is an extensive $H\%$ stretch which spreads over to the whole of the posttonic syllable in examples such as Bàrbara!, or to the mid portion of the posttonic vowel in examples such as Maria!

Fig. 2.24 illustrates the vocative chant in Catalan, which is characterized by a rising pitch accent associated with the nuclear syllable followed by a fall to sustained pitch until the end of the contour. Sustained pitch has been analyzed in Cat_ToBI, as in the rest of Romance languages in this volume, as having an $!H\%$ boundary tone, which in this particular contour spreads to the left in the posttonic stretch. That is, the spreading goes together with the extreme final lengthening that we also find in the calling contour, as also described for Portuguese (see Frota 2014; Chapter 7 in this volume).
FIG. 2.23 Waveform, spectrogram, and F0 contour of the vocative Maria!, produced by a speaker of Central Catalan (Solsona)

FIG. 2.24 Waveform, spectrogram, and F0 contour of the vocative Maria!, produced by a speaker of Northwestern Catalan (Balaguer)
2.3.5.2 Insistent call  The results in Map 2.12 show the melodic realizations obtained for the insistent (or second) call across Catalan dialects. The results in this map show that the predominant insistence pattern is the vocative chant, L+H* !H% (see Fig. 2.24). A recent study on Central Catalan vocatives (Borràs-Comes et al. 2013) analyzed the influence of four sociopragmatic features in the selection of intonation contours in vocative production: social distance, power balance, physical distance, and insistence in the call. Their results confirmed the tendency found here: L+H* !H% is mostly found for second (insistent) calls, whereas L+H* HL% is mostly used for first calls. Interestingly, it was found that when the call is directed to a subordinate, speakers use L+H* !H% more frequently than when they call a superior.

Map 2.12 shows the sporadic appearance of five other pitch contours. First, in Northern Catalan the vocative L+H* L% pitch contour appears most consistently, as it appeared in initial calls (see Map 2.11). Second, the L+H* HL% pitch contour, which was so common in the first call, appears very seldom in this case. Third, two types of interrogative rising pitch contour appear: L* H% and L+H* LH%. Fig. 2.25 shows an example of this type of contour with the vocative Maria! produced by a speaker of Central Catalan.

Finally, the only case of L* L% is found in Majorcan Catalan, and corresponds to the sentence O Margalida! In some varieties of Catalan (Algherese and Balearic Catalan), vocatives with a more emphatic nuance can be expressed by the addition of the sentence-initial particle o and a nuclear falling intonation (i.e. O Margalida!).

![Fig. 2.25 Waveform, spectrogram, and F0 contour of the vocative Maria!, produced by a speaker of Central Catalan (Ripoll)](image)
The intonation pattern of these types of vocatives is characterized by a falling tonal movement followed by a low boundary tone.

Another characteristic of Algherese vocatives is that they can be truncated, i.e. they can undergo deletion of the segmental material following the stressed vowel (e.g. Maria > Mari, Pasqualino > Pasquali, Rita > Ri, Juan > Juà). As an alternative to the presence of the particle o as a marker of insistence, Algherese vocatives can also present a rising–falling pitch accent associated with the first syllable of the target name. This feature, which is also found in Sardinian (see Chapter 9 in this volume), has been interpreted as stress shift by more traditional approaches (Kuen 1932). The association of the rising–falling pitch accent with the first syllable of the name is only found in truncated base names, and preferably in bisyllabic truncates (i.e. Francé or Mari vs. Pasqualí or Caterí).

2.3.6 Intonational analysis: summary

2.3.6.1 Pitch accents The dialects of Catalan have used the same seven basic phonological inventory of pitch accents, namely H*, L+H*, L+¡H*, L+<H*, 4 L*, L*+H, and H+L*, five of them nuclear pitch accents, with the addition of the H*+L and the ¡H+L* pitch accents, which are only used in some varieties. Thus in general, the same basic inventory presented for the Cat_TOBI proposal for the analysis of Central Catalan (e.g. Prieto et al. 2009; Aguilar et al. 2009–11; Prieto 2014) can be maintained to analyze cross-dialectal variation. Table 2.1 shows a description of the phonetic realization of the monotonal and bitonal pitch accents used by the majority of Catalan dialects, together with the schematic contour and main pragmatic functions. Table 2.2 represents the two pitch accents found in a more limited number of varieties of Catalan. In the schematic contours, the shaded part of each contour shape indicates the stressed syllable.

