

**Tonal Structure of Post-focal L in English and Catalan**  
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**Abstract**

The aim of this paper is to investigate the tonal structure of narrow focus signalled by accentual means in English and in Catalan. In particular, it analyses the status of the  $F_0$  valley in the H(igh)-L(ow) movement observed after the focal constituent. In both languages, the H is interpreted as an  $H^*$  pitch accent given its alignment within the accented syllable of the focal word. However, the nature of L is unclear since it can be analysed as the trailing tone of a bitonal accent ( $H^*+L$ ) or a phrase accent ( $H^*L-$ ). The status of L is investigated in words with different stress distributions (oxytones, paroxytones, and proparoxytones) in subject and verb focal positions. An examination of the timing of L with respect to the accented syllable demonstrates that in Catalan the L corresponds to a phrase accent since it is anchored at the end of the word irrespective of the number of post-accented syllables. In English, on the other hand, the L is better interpreted as the trailing tone of  $H^*+L$  due to its fixed distance with respect to the accented syllable. These results confirm the assignment of focus at phrase final position in Romance languages as opposed to Germanic languages.

**1. Introduction**

Studies on the strategies used to signal the focal structure of sentences have usually classified English and Catalan as languages that convey focus by different means (Vallduví and Zacharski 1994; Vallduví 1995; Kiss 1995). Whereas English signals focus by means of an accentual shift, that is, by locating the nuclear accent on the focal constituent and

deleting post-focal accents (Ladd 1980, 1996), Catalan tends to use a syntactic restructuring (the focal constituent moves into an intonationally prominent position, namely, the last position of the sentence). These two strategies are illustrated in (1) and (2) for English and Catalan respectively. (1a) and (2a) show a sentence with a broad focus reading (focus on the whole sentence). For the two languages, the nuclear accent falls on the stressed syllable of the last lexical item (underlined). (1b) and (2b), on the other hand, illustrate the same sentence but produced with narrow focus (focus on a particular part of the sentence). In both examples, the focal element is the subject. In English, the syntactic structure remains the same but now the nuclear accent is located over the focal element (in capitals). No more pitch accents are realised after the focal material. In Catalan, the phonological structure is unchanged (the nuclear accent remains on the last position) but there is a syntactic shift, that is, the focused element moves into the last sentence slot. Thus, whereas in English the assignment of focus may cause an accentual shift, in Catalan it is positionally determined.

- (1) a. Millie lives in Ireland  
 b. MILLIE lives in Ireland

- (2) a. *La mare menja arengades*  
 The mother eats herrings  
 b. *D'arengades, en menja la MARE*  
 Herrings, eats them the MOTHER

Vallduví and Zacharski (1994) and Vallduví (1995) claim that the cross-linguistic variation observed in Catalan and in English is the reflex of a *Plasticity Parameter* of intonation relative to focus. In [+plastic] languages, such as English, the relation between focus and prominence is achieved by accentual means. In [-plastic] languages, such as Catalan, the relation between prominence and focus is achieved through syntax. This cross-linguistic classification has received different names in the literature, namely, [+syntactic] against [-syntactic] languages (Frota 1993) or discourse-configurational against non-discourse-configurational languages (Kiss 1995). However, recent work on the ways of expressing focus in Catalan (Estebas-Vilaplana 2000, 2001), as well as in other Romance languages (Spanish: García-Lecumberri 1995; French: Zubizarreta 1998; or European Portuguese: Frota 1998), seems to be at odds with the aforementioned classification since it has been shown that accentual strategies similar to the English ones can be used in these languages to signal the focal structure of sentences. Estebas-Vilaplana (2000) showed that it is possible for Catalan speakers to produce (as well as to perceive) focus signalled by an accentual re-structuring. Thus, a sentence such as the one illustrated in (3) was found to be accepted by Catalan speakers.

- (3) *LA MARE menja arengades*  
THE MOTHER eats herrings

Figures 1 and 2 show the speech waveforms and the  $F_0$  contours of the utterances *&Millie& lives in Ireland* and *&la mare& menja arengades*, produced by an English and a Catalan native speaker respectively. The beginning of each syllable is marked with a vertical line at the bottom screen.

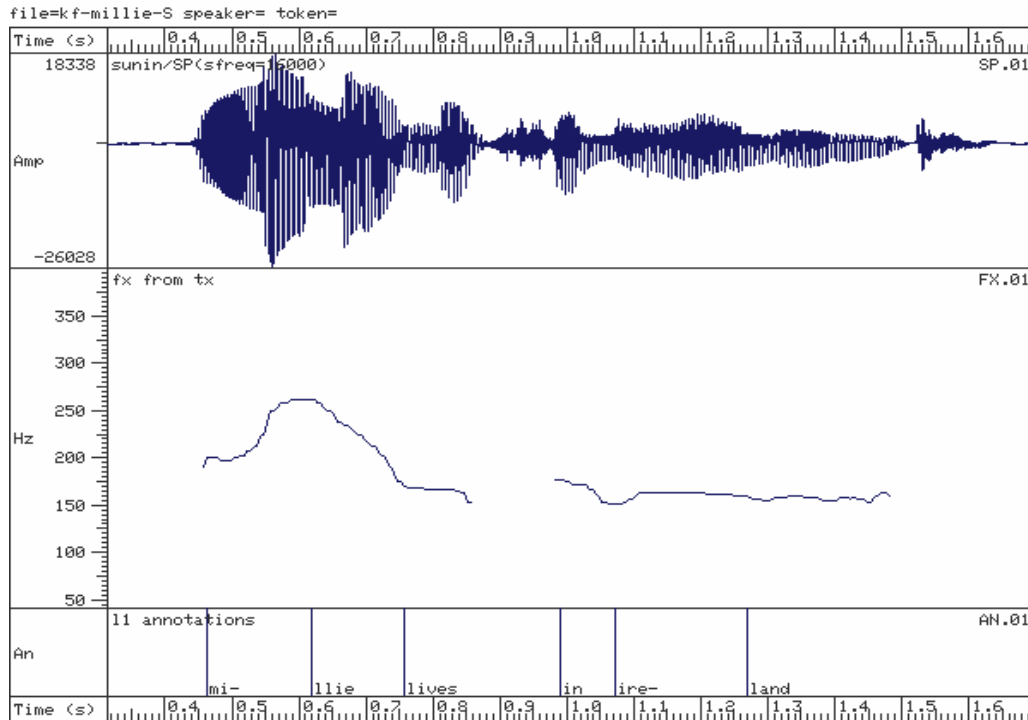


Figure 1. Speech waveform and  $F_0$  contour for the sentence &Millie& lives in Ireland.

