

# The Prosody of Simple Sentences in the Spanish of Barcelona, a Spanish-Catalan Bilingual Context

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## 1. Introduction

The AMPER Project,<sup>1</sup> overseen by the Centre de dialectologie at the Université Stendhal-Grenoble 3 (France) since the 1990s, seeks to collect and describe prosodic samples of Romance languages for the elaboration of a large-scale multimedia atlas (Contini 2005). In Catalonia, the development of the project for the two official languages, Spanish and Catalan, is known as AMPERCAT under the direction of E. Martínez Celdrán. Within this framework, the present paper<sup>2</sup> examines a number of simple sentences produced by a 35-year-old female informant, whose first language is Spanish but who shows noticeable influence of Catalan being born in Barcelona, a Catalan-Spanish bilingual area.

The analyses performed on the corpus of 81 sentences focused on F0, duration, and intensity. As for F0, a similar intonation contour to that of the Catalan of Barcelona has been observed for declarative sentences and interrogatives with and without the unstressed conjunction *que* in sentence-initial position. Even if the latter type of interrogative is not to be found in the descriptions of Spanish intonation, it is commonly observed in Spanish speakers residing in Catalonia, as a result of the influence of Catalan intonation contours, which combine both types of interrogatives (*¿La guitarra se toca con paciencia?* ‘Is the guitar played with patience?’ versus *¿Que se toca con paciencia la guitarra?* ‘That is played with patience the guitar?’). Concerning duration, the findings of this study show a lengthening of the final vowel in all sentence types, which is in line with the literature on Spanish, Catalan, and other languages (Lindblom 1968). Finally, intensity diminishes in the last vowel in these sentences, though not at significant rates.

Examination of the phonetic results reported above from the perspective of Autosegmental-Metrical Theory reveals a fall in the intonation curve at the end of declaratives (L% or L\*% according to the type of final pitch accent in sentences), a prominent peak at the beginning of the predicate of interrogatives without *que* (L\*+H; H+L\* or L+H\*+L according to the type of pitch accent) and L\*+H% in sentences ending in paroxytone or proparoxytone words, or H\*% in sentences ending in oxytone words. Finally, interrogatives with *que* are characterized by L\* at the end of the predicate.

As a general conclusion, the passive knowledge of the prosody of any non-native contact language, in this case Catalan, appears to exert a strong influence in modifying or determining the prosody of the speaker’s mother tongue, here Spanish. This is shown by the consideration of Spanish interrogatives formed by inserting initial unstressed *que* – hence closely resembling Catalan interrogatives – as widely accepted “standard” interrogative sentences.

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\* We thank the two anonymous reviewers for their insightful and constructive comments.

<sup>1</sup> The AMPER Project (ORIGINAL TITLE ‘Multimedia Atlas of Prosody of the Romance Language Area’) seeks to characterize geoprosodic patterns based on the parameters of duration, intensity, and pitch. (Contini 2005, Fernández Planas 2005). The present study has been carried out within the framework of AMPERCAT, which applies the methodology of AMPER to the main linguistic varieties of Catalonia. This methodology is not only being applied to the description of several Spanish varieties but also to those of other European countries including France (where the idea of AMPER originated), Italy, Portugal, and Romania.

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### 1.1. The AMPER project

To date, the work of AMPERCAT has resulted in a number of publications describing the different geoproisodic varieties of Catalan, which constitutes a significant contribution to Catalan phonetics. This study is the first to describe the intonation of Catalonian Spanish within the AMPERCAT project. This variety of Spanish is particularly interesting, due to the presence of widespread bilingualism.

### 1.2. Bilingualism in Catalonia

In Catalonia, as in other Spanish regions like the Balearic Islands, Catalan shares the status of an official language with Spanish. In addition, it should be noted that more than two languages are currently spoken in Catalonia, (see Departament de Lingüística General, Universitat de Barcelona, 2005) as a result of massive immigration from both European and non-European countries in the last decade. However, as the phenomenon of immigration is fairly recent, this section will focus on the Spanish-Catalan bilingual context only.

Between 1950 and 1970, due to socioeconomic reasons, over a million people from different places in Spain arrived in Catalonia and settled in the most industrial and well serviced, tourist areas. This mobility resulted in a noticeable demographic impact: whereas in 1975, 38% of the Catalan population came from different areas in Spain, in 1996, the number of immigrants already amounted to 41% of the Catalan population (see *Lingcat Inter.@t*: <http://www.intercat.gencat.net/lingcat/index800.htm>).

The circumstances under which this migratory movement took place have affected the Catalan language considerably. To be more precise, in the 1960s, the time of the greatest migratory impact, newcomers did not encounter favourable conditions for learning Catalan. To begin with, Catalan did not hold any official status. Secondly, Spanish was the official language at school. Finally, newcomers used to gather in areas where contact with native Catalan speakers was scarce. All of the above factors account for the large difference observed in Catalan speaking skills between Catalan speakers and Spanish speakers who arrived in Catalonia between 1950 and 1970.

According to a study conducted with 7257 participants (Vila, Melia, Torres, Montoya & Sorolla 2005) 97.4% of Catalan citizens understand Catalan, 84.7% of participants speak it, and 90.5% and 62.3% of interviewees read and write it respectively. This research concludes that the “knowledge of Catalan is distributed unevenly as a function of two main groups: on the one hand, those who have acquired Catalan within the family context, and, on the other hand, those who have not acquired Catalan as their mother tongue. As shown in Figure 1, which illustrates the knowledge of Catalan, on a 0-to-10 point scale, according to first language those who do not have Catalan as their first language are less proficient than those who have learned it at home.