2.3.6.2 Boundary tones Given that in Romance languages the prosodic nucleus is located at the end of prosodic phrases, several authors have argued that the phrase accent category is not needed before IP boundaries (Sosa 1999 for Spanish, Frota 2014 for Portuguese). Following this line of reasoning, Cat_TOBI does not posit the existence of an ip phrase accent category before the IP boundary tone. That means that boundary tonal movements before an IP will be signaled by either simple or complex boundary tones. Seven types of boundary tone have been attested before the IP level: L%, H%, ¡H%, L!H%, LH%, HL%, and LHL%, depending on the number of target tones. For example, the LH% configuration is phonetically realized as a fall followed by a rise in the posttonic stretch. The fact that we do not need phrase accents at the ends of IPs is independent from the fact that phrase accents do mark the end of ips in Catalan. Four types of phrase accent tones have been attested at the

4 The late rising prenuclear pitch accent is not found in Northern or Algherese Catalan.
Table 2.1 Inventory of pitch accents used in the majority of Catalan dialects: schematic contour, phonetic description, and main pragmatic functions

<table>
<thead>
<tr>
<th>Pitch Accent</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H*</td>
<td>High plateau, and no initial dip is observed. In our corpus, it is attested as one of the possible choices for nuclear position in wh-questions.</td>
</tr>
<tr>
<td>L*</td>
<td>This pitch accent is phonetically realized as a low plateau. It is generally realized as a local pitch minimum in the speaker’s range. It is attested in nuclear position in broad focus statements and in yes/no questions (rising type).</td>
</tr>
<tr>
<td>L+H*</td>
<td>This pitch accent is phonetically realized as a rising pitch movement during the accented syllable. The rise starts at the onset of the accented syllable and ends at the end of that syllable. It is attested in nuclear position in broad and narrow focus statements, and in combination with a variety of boundary tones in calls, statements of the obvious, etc.</td>
</tr>
<tr>
<td>L+¡H*</td>
<td>This pitch accent is phonetically realized as a rising pitch movement to an extra-high level during the accented syllable. It characterizes echo questions.</td>
</tr>
<tr>
<td>L+&lt;H*</td>
<td>This pitch accent is also phonetically realized as a rising pitch movement. Typically, the L tone is aligned with the onset of the accented syllable, and the H tone is aligned with the post-accentual syllable. This is the predominant choice for prenuclear accents in broad-focus statements.</td>
</tr>
<tr>
<td>L*+H</td>
<td>This pitch accent is realized as a low tone on the accented syllable followed by a rise on the posttonic syllable. The peak is typically realized at the end of the posttonic syllable, and sometimes later. In our corpus, it is attested in prenuclear position in yes/no questions and requests.</td>
</tr>
<tr>
<td>H+L*</td>
<td>This pitch accent is phonetically realized as a fall within the accented syllable. The start of the fall is aligned with the beginning of the accented syllable and the end of the fall is aligned (roughly) with the end of the stressed syllable. It is attested in nuclear position in yes/no questions (falling type).</td>
</tr>
</tbody>
</table>

end of ips (marked with the - symbol after the tone), namely, L-, !H-, H-, and LH-. Table 2.3 describes the phonetic manifestation of the seven types of boundary tone, together with the sentence types in which they are typically found. In the idealized contours, the shaded part of the contour indicates the posttonic syllable (or syllables) the boundary tones are associated with.