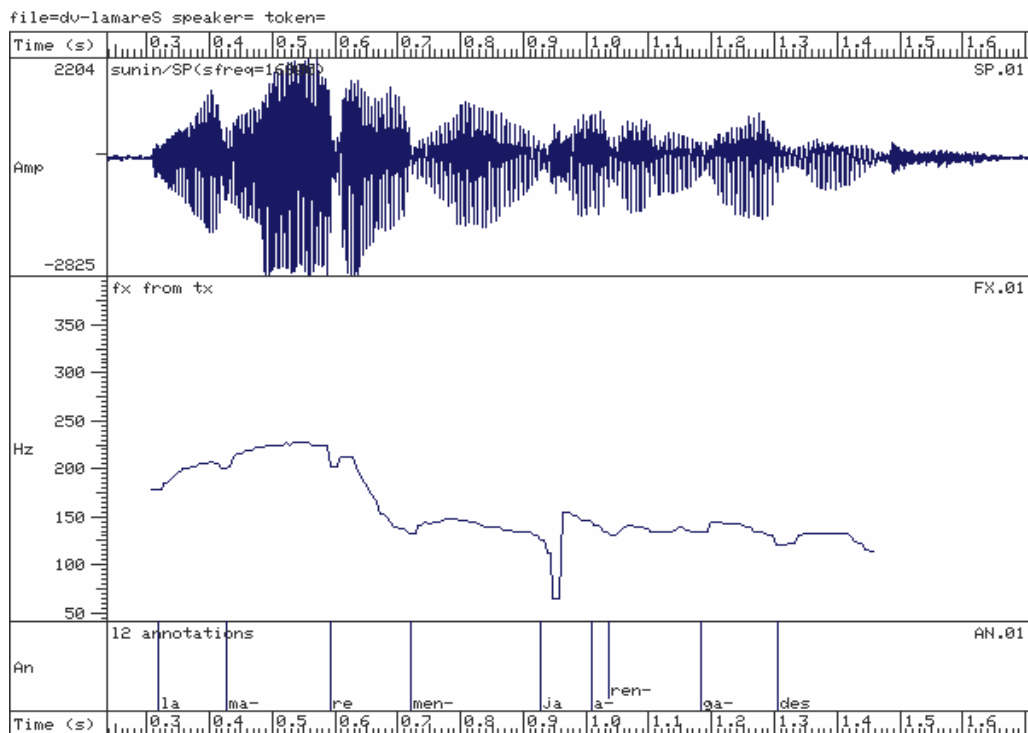


Figure 2. Speech waveform and  $F_0$  contour for the sentence &la mare& menja arengades.

The  $F_0$  contours displayed in Figures 1 and 2 show that the phonetic properties of narrow focus signalled by intonational means happen to be very similar in the two languages: a high  $F_0$  movement is observed over the accented syllable of the focal word followed by an immediate fall. After the fall, the  $F_0$  contour remains low and level till the end of the utterance. The possibility of using accentual devices in Catalan to express focus is at odds with the claim that in this language the focal element is positionally-determined and must occupy the last slot of the phrase. Given the controversy arisen from these data, the aim of this study is to investigate whether the similar phonetic properties observed in the two languages in utterances such as the ones illustrated in Figures 1 and 2 actually correspond to the same tonal structure.

In order to do that, we will concentrate our investigation on the analysis of the falling intonation (HL) observed after the focal element. The  $F_0$  contours will be examined within the tenets of the Autosegmental-Metrical (AM) approach of intonational analysis (Pierrehumbert 1980; Ladd 1992; Beckman and Hirschberg 1994; among many others). This framework represents the  $F_0$  contour as a string of H and L *pitch accents* and *edge tones*. Pitch accents are associated to accented syllables and are indicated with an asterisk (H\* and L\*). They can be monotonal (H\* and L\*) or bitonal (L\*+H, H\*+L, L+H\*, H+L\*). In bitonal accents, the starred tone is associated to the accented syllable and the leading or trailing tone indicates the presence of a significant  $F_0$  movement before or after the accented syllable. Edge tones are divided into *phrase accents* and *boundary tones*. Boundary tones mark the end of an *intonation phrase* and are indicated as H% and L%. Phrase accents signal the end of an *intermediate phrase* and are indicated as H- and L-. The intonation phrase is the highest domain of prosodic structure and is composed of one or

more intermediate phrases. An intermediate phrase is a lower domain of prosodic structure which has at least one pitch accent followed by a phrase accent.

According to the AM framework, the  $F_0$  peak observed on the accented syllable of the focal word in English and in Catalan should be interpreted as an  $H^*$  pitch accent since the peak clearly occurs within the limits of the accented syllable in the two languages. However, the interpretation of the following  $F_0$  valley is not so clear. The L can be the trailing tone of a bitonal accent (as in  $H^*+L$ ) or it can be a phrase accent signalling the end of an intermediate phrase (L-).

Given the claim that in Catalan the focal word always occupies a phrase-final position, it is expected that in this language the L marks the presence of a phrase boundary (L-) after the focal element. In English, on the other hand, the presence of a phrase boundary after  $H^*$  is not necessary, so its status might correspond to the trailing tone of  $H^*+L$  rather than L-.

## **2. Experimental design**

In order to determine the status of L after the focal element in the two languages, focal words with different stress distributions were used, namely, oxytones (words with stress on the ultimate syllable), paroxytones (words with stress on the penultimate syllable), and proparoxytones (words with stress on the antepenultimate syllable). The expectations are as follows: If L is part of the bitonal accent, it is expected to be placed at a fixed distance with respect to the accented syllable, since trailing tones are observed to have a fixed location after the starred tone (Pierrehumbert and Beckman 1988; Grice 1995;

Arvaniti et al. 2000). If, on the other hand, L demarcates a boundary, its location is independent of the accented syllable, yet it should be aligned with the end of the focussed word, irrespective of the number of post-stressed syllables. This is schematised in Figure 3 below. The shaded boxes show the limits of the accented syllable and the white boxes stand for unaccented syllables.