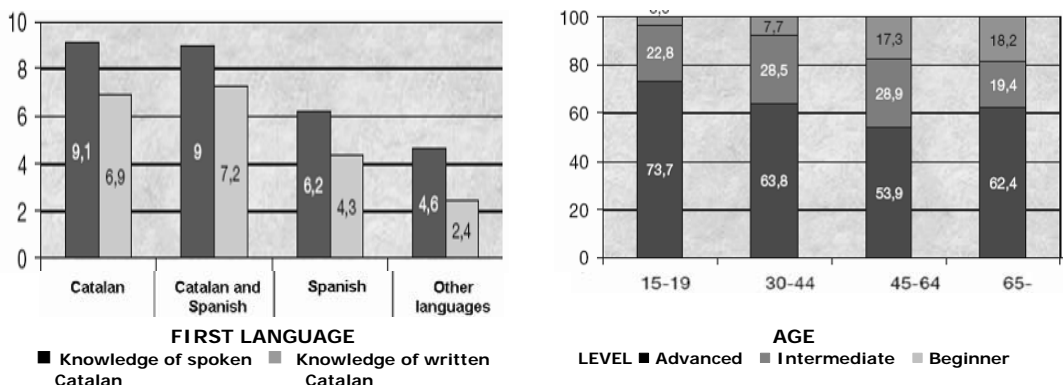


Figure 1. Knowledge of Catalan as a function of first language and age (Vila, Melia, Torres, Montoya & Sorolla 2005).

In addition, younger speakers have a greater knowledge of Catalan (see Figure 1, right-hand side) since younger speakers represent “the first socialised generation in the autonomous region of Catalonia with public and official presence of Catalan that has mostly been trained in Catalan language schools”. In spite of this, younger speakers’ superior knowledge of Catalan does not entail an increase in their use of Catalan.

## 2. Methodology

### 2.1. Corpus

This study looked at declarative and interrogative sentences uttered in a natural and neutral manner (e.g. broad-focus declaratives). There are three pitch accents per sentence, associated with a tri-syllabic word (*guitarra* ‘guitar’, *se toca* ‘is played’, *paciencia* ‘patience’) and the tri-syllabic words vary in stress placement, manifesting each of the three possible stress patterns in Spanish (proparoxytone: *cítara* ‘zither’, paroxytone: *guitarra* ‘guitar’, oxytone: *saxofón* ‘saxophone’). All sentences have full meaning. Furthermore, declaratives and interrogatives without the conjunction *que* in sentence-initial position (henceforth interrogatives without *que*) have an SVO (where O means verb complement, not object) order, whereas interrogatives with *que* in sentence-initial position (hereafter interrogatives with *que*) have a VOS syntactic order. As for word stress in declaratives and interrogatives without *que*, the middle word, which is the verb, has paroxytone stress, while the initial and final word stress include all possible combinations in Spanish (oxytone, paroxytone, and proparoxytone). In the case of interrogatives with *que*, it is the initial word stress that contains the paroxytone stress. Thus, each of the three sentence types – the two interrogatives in the study can be classified as two different types (see Appendix) – yielded nine sentences. Each of the nine sentences was produced by the informant three times. The sentences included in the corpus of this study were first randomized to avoid a serial-reading effect and then presented to the informant. A total of 81 sentences was analyzed.

It should be noted that interrogatives with *que* in sentence-initial position do not exist in standard peninsular Spanish, though it is common to hear these sentences in the Spanish of Catalonia due to the influence of Catalan. These sentences consist of a yes/no interrogative in which the conjunction *que* is unstressed, rather than a proper interrogative conjunction. This conjunction has also been referred to as a *formal marker* (Rigau & Prieto 2005), and it constitutes an element that can be easily discarded, as shown by the fact that only a few dialects of Catalan have this type of sentences. As mentioned above, *que* appears in the production of some Spanish speakers as a result of the influence of Catalan, although it can be clearly differentiated from the stressed interrogative *que* which introduces wh-questions.

### 2.2. Participants

The speech of a single female speaker representative of the Spanish of Catalonia was examined. The informant’s age was within the range established in the groups AMPER-in-SPAIN-and-LATIN-AMERICA (i.e. 25-50 years), and she did not have any university education. She was born and has always lived in Barcelona. Therefore, her speech has always been influenced by Catalan even though her first language is the Spanish of Castile, where her parents came from. The speaker is representative of a large group of speakers, born to the immigrant population that moved to Barcelona in the 1960’s as mentioned in §1.2.

### 2.3. Analysis

The tape-recorded sentences were digitized, optimized and had noise removed using *Goldwave*. They were then analyzed following the guidelines developed within the *Matlab* environment at the Centre de dialectologie of the Université Stendhal Grenoble 3 for the AMPER Project (Contini 2005, Fernández Planas 2005). *Matlab* has been designed to study vowels in sentences, including vocalic segmentation, extracting five values per vowel, namely duration, overall intensity, and fundamental frequency (F0) at vowel onset, midpoint, and offset. At the same time, the use of these parameters

makes it possible to synthesize the sentence maintaining its prosodic information (i.e. pitch, duration, and intensity), while removing the segmental content. The information used in the figures below has been generated based on the average across the various repetitions of the same sentence. This method of analysis is common to all of the investigations carried out in the AMPER Project (Martínez Celdrán, Fernández, Carrera & Espuny 2005).

### 3. Phonetic characterization of Catalanian Spanish intonation

#### 3.1. Fundamental frequency

In this sub-section, results are presented by sentence type: declaratives, interrogatives without *que* and interrogatives with *que*. In the figures below, the X and Y-axes represent time and fundamental frequency, respectively. Each line in the figure stands for one syllable of the sentence in question (e.g. la-gui-ta-rra-se-to-ca-con-pa-cien-cia).

##### 3.1.1. Declaratives

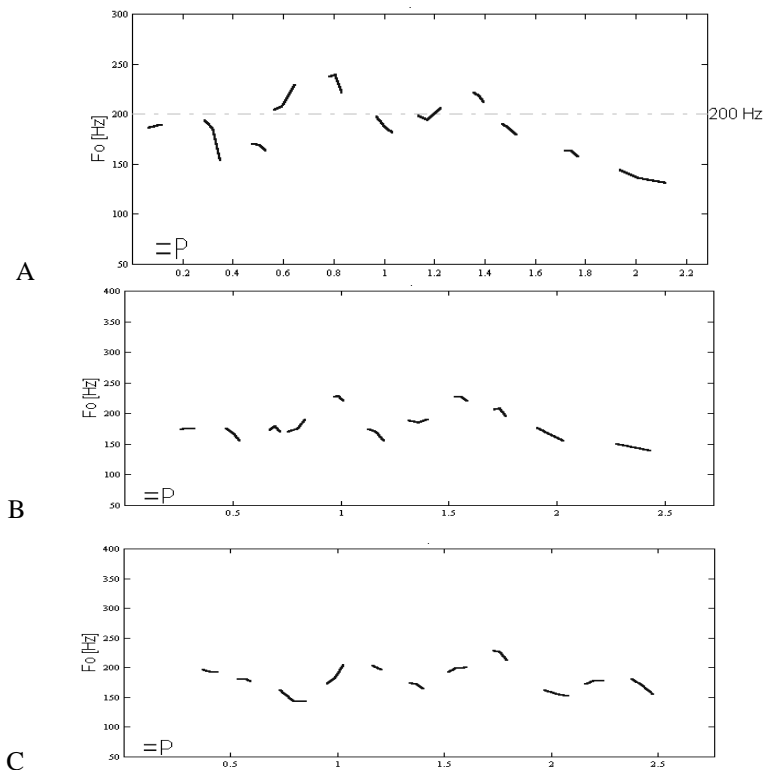


Figure 2. Melodies of the declarative sentences.