2.3.6.3 Nuclear configurations Based on the descriptions offered in §§ 2.3.1–2.3.6, Table 2.4 illustrates the 15 distinctive nuclear tonal configurations reported in this chapter. It is thus clear that not all possible combinations of pitch accents plus boundary tones are possible in the language, as sometimes only one combination is
Table 2.2 Pitch accents with a more restricted dialectal distribution in Catalan: schematic contour, phonetic description, and main pragmatic functions

<table>
<thead>
<tr>
<th>Accent</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>H*+L</td>
<td>A fall from a peak located within the stressed vowel. It is found in contrastive focus statements and statements of the obvious in Northern Catalan, and in several sentence types (including contrastive focus statements, statements of the obvious, and yes/no questions with fronted constituents) in Algherese Catalan.</td>
<td></td>
</tr>
<tr>
<td>¡H+L*</td>
<td>A fall from a extra-high pretonic syllable. It is found in the nucleus of information-seeking yes/no questions in Balearic, Algherese, and Northwestern Catalan.</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.3 Schematic contours of seven types of boundary tone combination at the IP level in Catalan

<table>
<thead>
<tr>
<th>Contour</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>L%</td>
<td>A low sustained tone or a low descending tone that attains the baseline of the speaker. It is attested at the end of broad and narrow focus statements, imperatives, falling yes/no questions, etc.</td>
<td></td>
</tr>
<tr>
<td>!H%</td>
<td>A rising movement to a target mid tone or a mid stylized sustained tone. It is attested in uncertainty statements and vocative chants.</td>
<td></td>
</tr>
<tr>
<td>H%</td>
<td>A very sharp rising pitch movement at the end of the phrase, often attaining a very high frequency in the speaker’s range. It is attested at the end of rising yes/no questions and echo questions.</td>
<td></td>
</tr>
<tr>
<td>LH%</td>
<td>A low target and then a rise to a high F0 value. It is attested in counterexpectational and incredulity questions.</td>
<td></td>
</tr>
<tr>
<td>L!H%</td>
<td>A low tone followed by a rise to a mid F0 value. It is attested in statements of the obvious.</td>
<td></td>
</tr>
<tr>
<td>HL%</td>
<td>A high plateau followed by a fall to a low F0 value. It is attested after high or low pitch accents in contradictions, requests, and vocatives.</td>
<td></td>
</tr>
<tr>
<td>LHL%</td>
<td>A complex pitch movement consisting of a fall plus a rise and then a fall to a low F0 value. It is found in exhortative requests.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2.4 Inventory of Catalan nuclear configurations, their schematic representations, and their use in several sentence types

<table>
<thead>
<tr>
<th>Nuclear configuration</th>
<th>Sentence types where it is used</th>
</tr>
</thead>
<tbody>
<tr>
<td>L* L%</td>
<td>Broad-focus statements, narrow-focus statements, information-seeking wh-questions</td>
</tr>
<tr>
<td>L* H%</td>
<td>Information-seeking yes/no questions</td>
</tr>
<tr>
<td>L+H* H%</td>
<td>Information-seeking yes/no questions</td>
</tr>
<tr>
<td>H+L* L%</td>
<td>Information-seeking yes/no questions, confirmation-seeking yes/no questions, information-seeking wh-questions (Valencian)</td>
</tr>
<tr>
<td>¡H+L* L%</td>
<td>Information-seeking questions (Balearic)</td>
</tr>
<tr>
<td>H* L%</td>
<td>Information-seeking wh-questions</td>
</tr>
<tr>
<td>H*+L L%</td>
<td>Contrastive focus (Algherese, Northern Catalan)</td>
</tr>
<tr>
<td>L+H* L%</td>
<td>Contrastive focus, narrow focus, vocatives (Northern Catalan)</td>
</tr>
<tr>
<td>L+H* !H%</td>
<td>Vocatives, uncertainty statements, yes/no questions (Northwestern, Tortosí area)</td>
</tr>
<tr>
<td>L+¡H* L%</td>
<td>Echo yes/no questions, echo wh-questions</td>
</tr>
<tr>
<td>L+H* HL%</td>
<td>Requests, vocatives</td>
</tr>
</tbody>
</table>

(continued)
possible (e.g. the tritonal LHL% boundary tone can only be combined with a \( L+H^{*} \) pitch accent).