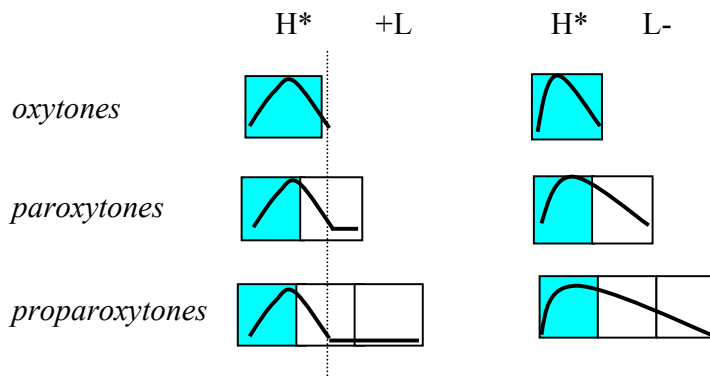


Figure 3. Expected location of L in H\*+L and H\* L- in words with different stress distributions.

For both English and Catalan, the data consisted of Subject-Verb-Object sentences produced with narrow focus either on the subject or on the verb. Narrow focus on the object was not included due to its potential confusion with broad focus. For each focal domain (subject and verb) 12 words with a different stress pattern (oxytones, paroxytones and proparoxytones) were gathered. Overall, 72 sentences were recorded for each language (the list of sentences is displayed in the Appendix).

English sentences were produced by a 30 year-old female speaker of a Southern (London) variety of British English (identified as KF). Catalan sentences were produced by a 32 year-old female speaker of the Central variety of Catalan (identified as DV). Neither of

them spoke the other language at the time of the recording. Sentences were gathered by means of a reading activity. The speakers were given a list of sentences which were replies to questions posed by the researcher. The questions were expected to trigger a narrow focus response. Questions were asked live. The data were recorded in the anechoic room of the Department of Phonetics and Linguistics of University College London. For each sentence, speech and laryngeal (Lx) signals were obtained. Speech was recorded to a B and K sound level meter of the type 2231, which was fitted with a 4165 microphone. The laryngeal signal was obtained by means of a laryngograph processor. Both speech and Lx signals were recorded on a Sony 1000 ES DAT recorder.

### **3. Analysis of the data**

An acoustic analysis of the data was done by means of the Speech Filing System (SFS) program. Speech and laryngeal signals transferred from the Sony 1000 ES DAT recorder into a Sun Sparc-10 computer in which SFS ran. Acquisition of the signals was done at 16 KHz sampling rate, following the routines of the program.  $F_0$  traces were obtained from the laryngeal signal by means of the VTX and FX programs.

The  $F_0$  contours of both English and Catalan sentences produced with narrow focus on the subject and on the verb showed an  $F_0$  peak located within the limits of the accented syllable of the focussed word. After that, a fall in  $F_0$  was observed followed by a low and level  $F_0$  till the end of the utterance (as illustrated in Figures 1 and 2 above for two sentences with narrow focus on the subject). A small percentage of the Catalan utterances (18%) showed a post-focal accent after the nuclear accent. This post-focal accent was consistently aligned with the stressed syllable of the last lexical word of the whole



intonation phrase. The post-focal accent showed a severely compressed pitch range compared to that of the focal accent but presented a similar  $F_0$  movement, that is, a peak located within the limits of the accented syllable. Post-focal accents will be analysed in more detail in section 5.1.

In order to determine whether the L is a trailing tone or a phrase accent, the following measurements were performed for all words in the two languages:

1. Distance between the onset of the accented syllable and the end of the word (on-end).
2. Distance between the onset of the accented syllable and the location of the  $F_0$  valley (on-valley). The valley was considered to be the lowest  $F_0$  point after the focal element.

#### **4. Results**

The results are presented in Table 1 and in Figures 4 and 5 for the Catalan and the English data respectively. Table 1 displays the mean values and standard deviations for the on-valley distance and the on-end distance in oxytones, paroxytones and proparoxytones both in Catalan and in English.

		<i>CATALAN</i>		<i>ENGLISH</i>	
		<i>on-valley</i>	<i>on-end</i>	<i>on-valley</i>	<i>on-end</i>
<i>Oxytones</i>	Mean	<b>0.22</b>	<b>0.22</b>	<b>0.31</b>	<b>0.24</b>
	SD	0.04	0.04	0.05	0.04
<i>Paroxytones</i>	Mean	<b>0.32</b>	<b>0.33</b>	<b>0.30</b>	<b>0.29</b>
	SD	0.05	0.05	0.04	0.05
<i>Proparoxytones</i>	Mean	<b>0.46</b>	<b>0.45</b>	<b>0.33</b>	<b>0.45</b>
	SD	0.06	0.07	0.03	0.05

*Table 1. Mean values and standard deviations (SD) for the on-valley and on-end distances in oxytones, paroxytones and proparoxytones in Catalan and in English.*

As expected, the results presented in Table 1 show that the mean values for the on-end distance vary as the number of post-accented syllables vary, that is, the higher the number of post-accented syllables the longer the on-end distance. This behaviour is observed both in English and in Catalan. However, the mean values for the on-valley distance show a different behaviour in the two languages. In Catalan, the on-valley distance is very similar to the on-end distance indicating that the L is anchored at (or very near to) the end of the word. In English, on the other hand, the on-valley distance ranges from 0.30 and 0.33 for all kinds of words, indicating that the L is located at a fixed distance with respect to the accented syllable no matter the number of post-accented syllables.

The results displayed in Figures 4 and 5 corroborate the observations presented in Table 1. Figures 4 and 5 plot the correlations between the on-end and the on-valley distances for nuclear oxytones, paroxytones and proparoxytones both in subject and in verb

positions for Catalan and English. If L is part of the bitonal accent, a very low correlation between the two distances is expected, as L will be anchored at a fixed location with respect to the starred tone (or onset of the accented syllable). If, on the other hand, L marks the presence of some kind of boundary, L will be anchored at the end of the word irrespective of the number of post-stressed syllables and hence a high correlation between the two measurements is expected. Each graph plots the distance between the onset of the accented syllable and the  $F_0$  valley (on-valley) against the distance between the onset of the accented syllable and the end of the word (on-end) in seconds. The coefficients of correlation between the two variables ( $R^2$ ) and the regression lines are displayed in each graph.