A: *La guitarra se toca con obsesión.* 'The guitar is played with obsession'

B: *La guitarra se toca con paciencia.* 'The guitar is played with patience'

C: *La guitarra se toca con pánico.* 'The guitar is played with fear'

In declaratives, the average pitch is approximately 200Hz. There is a noticeable peak at position 5, (that is, the fifth syllable from the left, between 225 and 250Hz), which corresponds to the post-tonic syllable of the oxytone subject (*obsesión* 'obsession') and to the pre-stressed syllable of verbs preceded by paroxytone and proparoxytone subjects (exceptionally, the prominent peak is located at position 4 in the sentence containing a proparoxytone subject and paroxytone complement). This start is similar to that of declaratives in the Catalan of Barcelona (Martínez Celdrán et al. 2005) and to declaratives in the Spanish of Valladolid and Salamanca (Zamora, Carrera & Meléndez 2005). The intonation curve subsequently starts to fall and then rises reaching another maximum value at position

8 (at about 230Hz). The tonal structure in the second part of declaratives does not coincide with that of declaratives in the Catalan of Barcelona, though it presents some similarities to declaratives in the Catalan of Tarragona (Martínez Celdrán et al. 2005). The overall tonal structure of declaratives is similar to the tonal structure reported for the Spanish of Valladolid and Salamanca, even though the peaks do not coincide with the same pitch accents (Zamora et al. 2005).

### 3.1.2. Yes-no questions. Interrogatives without ‘que’ in sentence-initial position

Interrogatives without *que* start at a lower than average pitch and reach a prominent peak (between 300 and 350Hz) at position 7 with oxytone subjects (i.e. on the post-tonic syllable of the second pitch accent), at position 5 with paroxyton subjects (i.e. pre-stressed syllable of the second pitch accent), or at position 6 with proparoxytone subjects (i.e., stressed syllable of the second pitch accent). The peak then falls to vowel 10 (oxytone complement: pre-stressed; paroxytone subject: stressed proparoxytone complement: post-tonic). Immediately afterwards it rises sharply on the last syllable of the sentence; this tonal rise is similar to positions 5, 6, and 7 of the sentence and ranges between 300 and 350Hz.

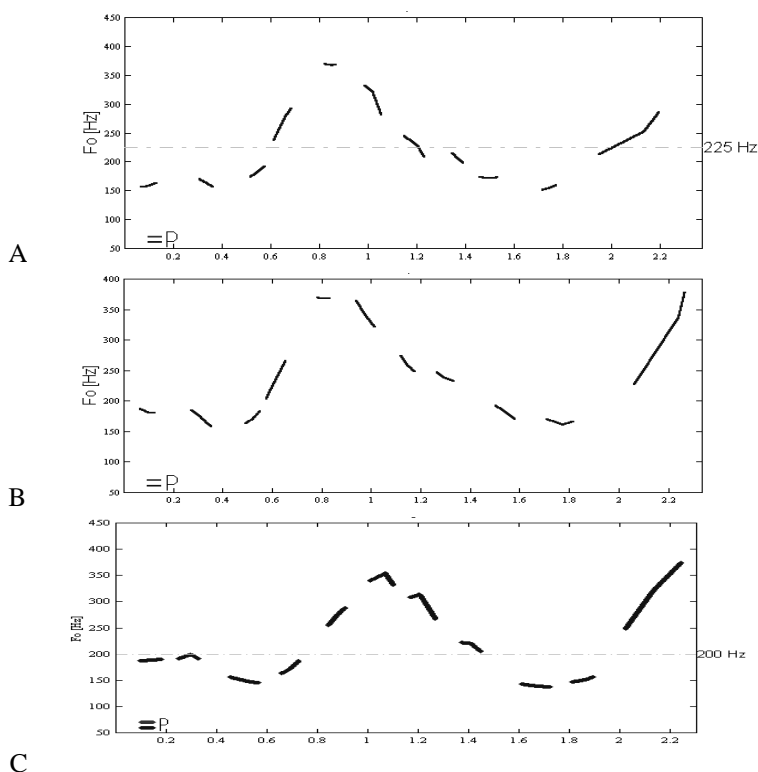


Figure 3. Melodies of interrogatives without *que*.

A: *¿La guitarra se toca con obsesión?* ‘Is the guitar played with obsession?’

B: *¿La guitarra se toca con paciencia?* ‘Is the guitar played with patience?’

C: *¿La guitarra se toca con pánico?* ‘Is the guitar played with fear?’

### 3.1.3. Yes-no questions. Interrogatives with ‘que’ in sentence-initial position

Interrogatives with *que* start at a higher frequency (about 300Hz) which is maintained until the stressed syllable of the second pitch accent corresponding to the verb complement. The first significant fall to 100-150Hz takes place on this stressed syllable (positions 8, 7, and 6 for oxytones, paroxytones, and proparoxytones, respectively). From that position onwards (8, 7, or 6 according to the type of verb object), it remains stable until the last syllable where it generally displays a less marked fall – to between 100 and 125 Hz. Thus, the tonal structure of this type of interrogatives largely resembles that of interrogatives with *que* in the Catalan of Barcelona and Tarragona (Martínez Celdrán et al. 2005).