### 2.4 Conclusions

In this chapter we have presented an analysis of the intonational variation found for a variety of sentence types across the six major Catalan dialects: the Central, Northwestern, Valencian, Balearic, Northern, and Algherese varieties. A Discourse Completion Task survey with 47 discourse contexts was administered to 144 Catalan speakers in 70 localities. The DCT methodology allowed us to obtain comparable semi-spontaneous responses to discourse contexts that elicit a set of sentence types with specific pragmatic intentions.

The dialectal results presented in this chapter have revealed interesting patterns of variation in Catalan, which can be visually assessed through the use of maps. With respect to statements, all dialects are characterized by a falling nuclear pitch configuration \( L^{*} L\% \), with the exception of Northern Catalan and Algherese, which have a \( H+L^{*} L\% \) configuration (the former with an optional initial accent LHi; see §2.3.1.1). This intonation pattern composed of an optional initial accent plus a \( H+L^{*} \) configuration has also been described for French and Occitan (see Chapters 3 and 6 in this volume). In general, Northern Catalan and Algherese stand out as displaying the more distinct intonation systems (see the dialectometric analysis presented in Prieto and Cabré 2013). Arguably, this situation has been favored by the fact that Northern

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### Table 2.4 Continued

<table>
<thead>
<tr>
<th>Nuclear configuration</th>
<th>Sentence types where it is used</th>
</tr>
</thead>
<tbody>
<tr>
<td>( L^{*} HL% )</td>
<td>Requests, vocatives, contradictory statements</td>
</tr>
<tr>
<td>( L+H^{*} L!H% )</td>
<td>Statements of the obvious</td>
</tr>
<tr>
<td>( L+H^{*} LH% )</td>
<td>Echo questions, incredulity questions</td>
</tr>
<tr>
<td>( L+H^{*} LHL% )</td>
<td>Insistent requests, insistent vocatives</td>
</tr>
</tbody>
</table>

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46 Pilar Prieto et al.
Catalan and Algherese have been in intense contact with neighboring languages (French in the case of Northern Catalan, and Sardinian in the case of Algherese) for centuries.

The dialectometric analysis presented in Prieto and Cabré (2013), which has taken into account the 1,400 data points from 20 dialectal maps, is summarized in Fig. 2.26 through the use of a schematic dendrogram. Firstly, Central and Northwestern Catalan were grouped into the same geoprosodic area, despite belonging to the East and West groups, respectively. It is important to note that both dialects belong to the politically autonomous region of Catalonia and therefore they are in a situation of intense interdialectal contact. Balearic and Valencian Catalan, which belong to two separate autonomous regions of Spain (Comunitat de les Illes Balears and the Comunitat Valenciana), are increasingly different from the Central-Northwestern varieties (Balearic to an even greater degree than Valencian). And finally, as mentioned before, Northern Catalan and Algherese stand out as having more distinct intonation systems. Crucially, this prosodic analysis does not support the classic partition of Catalan dialects into Eastern Catalan (which includes Central, Algherese, and Balearic Catalan) and Western Catalan (which includes Northwestern and Valencian Catalan; see e.g. Veny 1982). Traditionally, this distinction has been based on a set of segmental phonological phenomena such as vowel reduction patterns. Importantly, this situation indicates that prosodic features need to be taken into account when assessing dialectal distinctions, as prosodic features are prone to change in situations of language contact.

Regarding the intonational realization of contrastive focus in Catalan, our results are in line with previous investigations showing that one of the most important cues to the distinction between focal and non-focal accents is tonal alignment: while contrastive accents tend to be characterized by the use of rising pitch accents with retracted pitch peaks, non-contrastive accents are characterized by the use of rising accents with non-retracted pitch peaks (see Estebas-Vilaplana 2009; Vanrell et al. 2013b; §2.3.1.2). Catalan shows two possibilities regarding this alignment contrast. While the majority of dialects express contrastive focus through the use of the focal accent L+H* with optional expanded pitch range (in contrast with the non-focal L+<H*), two dialects (Northern Catalan and Algherese) express it through the use the focal accent H*+L (in contrast with the non-focal L+H* pitch accent). Other Romance languages display one of the two types of alignment contrast shown in
Catalan (for a summary, see in this volume Chapter 10 for Spanish, Chapter 5 for Italian, Chapter 8 for Romanian, Chapter 4 for Friulian, and Chapter 9 for Sardinian).