The results on the Catalan data show high correlations ( $R^2$  ranges from 0.84 to 0.96) between the on-end distance and the on-valley distance, indicating that the valley is consistently anchored at the end of the focussed word, irrespective of the number of post-stressed syllables. This suggests that the L signals a prosodic boundary, rather than the trailing tone of a bitonal accent. Thus, according to these results, the HL  $F_0$  movement observed in the focal constituent has to be described as an  $H^*$  pitch accent followed by an L- phrase accent.

## CATALAN

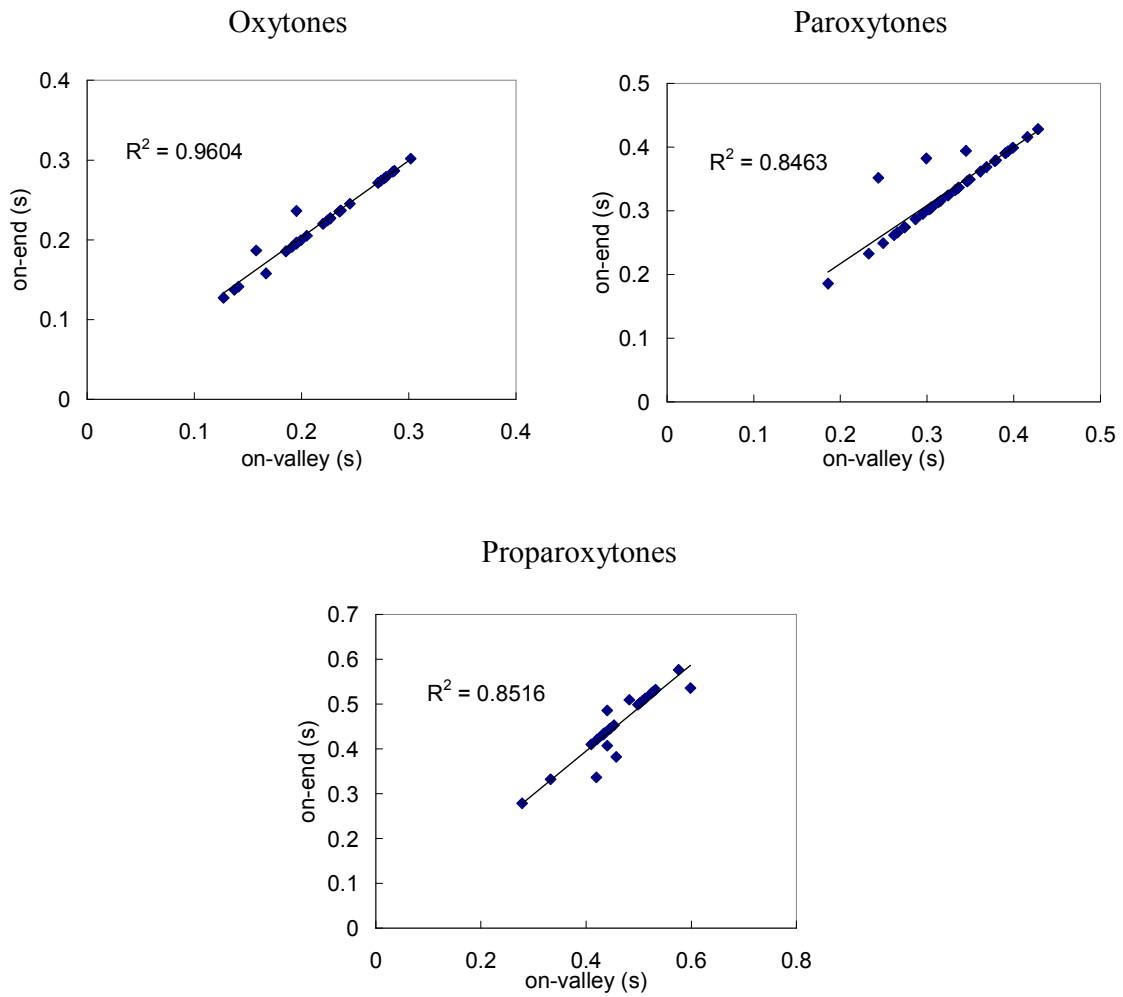


Figure 4. Distance between the onset of the accented syllable and the  $F_0$  valley (on-valley) against distance between the onset of the accented syllable and the end of the word (on-end) in seconds for nuclear accents in different kinds of words (oxytones, paroxytones and proparoxytones) in Catalan.