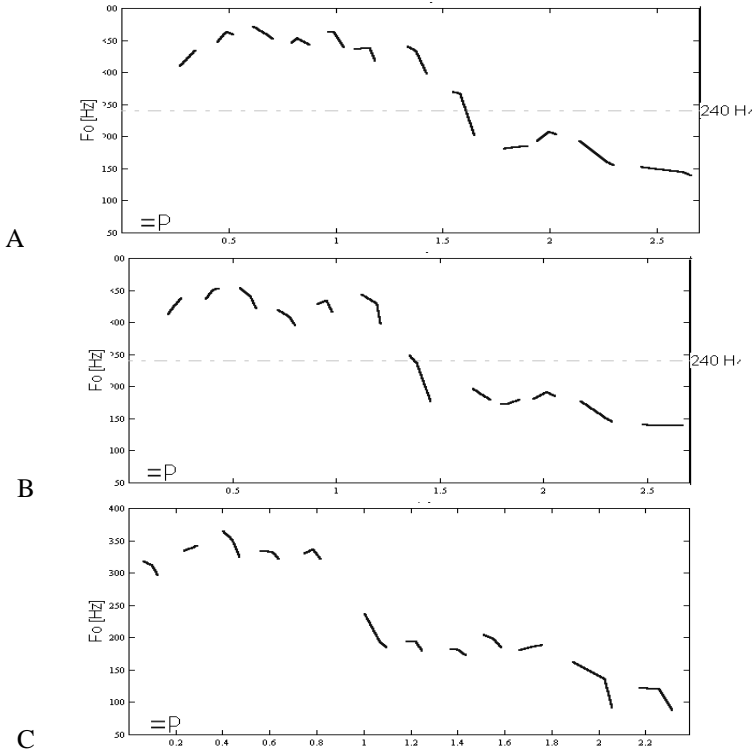


Figure 4. Melodies of interrogatives with *que*.

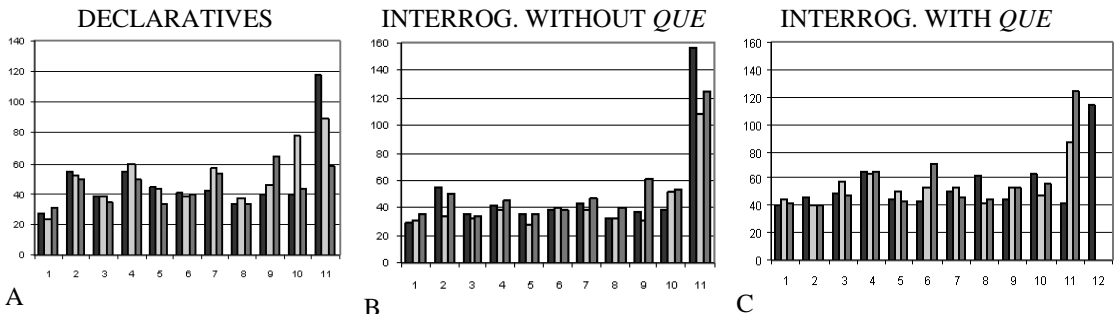
A: *¿Que se toca con obsesión la guitarra? ‘That is played with obsession the guitar?’*

B: *¿Que se toca con paciencia la guitarra? ‘That is played with patience the guitar?’*

C: *¿Que se toca con pánico la guitarra? ‘That is played with fear the guitar?’*

### 3.2. Duration

In the case of duration, a number of consistent patterns observed in Figure 5 should be mentioned. First, it can be seen that the differences correlating with lexical word stress in the internal positions (non final) sentences are almost non-existent. Second, there is an increase in the duration of the last vowel in each sentence. Concerning the parameter of lexical stress, sentences ending in an oxytone word are the longest in all cases but two (*¿La guitarra se toca con obsesión? ‘Is the guitar played with obsession?’* versus *¿La guitarra se toca con pánico? ‘Is the guitar played with fear?’*; *¿Que se toca con obsesión el saxofón? ‘That is played with obsession the saxophone?’* versus *¿Que se toca con pánico el saxofón? ‘That is played with obsession the saxophone?’*). It should be further noted that this increase in duration is particularly salient when compared with the penultimate vowel. For instance, in the sentence *¿El saxofón se toca con obsesión?*, the duration is at least three times greater as it goes from 39ms in the penultimate vowel to 156ms in the last vowel.



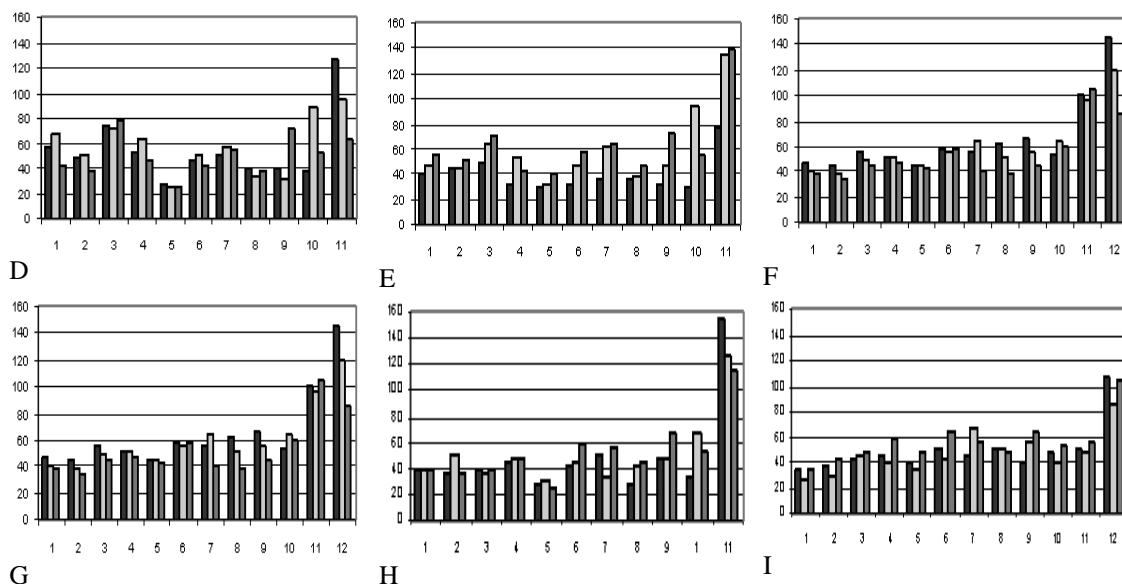


Figure 5. Duration data in ms.

Black bars: sentences with oxytone final pitch accent; light-grey bars: sentences with paroxytone final pitch accent; dark grey bars: sentences with proparoxytone final pitch accent.