It is also interesting to note that Catalan frequently conveys different types of epistemic biases in statements and questions through the use of intonation, with the exception of Algherese. In the case of statements, the communication of obviousness, doubt, as well as contradiction with respect to a preceding move in the conversation, can have clear intonational correlates (see §2.3.1.3; see also Prieto 2014 for the intonation of uncertainty statements). This contrasts with the behavior of other Romance languages, which produce these sentences with the more general contrastive-focus intonation, as in Sardinian and Portuguese (Chapters 9 and 7 respectively, this volume). In Friulian, for example, these biases are conveyed almost exclusively by lexical units and by specific modal particles (e.g. Chapter 4). With respect to questions, Catalan speakers can also signal a set of pragmatic biases (i.e. the distinction between information-seeking, confirmation-seeking questions, echo questions, and incredulity questions) by the use of different question particles in combination with different prosodic means (i.e. the use of expanded pitch range in the case of incredulity questions, as well as different intonation patterns) (see §§2.3.2.1–2.3.2.3).

Yes/no questions display especially rich dialectal variation with respect to type of intonation contour, as well as the presence of the sentence-initial interrogative particle que ‘that’ (e.g. Que plou? ‘Is it raining?’). In this respect, Catalan behaves differently from some neighboring Romance languages such as Standard Italian and Portuguese, which do not make use of such particles. Other Romance languages such as Sardinian and (Gascon) Occitan have been reported to display similar types of interrogative particle such as a or e (e.g. Sardinian A bi venit Juanne? ‘Is John coming?’, Chapter 9, this volume; Occitan E vies tu? ‘Are you coming?’; Chapter 6, this volume). French yes/no questions can also be headed with an interrogative unit est-ce que. In all these languages, as well as French, the presence of interrogative particles interacts with intonation, as there is a preference to use a certain intonation pattern when such particles are used (e.g. in French the intonation pattern may be falling instead of rising; e.g. Chapter 3, this volume). Interestingly, in Mexican Spanish, yes/no questions headed by que have reportative/evidential value (see Chapter 10). More research is needed on the interaction between intonation and the use of interrogative particles (as well as other syntactic features) in the expression of epistemic or evidential biases in questions.

Information-seeking yes/no questions display two distinct intonation patterns in Catalan, depending on the dialectal area. A falling nuclear configuration H+L* L% characterizes yes/no questions in Balearic, Northwestern, and Algherese Catalan (which coincide with more conservative dialectal areas that display archaic linguistic
traits), while a rising nuclear configuration L* H% characterizes the rest of the dialects. Interestingly, other Romance varieties such as Sardinian, Galician, as well as Caribbean Spanish also use falling intonational configuration for questions (e.g. Chapter 10).

The intonation of wh-questions is also interesting from a dialectal point of view. Wh-questions are typically produced with a H* L% nuclear configuration in most Catalan dialects (Central, Northwestern, and Northern Catalan), while Algherese, Balearic, and Valencian Catalan use a (H+)L* L% nuclear pitch configuration. On the other hand, echo questions, specifically those echoing a wh-question, are characterized by the use of L+¡H*, as in other Romance languages like Friulian (see Chapter 4), and Spanish (see Chapter 10). Perception experiments conducted by Borràs-Comes (2012) and Borràs-Comes et al. (2014) have argued for the phonological distinction between L+H* and upstepped L+¡H* in Catalan.