## ENGLISH

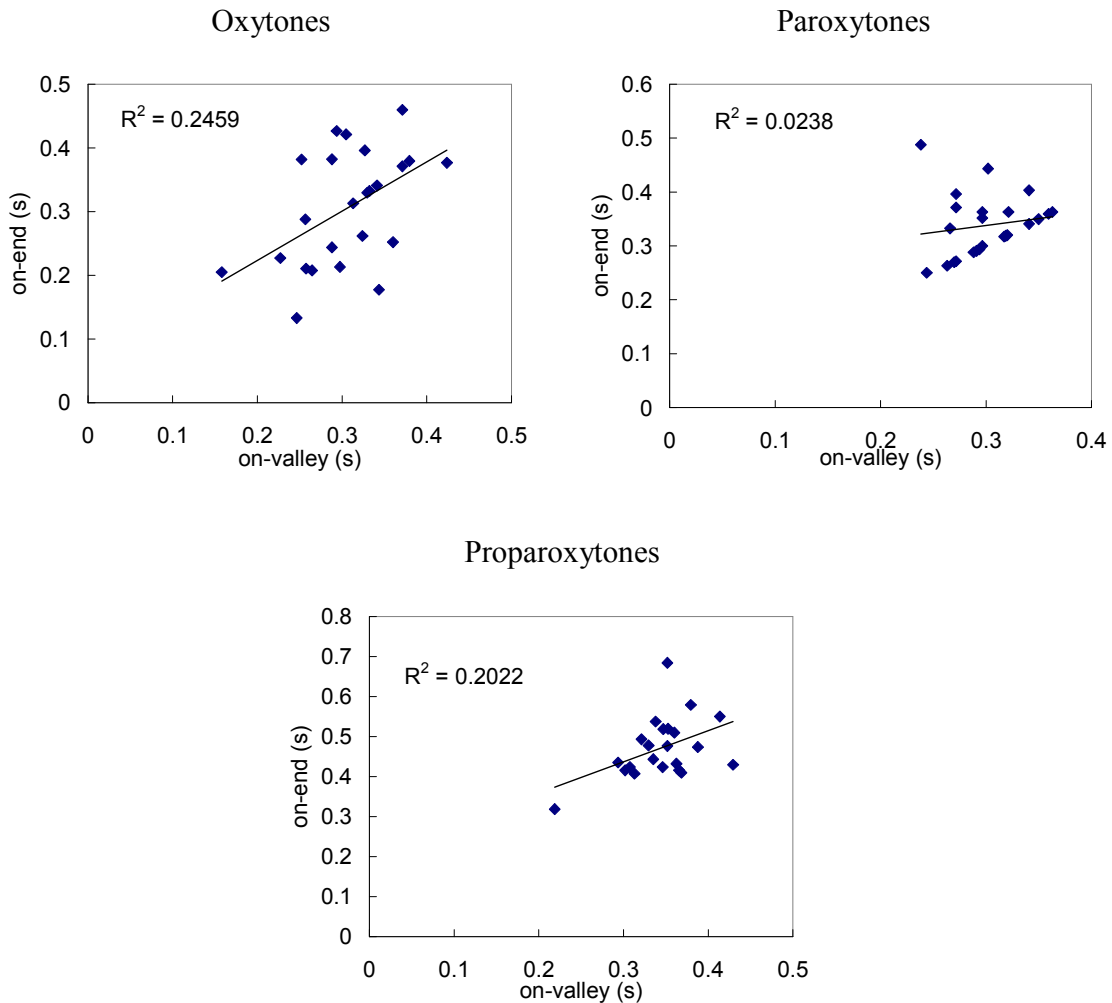


Figure 5. Distance between the onset of the accented syllable and the  $F_0$  valley (on-valley) against distance between the onset of the accented syllable and the end of the word (on-end) in seconds for nuclear accents in different kinds of words (oxytones, paroxytones and proparoxytones) in English.

The English results, on the other hand, show a very low correlation between the two variables for all kinds of words ( $R^2$  varies from 0.02 to 0.25), suggesting that the L is not anchored at the end of the word but seems to be the trailing tone of a bitonal accent ( $H^*+L$ ). In order to confirm this possibility, we performed an analysis of variance on the

on-valley measurements for the three groups of words (oxytones, paroxytones and proparoxytones) in English. The expectations were that if L is the trailing tone of the bitonal accent, no significant differences should be observed on the on-valley distance for the three types of words since trailing tones have been shown to be located at a fixed distance after the starred tone (Pierrehumbert and Beckman 1988; Grice 1995; Arvaniti et al. 2000). Setting the significance level at 1 per cent ( $p < 0.01$ ), the results of the ANOVA showed no significant differences in the location of L in the three word types ( $p = 0.03$ ,  $F = 6.08$ ). As presented in Table 1, the on-valley mean values for the three word types were very similar: oxytones (mean = 0.31), paroxytones (mean = 0.30) and proparoxytones (mean = 0.33). These results indicate that the L has a fixed location in time with respect to the starred tone (or onset of the accented syllable) and confirm the interpretation of the nuclear accent in English narrow focus sentences as  $H^*+L$ . This behaviour is different from the Catalan data where the L was clearly located at the offset of the word marking the right boundary of an intermediate phrase.

## **5. Discussion**

The results obtained in this study showed that the  $F_0$  contours of narrow focus signalled by intonational means do not correspond to the same tonal structure in Catalan and in English. Whereas in Catalan the HL sequence corresponds to an  $H^*$  pitch accent followed by a phrase accent (L-), in English HL is better interpreted as a bitonal accent ( $H^*+L$ ) since the L is located at a fixed distance with respect to the accented syllable. These results have some implications for intonational theory.

## 5.1 Catalan H\*L-

The presence of a prosodic boundary after the focussed element in Catalan is in line with the idea that in Romance languages focus has to be assigned at a prominent sentence position, namely, sentence/phrase final position (Zubizarreta 1998; Sosa 1999). However, the data showed that the location of the focussed element in a prominent position does not always have to be mediated by a syntactic shift, as claimed by Vallduví and Zacharski (1994) and Vallduví (1995), but intonation alone can create a prominent position by introducing a prosodic boundary after the focussed item. The effects of focus on the phrasing structure of an utterance have been observed in languages such as Bengali (Hayes and Lahiri 1991), Chichewa (Kanerva 1990), Korean (Jun 1996; Oh 1999) and Greek (Baltazani and Jun 1999).

The postulation of an intermediate phrase boundary after the focal domain in Catalan creates some problems for intonational theory, since the status of post-focal material is unclear. If an intonation phrase is made up of one or more intermediate phrases (Beckman and Pierrehumbert 1986), it seems logical to think that after an intermediate phrase boundary a new intermediate phrase starts. Thus, for example in our data, the stretch of words after the intermediate phrase marked L- should constitute another intermediate phrase, most probably identified as L- followed by the L% boundary tone. This proposal, however, is problematic for phonological structure since the second intermediate phrase has no pitch accent and in principle the theory does not allow empty intermediate phrases. The presence of this second intermediate phrase, however, can be justified by the presence of post-focal accents.

Most of the Catalan narrow focus utterances produced with accentual strategies obtained in the production test showed deaccenting of the post-focal material. Deaccenting has been described as the lack of a pitch accent in words that are expected to be accented mainly due to the focalisation of early elements in the sentence. Even though in most cases the Catalan post-focal material presented deaccentuation, a small number of productions (13 sentences) showed a pitch accent after the nuclear tone. This post-focal accent was consistently aligned with the stressed syllable of the last lexical word of the whole intonation phrase. The post-focal accent showed a severely compressed pitch range compared to that of the focal accent but presented the same tonal specification (an  $F_0$  peak described as  $H^*$ ).