A: *El saxofón se toca con obsesión/paciencia/pánico.* (See appendix)

B: *¿El saxofón se toca con obsesión/paciencia/pánico?*

C: *¿Que se toca con obsesión/paciencia/pánico el saxofón?*

D: *La guitarra se toca con obsesión/paciencia/pánico.*

E: *¿La guitarra se toca con obsesión/paciencia/pánico?*

F: *¿Que se toca con obsesión/paciencia/pánico la guitarra?*

G: *La cítara se toca con obsesión/paciencia/pánico.*

H: *¿La cítara se toca con obsesión/paciencia/pánico?*

I: *¿Que se toca con obsesión/paciencia/pánico la cítara?*

### 3.2.1. Declaratives

In declaratives, the stressed vowel in oxytone words shows a substantial increase in duration when compared to preceding vowels. In the case of paroxytone words, there is a gradual increase between pre-stressed, stressed, and post-tonic syllables. In contrast, proparoxytone words follow the following pattern from greater to lesser stressed syllables: stressed > post-post-tonic > post-tonic. This pattern might be due to the fact that the speaker has to specify the stressed syllable as well as signaling the end of the sentence. As a result, the vowel in post-tonic position (included in the count) should necessarily be shorter in duration so that the two remaining positions are emphasized. The position of the verb *se toca* 'is played' shows a rising progression in duration as syllables systematically go forward in all sentences.

With regard to sentence subjects, both in the paroxytone and oxytone words, vowels in stressed syllables are longer than those in pre-stressed and post-tonic syllables. However, in the proparoxytone word, the vowel in the post-tonic syllable has a greater duration. That is, the peak tends to be aligned with the word offset, as is the case of F0.

### 3.2.2. Interrogatives without 'que' in sentence-initial position

As far as subject, verb, and verbal complement positions are concerned, interrogatives without *que* behave in the same way as declaratives, except for the sentence *¿La guitarra se toca con obsesión?*. In this case, the last vowel in the sentence does not display values as high as those of sentences ending in paroxytone or proparoxytone words.

It should be further noted that, in general, the duration of the last vowel in interrogatives without *que* is greater than that of declaratives. For instance, in the declarative sentences *La cítara se toca con obsesión/con paciencia/con pánico*, the values of the last vowels are 114ms, 99ms, and 65ms respectively, whereas in interrogatives without *que* they are 154ms, 127ms, and 114ms. In contrast, there are hardly any differences in the other vowels of the sentences examined.

3.2.3. Interrogatives with ‘*que*’ in sentence-initial position

As in the previous section, we present our results by sentence-type below. In the case of interrogatives with *que*, greater duration values are found with verbs and subjects (i.e., with the stressed syllables of all oxytones, paroxytones, and proparoxytones), although with some pitch accents, there is only a slight difference between the various positions. As mentioned before, the last vowel in the ‘nucleus’, that is, the last pitch accent (*tonema*), has the highest duration values in the sentence. Moreover, in relation to the values of preceding syllables, the increase in duration is especially marked in oxytone and proparoxytone words in sentence-final position. Despite the fact that the values of the last vowels are the highest in the sentence, they are not as high as those obtained in interrogatives without *que*, rather they are more similar to those of declaratives.

3.3. Intensity

In this last section we will discuss the results for intensity, which, as in previous sections, will be presented by type.

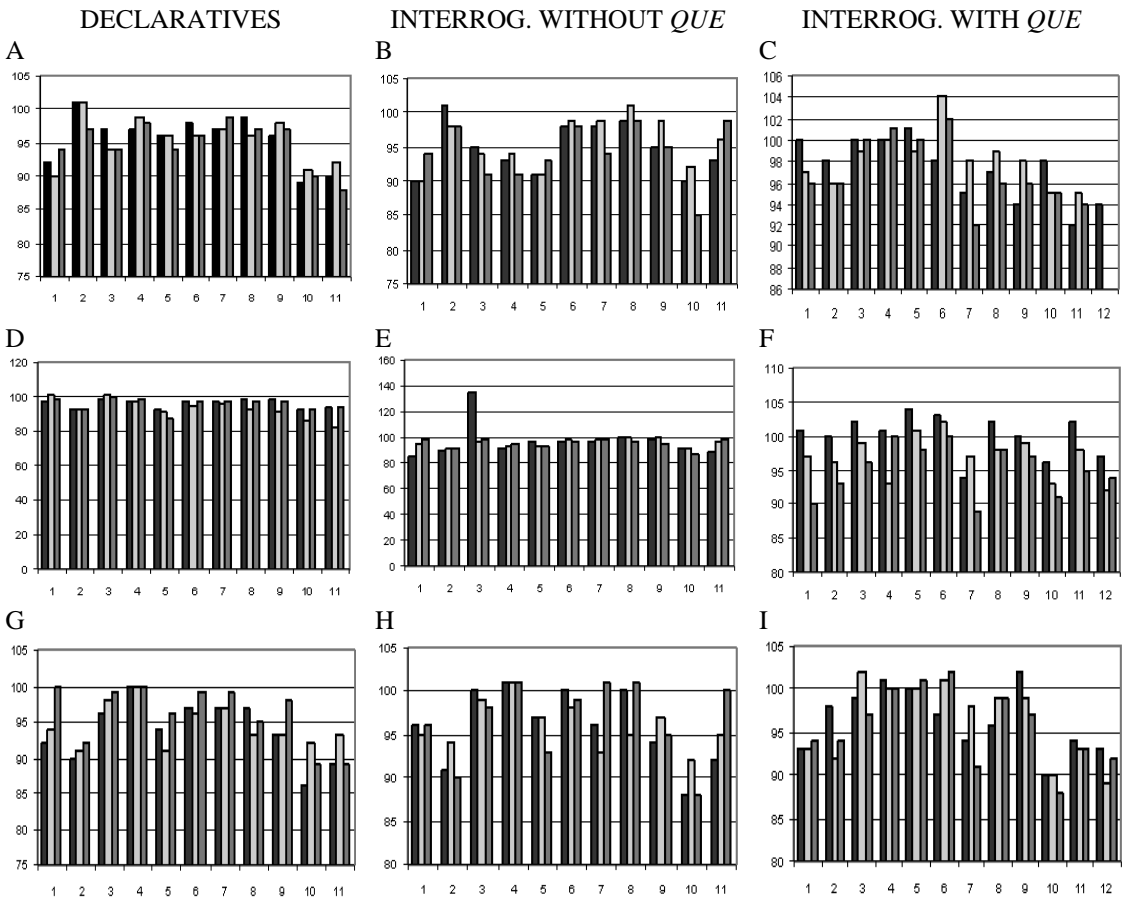


Figure 6. Intensity data in dB.