Vocatives in Catalan also display a set of intonational possibilities, which are selected as a function of dialectal and sociopragmatic factors. First, the majority of dialects use the so-called vocative chant, L+H* ¡H%, which, as in other European and Romance languages, is realized with a sustained mid boundary tone (see Ladd 2008a for English, Arvaniti and Baltazani 2005 for Greek, Grice et al. 2005 for German; for Romance languages, see also all chapters in this volume). In Catalan, the vocative chant is more extensively used for insistent calls and in some specific sociopragmatic conditions, while other pitch patterns such as L+H* HL% are more extensively used in first calls (see Borràs-Comes et al. 2013). Northern Catalan, however, predominantly uses the L+H* L% pitch pattern. In contrast, Balearic and Algherese Catalan can display an interesting type of vocative which tends to be headed by the initial-particle o and is characterized by a falling tonal movement aligned with the stressed syllable of the name followed by a low boundary tone. In Algherese Catalan, as in other Romance languages such as Sardinian (see Chapter 9), Corsican (Floricic 2002), and Southern varieties of Italian (Alber 2010; Chapter 5), vocatives can be marked not just by a specific intonation but also by a truncation process involving the deletion of the segmental material after the stressed vowel of the name (i.e. Bãrbara > Ba, Teresa > Teré, Pasqual > Pasquí). As for the intonation of truncated vocatives in Algherese Catalan, the falling pattern is more frequent for less insistent calls, whereas a rising-falling accent associated with the first syllable of the proper name is commonly used in more insistent calls.

Finally, the intonational description of Catalan presented in this chapter has indicated that the Cat_ToBI proposal, initially aimed at describing Central Catalan (Prieto 2014), is adequate to transcribe intonational variation across Catalan dialects. Both intra- and inter-dialectal differences of the main sentence types covered in this chapter were successfully transcribed using the Cat_ToBI proposal, with two pitch accent additions that have a more restricted dialectal use, namely H*+L and ¡H+L*.
2.5 Appendix: Dialect maps

Map 2.1 Geographical distribution of the nuclear tonal configuration types found in the target broad-focus statement *La Maria menja mandarines* ‘Mary eats tangerines’
MAP 2.2 Geographical distribution of the nuclear tonal configuration types found in the target contrastive-focus statement *TARONGES, vull! ‘I want ORANGES (and not pears!)*’
Map 2.3 Geographical distribution of the nuclear tonal configuration types found in the target information-seeking question (Que) *teniu mandarines?* 'Do you have tangerines?'
Map 2.4 Geographical distribution of the nuclear tonal configuration types found in the target echo question (M’has dit que és la una? ‘Did you say it was one o’clock?’

**Intonational phonology of Catalan**

53
Map 2.5 Geographical distribution of the nuclear tonal configuration types found in the target incredulity echo question *En Jaume, es presenta per a alcalde?*! 'Jaume’s running for mayor?!!'
Map 2.6 Geographical distribution of the nuclear tonal configuration types found in the confirmation-seeking question "(Que) ja hi és, la Maria? ‘Did Maria arrive yet?’
Map 2.7 Geographical distribution of the nuclear tonal configuration types found in the target information-seeking wh-question Què li portaries? ‘What will you bring?’
Map 2.8 Geographical distribution of the nuclear tonal configuration types found in the target echo wh-question *On anava? 'Where was I going?'
Map 2.9 Geographical distribution of the nuclear tonal configuration types found in the target command Vine! ‘Come here!’
MAP 2.10 Geographical distribution of the nuclear tonal configuration types found in the target gentle request *Vine...‘(Please) come...’*
Map 2.11 Geographical distribution of the nuclear tonal configuration types found in the target initial call Maria! 'Maria!'
Note on maps

The maps were created using ArcGIS 9.2. For the divisions in between localities, we first took the geographical locations of our 70 inquiry points, and then created a Voronoi tessellation with them. This tessellation is commonly used in spatial sciences, like dialectometry, and allows us to obtain a regular partitioning among all inquiry points. The line segment that divides two regions is equidistant to two points, and
vertices are equidistant to three points. The base tessellation was then cropped within the specific Catalan language domain (see Goebl 2010).

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