A perceptual test was designed to see whether the post-focal accent was perceived as a secondary accent and hence subordinate to the nuclear one or whether the post-focal accent was perceived as primary and hence having double focus. The perceptual test was performed by two Central Catalan speakers aged 29 and 31. They were asked to listen to 25 stimuli consisting of 13 target sentences (narrow focus sentences containing a post-focal accent) and 12 distractors (narrow focus sentences with no post-focal accent). Both types of sentences were produced by speaker DV in the production test. The 12 distractors were selected at random from the number of sentences with no post-focal accent. The distractors were included to see whether the speakers perceived any differences between utterances with a post-focal accent and utterances without a post-focal accent. The stimuli were separated from the whole recording by means of the SFS program which allowed us to break the signal into different speech chunks. The stimuli were transferred to a Sony 1000 ES DAT recorder and finally recorded onto a UHER CR 160 tape. For each



stimulus, the listeners were asked to underline (in a written list of sentences) what they considered the most informative word or words of the utterance. A minimum of one and a maximum of two words should be underlined per sentence. The results of the perception test were categorical since for all utterances (both targets and distractors) the speakers only underlined as the most informative word the nuclear item of the focal constituent. The last lexical word of the utterance was never underlined despite the presence of a post-focal accent in some of the utterances. These results suggest that post-focal accents should be interpreted as secondary and subordinate to the primary ones rather than as a case of double focus.

The presence of post-focal accents in Catalan justifies the claim that post-focal material is part of another intermediate phrase, since within the AM model (Beckman and Pierrehumbert 1986) every intermediate phrase has to have a minimum of one pitch accent. However, this raises the question of what the status of post-focal accents is: are they optional (sometimes they appear, sometimes they do not and there is deaccentuation), or is deaccenting a reduction or elision of an underlying post-focal accent? Post-focal accents have been observed in several Romance languages, such as Italian (Grice 1995; Grice and Savino 1997; D'Imperio 1997), Maltese (Vella 1995), Peninsular Spanish (García-Lecumberri 1995) and European Portuguese (Frota 1998). Frota (1998) claims that the post-focal accent is an obligatory event in Portuguese focus contours. Its apparent absence in some of the contours is due to a case of *extreme subordination* to the nuclear accent, rather than deaccenting.

Further research is needed to clarify the status of Catalan post-focal accents. However, from a phonological point of view, the appearance of a post-focal accent accounts for the presence of an intermediate phrase after the focal material and allows us to propose that in Catalan, as in other Romance languages, the focal element is always placed at the end of an intermediate phrase. Based on phonological grounds then, it seems plausible to claim that there is always an underlying post-focal accent after the early focussed material in Catalan and that this post-focal accent tends to be reduced in most cases, although it can sporadically emerge. Thus, the notion of "post-focal deaccenting" in Catalan seems to be explained as a reduction of a pitch accent rather than as the lack of accentuation. With this proposal the problem of what is post-focal in Central Catalan seems to be solved since the presence of a post-focal accent confirms the presence of a post-focal intermediate phrase.

## **5.2. English H\*+L**

The tonal structure proposed for the English data is at odds with the first proposals of the AM model (Pierrehumbert 1980). Within the AM model, the traditional characterisation of the valley (and subsequent low plateau) after the nuclear accent (H\*) in narrow focus sentences is an L- phrase accent followed by a boundary tone L% (Pierrehumbert 1980; Beckman and Pierrehumbert 1986). In early versions of the model (Pierrehumbert 1980), phrase accents were not associated to a particular level of prosodic phrasing, but were treated as floating tones, which accounted for the intonation between the last pitch accent and the boundary tone. Thus, L- accounted for the F<sub>0</sub> contour between the H\* observed on the focussed word and the boundary tone (L%). However, in later proposals (Beckman and Pierrehumbert 1986; Pierrehumbert and Beckman 1988), phrase

accents became markers of an intermediate level of prosodic phrasing and subsequently the L- had to be associated at the right edge of an intermediate phrase. In the case of English narrow focus sentences the end of the intermediate phrase coincided with the end of the intonation phrase. This meant that in order to account for the low plateau between the nuclear H\* and the end of the phrase, a tone spreading rule had to be formulated, which claimed a leftward spreading of the L- phrase accent up to the nuclear accent.

However, if we analyse the nuclear accent of narrow focus productions as H\*+L, the discrepancy derived from the two versions of the theory seems to be solved. On the one hand, H\*+L accounts for the immediate valley after the focal peak. On the other, the L- phrase accent is associated to the end of the intermediate phrase domain and there is no need to postulate a spreading of the tone. Furthermore, the model predicts that the interpolation between H\* and L is a progressively falling line. If the HL fall of English narrow focus utterances (Figure 1) is described as H\*L-, then there is a mismatch between the predictions of the model and the F<sub>0</sub> contours since there is no progressively falling interpolation between H\*L- in such cases. However, if we interpret the falling F<sub>0</sub> as H\*+L L-, the model better accounts for the F<sub>0</sub> trace since between H\*+L and L- the F<sub>0</sub> is low and level as predicted by interpolation rules.

The H\*+L notation is problematic with the initial taxonomy of the model (Pierrehumbert 1980), where the L had no phonetic target value but only functioned as a downstep trigger of a succeeding H. However, with the treatment of downstep as a property of the lowered tone itself (Ladd 1980, 1996; Beckman and Hirschberg 1994; Grice 1995; Grabe 1998), the H\*+L accent is relieved of its downstepping duty and can be used as a

phonetically transparent notation. Furthermore, the analysis of the pitch movements observed in the data as H\*+L entities agrees with those analyses that describe English F<sub>0</sub> contours by means of left-headed accents (Gussenhoven 1984; Grabe 1998). In this approach, only two pitch accents (H\*+L and L\*+H) are taken as basic tones and all other patterns are derived from them by means of a set of phonological adjustment rules.

Overall, the results have shown that similar F<sub>0</sub> contours in Catalan and in English narrow focus sequences correspond to two different tonal structures. In Catalan the HL sequence corresponds to an H\* pitch accent followed by a phrase accent (L-) since the L is consistently anchored at the end of the word irrespective of the number of post-accented syllables. In English, on the other hand, HL is better interpreted as a bitonal accent (H\*+L) since the L is located at a fixed distance with respect to the accented syllable. Whereas Catalan introduces an intermediate phrase boundary after the focal element with optional deaccenting of post-focal material, English does not signal focus by means of phrasing and hence deaccentuation is compulsory in this language. A sketched contour of the different ways of signalling focus in the two languages is presented in Figure 6 below. The big brackets stand for an intonation phrase and the small ones for an intermediate phrase.