Black bars: sentences with oxytone final pitch accent; light-grey bars: sentences with paroxytone final pitch accent; dark grey bars: sentences with proparoxytone final pitch accent.

- A: *El saxofón se toca con obsesión/paciencia/pánico.* (See appendix)  
 B: *¿El saxofón se toca con obsesión./paciencia/pánico?*  
 C: *¿Que se toca con obsesión/paciencia/pánico el saxofón?*  
 D: *La guitarra se toca con obsesión/paciencia/pánico.*  
 E: *¿La guitarra se toca con obsesión./paciencia/pánico?*  
 F: *¿Que se toca con obsesión/paciencia/pánico la guitarra?*  
 G: *La cítara se toca con obsesión/paciencia/pánico.*  
 H: *¿La cítara se toca con obsesión./paciencia/pánico?*  
 I: *¿Que se toca con obsesión/paciencia/pánico la cítara?*

### 3.3.1. Declaratives

Overall, the final or last two vowels have lesser intensity (approximately 6 or 7 dB less) than the preceding vowels, in particular, in sentences beginning with oxytone and proparoxytone words. The slight differences in intensity among pitch accents do not seem to be relevant. Moreover, the assumption that stressed syllables have greater intensity than adjacent unstressed syllables does not always hold. By way of illustration, in *la cítara* ‘the zither’ the intensity peak is aligned within the last syllable, as is the case of F0 and, occasionally, duration.

### 3.3.2. Interrogatives without ‘que’ in sentence-initial position (yes-no questions)

The analysis of intensity shows that vowels in sentence-final position do not have lower values (in dB) than preceding ones. In general, intensity in penultimate and antepenultimate syllables starts to fall, yet the intensity contour in the last vowel rises slightly again. This goes against Lindblom’s (1968) findings that, cross-linguistically, an increase in duration of sentence-final syllables compensates for the loss in intensity they undergo. As seen above, duration increases noticeably, but so does intensity. Thus, it might be inferred that duration and intensity are separately controlled parameters, though they always go hand in hand, in addition to having an inverse relationship in the ‘nucleus’ of sentences. As with declaratives, no consistent pattern in the location of intensity peaks and the type of syllable or the stress type of the word can be observed.

### 3.3.3. Interrogatives with ‘que’ in sentence-initial position

Once again, the final syllables show a marked drop in intensity in comparison to the previous vowels in this type of sentences. More intense syllables are located in sentence-medial position and do not always coincide with the stressed syllable of the word. In addition, intensity does not seem to be correlated with word stress type.

## 4. Phonological interpretation

The phonological interpretation of the findings of this study is formalized within Autosegmental-Metrical (AM) Theory (Pierrehumbert 1980; Ladd 1996). The aim of the current section, which focuses on the F0 movement, is to determine how intonational structures might help to determine the differences between the three sentence types. Another objective is to examine the prosodic similarities between the Spanish dialect spoken by the informant, the Catalan of Barcelona to which she has always been exposed, and other Spanish dialects.

### 4.1. Declaratives

In all declaratives both the initial and final boundary tones are low, which is in line with several intonational studies (Navarro Tomás 1944, Sosa 1999, Beckman et al. 2002, Hualde 2002). The differences in the intonation contour are related to the various types of word accents, represented by the first and the last (or ‘nuclear’) accents in these sentences; the word bearing the second lexical accent is always a prooxytone. Those sentences with an oxytone word in the initial noun phrase (NP)

display the same intonation contour (L% H + L\* H+ L\* H+L\* L%). Additionally, a similar intonation contour (L% L\*+ H L\*+ H H+ L\* L%) is observed among all declaratives with an initial paroxytone word.

In contrast, differences in declaratives emerge in initial proparoxytone words, as there is only one coincidence with the pitch accent of the second pre-nuclear (L\* + H). With the first pitch accent two contours are possible (H\* + L; L\* + H), while in the ‘nucleus’ the difference is H + L\* versus L\* + H, the latter with a proparoxytone ending.

	<b>Initial Boundary Tone</b>	<b>First Pitch Accent</b>	<b>Second Pitch Accent</b>	<b>Nucleus</b>	<b>Final Boundary Tone</b>
Oxytone Word	L%	H + L*	H + L*	H + L*	L%
Paroxytone Word	L%	L* + H	L* + H	H + L*	L%
Proparoxytone Word	L%	<b>H* + L</b> L* + H	L* + H	<b>H + L*</b> L* + H	L%

Table 1. Pitch accents in declaratives.

When interpreting the results of Table 1, the reader should keep in mind that: (i) the word is always a paroxytone, hence the difference is established according to the preceding pitch accent; (ii) the oxytone word prior to the second pre-nuclear signals the difference, resulting in the contour H + L\*; (iii) pitch accents with a higher frequency of appearance (i.e. twice) are in boldface.

The intonation contour falls at the end of these declarative sentences, therefore their boundary tone is L%. The ‘nucleus’ only varies in the sentence containing the two proparoxytone words *La cítara se toca con pánico* ‘The zither is played with fear’.

#### 4.2. Interrogatives without ‘que’ in sentence-initial position

These sentences begin with a low boundary tone and finish with a high tone, which is the case in this type of interrogatives in other Spanish varieties. The sentences below, which correspond to the initial oxytone word accent (*el saxofón* ‘the saxophone’), have the intonation contour L% H + L\* L\* + H L + H\* H%, with the exception of the last sentence that has a final proparoxytone word (*pánico* ‘fear’).

The predominant intonation contour in the sentences with initial paroxytone word accents (*la guitarra* ‘the guitar’) consists of L% L\* + H H\* + L L\* + H H%. The only variation in this pattern is to be found in the last ‘nucleus’ of the first sentence, which has a final oxytone word accent. Likewise, in the three sentences above with initial proparoxytone word accents (*la cítara* ‘the zither’), the difference in intonation contour lies with the final oxytone word (*obsesión* ‘obsession’). In the remaining instances, pitch accents are the same, namely L% H\* + L H\* + L L\* + H H%.