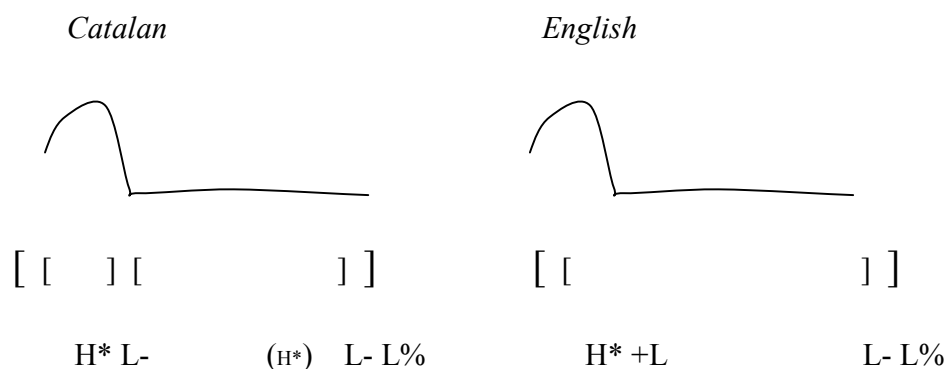


Figure 6. Tonal interpretation of narrow focus sentences in Catalan and in English.

## 6. Conclusion

In this study the status of the L observed after the focal element in Catalan and in English narrow focus utterances was examined by analysing the anchoring of the F<sub>0</sub> valley in focal words with different stress distributions (oxytones, paroxytones, and proparoxytones). The results showed that in Catalan the L corresponded to a phrase accent (L-) which signalled the end of the focal domain. These results corroborate the fact that in Romance languages focus is assigned at phrase final position (Zubizarreta 1998; Sosa 1999) but reject the idea that the relation between focus and accentuation must be mediated by syntax (Vallduví and Zacharski 1994; Vallduví 1995). The Catalan data show that intonation alone can create a prominent position by introducing a prosodic boundary after the focussed item. In English, on the other hand, the post-focal L should be interpreted as the trailing tone of a bitonal accent (H\*+L) since the F<sub>0</sub> valley is located at a fixed distance with respect to the accented syllable. This interpretation provides a better account for the low and level F<sub>0</sub> contour after the focal element till the end of the sentence.

## References

- Arvaniti, Amalia, Robert Ladd, and Ineke Mennen 2000: "What is a Starred Tone? Evidence from Greek." *Papers in Laboratory Phonology V*. Eds. Michael Broe and Janet Pierrehumbert. Cambridge: Cambridge UP. 119-131.
- Baltazani, Mary and Sun-Ah Jun 1999: "Focus and Topic Intonation in Greek." *Proceedings of the 14<sup>th</sup> International Congress of Phonetic Sciences*. San Francisco. 1305-1308.

- Beckman, Mary and Julia Hirschberg 1994: *The ToBI Annotation Conventions. Ms. and Accompanying Speech Materials*. <http://www.ling.ohio-state.edu/ToBI.6.html>.
- Beckman, Mary and Janet Pierrehumbert 1986: "Intonational Structure in Japanese and English." *Phonology Yearbook* 3: 255-310.
- D'Imperio, Mariapaola 1997: "Narrow Focus and Focal Accent in the Neopolitan Variety of Italian." *Intonation: Theory, Models and Applications. Proceedings of an ESCA Workshop*. Eds. Antonis Botininis et al. Athens. 87-90.
- Estebas-Vilaplana, Eva 2000: *The Use and Realisation of Accentual Focus in Central Catalan with a Comparison to English*. PhD thesis. U College London.
- \_\_\_\_\_ 2001: "Teaching Accentual Focus to Catalan Students of English." *Proceedings of the 2<sup>nd</sup> Phonetics Teaching and Learning Conference*. Eds. John Maidment and Eva Estebas-Vilaplana. London: U College London. 54-57.
- Frota, Sonia 1993: "On the Prosody of Focus in European Portuguese." *Proceedings of the Workshop on Phonology*. Lisboa: APL. 45-66.
- \_\_\_\_\_ 1998: *Prosody and Focus in European Portuguese*. PhD dissertation. U of Lisbon.
- García-Lecumberri, María Luisa 1995: *Intonational Signalling of Information Structure in English and in Spanish: a Comparative Study*. PhD dissertation. U College London.
- Grabe, Esther 1998: *Comparative Intonational Phonology: English and German*. Wageningen: Ponsen and Looijen bv.
- Grice, Martine 1995: *The Intonation of Interrogation in Palermo Italian: Implications for Intonation Theory*. Tübingen: Niemeyer.
- Grice, Martine and Michaelina Savino 1997: "Can Pitch Accent Type Convey Information Status in Yes-no Questions?" *Proceedings ACL Workshop on Concept to Speech Generation Systems*. Madrid. 29-38.

- Gussenhoven, Carlos 1984: *On the Grammar and Semantics of Sentence Accents*.  
Dordrecht: Foris.
- Hayes, Bruce and Aditi Lahiri 1991: "Bengali Intonational Phonology." *Natural Language and Linguistic Theory* 9: 47-96.
- Jun, Sun-Ah 1996: *The Phonetics and Phonology of Korean Prosody*. New York and London: Garland Publishing.
- Kanerva, Jonni 1990: "Focussing and Phonological Phrases in Chichewa." *The Phonology-Syntax Connection*. Eds. Sharon Inkelas and Draga Zec. Chicago: U of Chicago P. 145-161.
- Kiss, Katalin 1995: "Introduction." *Discourse Configurational Languages*. Ed. Katalin Kiss. New York and Oxford: Oxford UP. 3-27.
- Ladd, Robert 1980: *The Structure of Intonational Meaning. Evidence from English*. Bloomington: Indiana UP.
- \_\_\_\_\_ 1992: "An Introduction to Intonational Phonology." *Papers in Laboratory Phonology II*. Eds. Gerry Docherty and Robert Ladd. Cambridge: Cambridge UP. 321-334.
- \_\_\_\_\_ 1996: *Intonational Phonology*. Cambridge: Cambridge UP.
- Oh, Mira 1999: "Korean Prosodic Structure and Focus." *Proceedings of the 14<sup>th</sup> International Conference of Phonetic Sciences*. San Francisco. 1517-1520.
- Pierrehumbert, Janet 1980: *The Phonology and Phonetics of English Intonation*. PhD dissertation. Bloomington: Indiana UP.
- Pierrehumbert, Janet and Mary Beckman 1988: *Japanese Tone Structure*. Cambridge, MA: MIT Press.
- Sosa, Juan Manuel 1999: *La entonación del español*. Barcelona: Cátedra.

- Vallduví, Enric 1995: “Structural Properties of Information Packaging in Catalan.”  
*Discourse Configurational Languages*. Ed. Katalin Kiss. New York and Oxford:  
 Oxford UP. 122-152.
- Vallduví, Enric and Ron Zacharski 1994: “Accenting Phenomena, Association with Focus  
 and the Recursiveness of Focus-ground.” *Proceedings of the Ninth Amsterdam  
 Colloquium*. Eds. Paul Dekker and Martin Stokhof. Amsterdam: ILLC. 683-702.
- Vella, Alexandra 1995: *Prosodic Structure and Intonation in Maltese: Influence on Maltese  
 English*. PhD dissertation. Edinburgh U.
- Zubizarreta, María Luisa. 1998: *Prosody, Focus and Word Order*. Cambridge, MA: MIT  
 Press.

## APPENDIX

### ENGLISH

#### Focus on the subject

##### Oxytones

THE BALLOON was moving upwards

THE NAME was written at the door

THE LAW was modified

THE MEAL was delicious

THE MOON was shining

THE MERINGUE was very sweet

RAY resigned from his job

JOHN divided the legacy

JO relies on my money

#### Focus on the verb

The girls BELIEVE in fairies

The jam REMAINED in the jar

Marjorie ADORES movies

Brenda REMOVES the garbage

The boys ASSUME their innocence

The girls ADMIRE the singer

The boys NEED a new game

The bluebells DIE with the rain

The gardener MOWS the lawn



*LEE remembered the melody*

*MO recovered the money*

*SUE directed the course*

*Norma RUNS every morning*

*Molly MEANS to succeed*

*Susan MOVES the chair*

### **Paroxytones**

*MY MOTHER loves babies*

*THE NANNY's ironing the linen*

*THE LAWYER's reading the journal*

*THE LADY ordered the meal*

*THE LINEN is very dirty*

*THE MONEY was in the bag*

*MARY learns languages*

*MILLIE lives in Ireland*

*MOLLY made the dinner*

*MINI loves marmalade*

*LORNA remembers the story*

*LILY wrote a novel*

*My brother REMEMBERS the rhymes*

*The boy DELIVERED the magazines*

*Ron AMENDED the bill*

*Jonathan ERASES the message*

*John RECORDED the performance*

*Brenda SUBMITTED the paper*

*Josephine NEEDED an explanation*

*Melanie ORDERED an orange juice*

*My neighbour MARRIED the model*

*The general MURDERED the villain*

*Robert HANDED the book*

*Nelly ALTERED the order*

### **Proparoxytones**

*THE MELODY was amazing*

*THE MARMALADE is on the fridge*

*THE GARDENER lived in London*

*THE LULLABY brings good memories*

*THE MESSAGES arrived late*

*Mary ACKNOWLEDGES receipt*

*John REORGANISED the meeting*

*Susie EXTRAPOLATES the result*

*Tom EXAGGERATES the truth*

*The boys EVACUATE the room*

*THE MAINTENANCE is very expensive*

*MELANIE will win the award*

*EMILY damaged the window*

*MARJORIE married an Indian marine*

*MARILYN nurses the baby*

*MARGERIE measured the distance*

*DEBORAH rejected the job*

*The boss ENUMERATES the articles*

*The rain DAMAGES the harvest*

*The journalist BALANCES the disorder*

*The minister MODERATES the class*

*Jeremy MANAGES his company*

*Julie MEMORISED the names*

*Melanie's MENACING the hostages*

## **CATALAN**

### **Focus on the subject**

#### **Oxytones**

*EN RAMON anava a Girona*

*LA MULLER vivia a Barcelona*

*LA MAMÀ regava els geranis*

*EL BARÓ mirava els estels*

*EN JOAN domina l'àlgebra*

*LA LLAVOR creixia amb la pluja*

*ELL anava a Girona*

*L'AU venia de l'illa*

*L'OU bullia a l'olla*

*JO menjava melmelada*

*NOU miraven el mar*

*DEU volien menjar*

### **Focus on the verb**

*Els homes BEURAN aiguardent*

*L'Elena MUNYÍ l'ovella*

*L'Alba BALLÀ dues munyeires*

*Els nens SEURAN a la cadira*

*La mare MIRÀ la muntanya*

*La nena LLIMÀ la taula*

*En Juli DIU bajanades*

*La Glòria VE de Vilanova*

*En Jaume MOU la galleda*

*La Marina BEU llimonada*

*L'Àngela DEU dos rals*

*L'home VEU la sol.lució*

### **Paroxytones**

LA LALI munyia l'ovella

LA ROSA llegia llibres

L'ELENA volia una nina

LA LLUNA mirava la platja

L'ISIDRE duia una gavardina

LA MARE menja arengades

L'HOME venia llimones

L'ALA lluia amb el sol

L'AMO volia amanida

L'ANNA vivia a Vilavella

L'ILLA brillava amb el sol

L'EVA guardava monedes

Els homes LLIMAVEN l'armari

En Joan DOMINA l'àlgebra

En Manel ANAVA al museu

La Mireia REMENA l'olla

La Neus ANIMA les alumnes

En Jordi GUARDAVA medalles

La Mila NEGA la maionesa

La Rosa REGA els geranis

En Jordi MIRA les mones

L'Emili MANA els obrers

La Remei MIMA les nenes

La Ramona MULLA la roba

### **Proparoxytones**

LA LÀMINA lluirà amb el sol

LA MELANIE mira les novel.les

EL NÚMERO serà massa gran

LA MÍNIMA baixarà demà

LA NÒMINA serà més alta

EL NÒMADA menjava al carrer

L'ÀNIMA demanava descans

L'ÒLIBA dormia vora l'arbre

L'ÀNGELA manejava l'ordinador

Ell va dir AMAGA-LI la roba

Ell va dir ANIMA-LI la festa

Ell va dir ARREGLA-LI la casa

Ell va dir AGAFA-LI la mandarina

Ell va dir APUJA-LI la quantitat

Ell va dir INVENTA-LI la història

Els judadors CÀPIGUEN a l'estadi

En Jaume SÀPIGA la veritat

La noia SÀPIGA la sol.lució

*L'ÀRBITRE demanava l'hora*

*L'ÍNTEGRE no es pot calcular*

*L'ÀGUILA volava sobre el mar*

*Els homes SÀPIGUEN el camí*

*Els llibres CÀPIGUEN a l'armari*

*La nena CÀPIGA dins la vànova*