	<b>Initial Boundary Tone</b>	<b>First Pitch Accent</b>	<b>Second Pitch Accent</b>	<b>Nucleus</b>	<b>Final Boundary Tone</b>
Oxytone Word	L%	H+ L*	<b>L* + H</b> / H* + L	L + H*	H%
Paroxytone Word	L%	L* + H	H* + L	<b>L* + H</b> / L + H*	H%
Proparoxytone Word	L%	H*+ L	H* + L	L* + H	H%

Table 2. Pitch accents in interrogatives without *que*.

In interrogatives without *que* the realization of the first pitch accent depends on the lexical stress of the first word, as each type has a distinct tone. On two occasions, the second pitch accent (which is generally H\* + L) is L\* + H, when preceded by an oxytone word. The final ‘nucleus’ also varies depending on the final pitch accent; while it is L\* + H in paroxytone (predominantly) and proparoxytone words, it is L + H\* in oxytone words and in one paroxytone word.

#### 4.3. Interrogatives with ‘*que*’ in sentence-initial position

As noted in §2.1, interrogatives with *que* in sentence-initial position are a “special” type of interrogative sentences, being present only in those Spanish dialects that are in contact with the Catalan dialects which have this type of interrogatives. In those sentences, *que* is unstressed, hence adding no relevant meaning to the sentence. Moreover, these interrogatives with *que* begin with a high tone (H%) and end with a low tone (L%).

The sentences with final oxytone and paroxytone words display the intonation contours H\* H + L\* H + L\*, except for the sentence containing the word *pánico* ‘fear’, in which the second pitch accent is H\* + L. The final proparoxytone pitch accent involves a difference in the ‘nucleus’. A further difference can be observed in the sentence where the two proparoxytone words coincide (here *cítara* ‘zither’ and *pánico* ‘fear’).

	<b>Initial Boundary Tone</b>	<b>First Pitch Accent</b>	<b>Second Pitch Accent</b>	<b>Nucleus</b>	<b>Final Boundary Tone</b>
Oxytone Word	H%	H*	H + L*	H + L*	L%
Paroxytone Word	H%	H*	H + L*	H + L*	L%
Proparoxytone Word	H%	H*	H* + L	H* + L	L%

Table 3. Pitch accents in interrogatives with *que*.

These interrogatives have a very high tone at the beginning, with a first pitch accent that is monotone (H\*). The differences in intonation contours are found in sentences with proparoxytone words, both in the second pitch accent and the ‘nucleus’.

#### 4.4. Comparison to Catalan intonation

##### 4.4.1. Declaratives

According to Martínez Celdrán et al. (2005), declarative sentences in Barcelona begin with a tone located around the informant’s average F0. Moreover, there is a peak at position 5 after which the tone falls gradually. In the current study, the same finding concerning the peak applies. However, it has been shown that before the fall there is another peak at position 8. In this case, the fall starts at the latter peak.

##### 4.4.2. Interrogatives

Prieto (2001, 2002) outlines two intonation contours for yes/no interrogatives in Barcelona Spanish:

- a) A rising contour in interrogatives with an SVO order. The sentence begins with a medium or low tone followed by a rise on the first post-tonic syllable, and a gradual fall until the final stressed syllable (the lowest tone in the sentence). The final post-tonic syllables are characterized by a fast marked rise (if the last syllable is stressed, it displays the falling-rising tone movement).

- b) A falling contour in interrogatives with *que* in sentence-initial position and VOS order. These sentences have a high beginning tone/pitch in the speaker's normal pitch range, which is maintained until the last stressed syllable, where there is a marked fall. This low tone remains until the end of the sentence.

Using a similar corpus to the one discussed here, Martínez Celdrán et al. (2005) have found that the intonation contour of interrogatives with *que* in the Catalan of Barcelona is L + H\* H + L\* H + L\*. This differs from the first pitch accent of the intonation contour observed in this study – namely H\* – as the difference with the pre-stressed syllable has been deemed insufficient. Moreover, the second pitch accent coincides with the one reported by Martínez Celdrán et al. but only in oxytone and paroxytone words and in the ‘nucleus’ of sentences ending in proparoxytone words.

Fernández Planas, Martínez Celdrán, Carrera, van Oosterzee, Salcioli, Castellví & Szmidt (2004) have indicated that in interrogatives with *que* the abrupt F0 drop occurs at the onset of the stressed syllable of the second pitch accent. These results are in line with the falling tone movement in sentence-final position reported by Salcioli (1988) and Prieto (2002).

#### 4.5. Comparison with the intonation of other Peninsular Spanish varieties

In our comparison, we will focus only on the results obtained in areas close to the speaker's family's cities of origin, namely Salamanca, Valladolid (Zamora et al. 2005), and Madrid (Ramírez 2005). It should be noted that the speakers' profiles are the same as far as age and sociological profile are concerned. Moreover, the speakers and their relatives are native to those cities. In the following tables the results reported for the speaker of the present study are in boldface.

##### 4.5.1. Valladolid and Salamanca

The results in Tables 4 and 5 can be interpreted in light of the nuclear values in Hz reported by Zamora et al. (2005)<sup>3</sup>. The speech of Valladolid and Salamanca are simultaneously compared to that of the participant of this study. In the case of declaratives, there is a coincidence among the realization of the nuclear accent in sentences containing a paroxytone word, in the maximum opposition in the realization of the nuclear accent in sentences containing an oxytone word, and in the value L\* in the nuclear accent of sentences ending in proparoxytone words. Yet again in Barcelona Spanish there appears a final rise, unlike the speech of Valladolid and Salamanca. As for interrogatives, there is a total coincidence in the intonation contours of oxytone and proparoxytone words, while the reverse applies to paroxytone words.

Valladolid	Initial Boundary Tone	First Pitch Accent	Second Pitch Accent	Nucleus	Final Boundary Tone
<b>Declaratives</b>					
Oxytone Word	L%	L*+H	L*+H	H+L* / <b>H+L*</b>	L%
Paroxytone Word				L+H* / <b>H+L*</b>	
Proparoxytone Word				H+L* / <b>L*+H</b>	
<b>Interrogatives</b>					
Oxytone Word	H% / <b>L%</b>	L*+H	H*+L	L*+H / <b>L*+H</b>	H%
Paroxytone Word				H+L* / <b>L+H*</b>	
Proparoxytone Word				L*+H / <b>L*+H</b>	

Table 4. Pitch accents and boundary tones in Valladolid Spanish (Zamora, Carrera & Meléndez 2005).

<sup>3</sup> Zamora et al. (2005) do not report values for the first pitch accents, thus the corresponding entries in some of the table cells here are blank.

Salamanca	Initial Boundary Tone	First Pitch Accent	Second Pitch Accent	Nucleus	Final Boundary Tone
<b>Declaratives</b>					
Oxytone Word	L%	L*+H	L*+H	H+L* / <b>H+L*</b>	L%
Paroxytone Word				H+L* / <b>H+L*</b>	
Proparoxytone Word				H+L* / <b>L*+H</b>	
<b>Interrogatives</b>					
Oxytone Word	H% / <b>L%</b>	L*+H	H*+L	L*+H / <b>L*+H</b>	H%
Paroxytone Word				H+L* / <b>L+H*</b>	
Proparoxytone Word				L*+H / <b>L*+H</b>	

Table 5. Pitch accents and boundary tones in Salamanca Spanish (Zamora, Carrera &amp; Meléndez 2005).

#### 4.5.2. Madrid

In the comparison between declaratives of Madrid and those of Barcelona (see Tables 1 and 2), the similarities are few. That is, there is a coincidence only in the first and second pitch accent of sentences with oxytone words, in both cases L\*+H. Another similarity is observed in the value L\* in the ‘nucleus’, though the value is higher in the pre-stressed syllable, while in the sentences uttered in the Spanish of Barcelona there is as an increase in the F0 value in the post-tonic syllable.

Madrid	Initial Boundary Tone	First Pitch Accent	Second Pitch Accent	Nucleus	Final Boundary Tone
<b>Declaratives</b>					
Oxytone Word	L%	L*+H / <b>L*+H</b>	L*+H / <b>L*+H</b>	L*+H / <b>H+L*</b>	L%
Paroxytone Word		L*+H / <b>H+L*</b>	H*+L / <b>H+L*</b>	L*+H / <b>H+L*</b>	
Proparoxytone Word		L*+H / <b>H*+L</b>	H*+L / <b>L*+H</b>	H+L* / <b>L*+H</b>	
<b>Interrogatives</b>					
Oxytone Word	H% <b>L%</b>	L*+H / <b>L*+H</b>	H*+L / <b>H*+L</b>	L*+H / <b>L*+H</b>	H% / <b>H%</b>
Paroxytone Word		L*+H / <b>H+L*</b>	L*+H / <b>L*+H</b>	H*+L / <b>L+H*</b>	
Proparoxytone Word		H*+L / <b>H*+L</b>	H*+L / <b>H*+L</b>	H*+L / <b>L*+H</b>	

Table 6. Pitch accents and boundary tones in Madrid Spanish (Ramírez 2005).

As for sentences with oxytone words, a coincidence in the L\* values is observed, although the reference value goes in the opposite direction: H in post-tonic syllables in Madrid versus H in pre-stressed syllables in Barcelona. Finally, in sentences with proparoxytone words, no coincidence is observed including the values of the main syllable in the pre-nuclei: the nuclear accent is realized as L\*, while in the realizations of our speaker there is a slight rise in the post-tonic syllable.

Concerning interrogatives, the findings of sentences with paroxytone words are all equivalent. There is no difference in the realization of pitch accents in interrogatives with oxytone words, but the reference values are distributed differently. Last, pitch accents in interrogatives with proparoxytone words have a similar realization in pre-nuclear position but differ in the ‘nucleus’ significantly.

## 5. Discussion and conclusions

As far as F0 is concerned, the beginning of the declaratives examined in the current study is similar to that of declaratives in the Catalan of Barcelona, though differing in the final part of the sentence. A higher degree of similarity is found in the comparison with the declaratives of Valladolid and Salamanca. However, in the peaks, which are not aligned within the stressed syllable, pitch accents are different. In interrogatives without *que* the beginning and end are similar to those of the Catalan of Barcelona, although the second pitch accent is higher in the present study, which in turn is also prominent in Castilian Spanish realizations. On the other hand, there is an overall coincidence between interrogatives with *que* and those of the Catalan of Barcelona. With regard to interrogatives, there exist significant Catalan sub-dialectal differences and distinct pragmatic information based on both the use of the conjunction *que* in sentence-initial position and intonation (Martínez Celdrán et al. 2005; Rigau & Prieto 2005). As such, intonation contours of interrogatives with *que* reported here are clearly influenced by the Catalan of Barcelona.

Concerning duration and intensity, it has been noted that an increase in duration in final syllables compensates for the lesser degree of intensity per time unit (Lindblom 1968). While the findings for declaratives and interrogatives with *que* corroborate this view, the observed results for interrogatives without *que* do not support such a claim. In fact, the graphs above show that the intensity curve parallels the F0 contour in the nucleus, i.e. falling in declaratives and interrogatives with *que*, and rising in interrogatives without *que*. Estebas (2003) found that the peak in Catalan declaratives is aligned with the word edge. This is further supported in the present study, particularly in proparoxytone words with F0 peaks and amplitude peaks corresponding to the final syllable. Moreover, Pamies & Amorós (2005) reach the same conclusion in their study of the declaratives of the Spanish of Granada.

As for intonation contours, several similarities between the pitch accents of the Spanish of Valladolid, Salamanca, and Madrid and those of the present study have been observed, in addition to other resemblances to the Catalan of Barcelona.

As a general conclusion, the present study has demonstrated that the passive knowledge of the prosody of any contact language — in this case, Catalan — can exert a strong influence to the extent of modifying the prosody of the speaker's mother tongue — specifically, Spanish. More precisely, the informant's Spanish utterances are characterized by intonation contours that are typical of the Catalan of Barcelona. This has been clearly illustrated by the fact that the habit of forming Spanish interrogatives with initial unstressed *que*-constructions closely resembling those of Catalan — results in widely accepted “normal” or standard interrogative sentences.

## Appendix

- |   |  |
|---|--|
| 1. El saxofón se toca con obsesión.     | <i>The saxophone is played with obsession.</i> |
| 2. El saxofón se toca con paciencia.    | <i>The saxophone is played with patience.</i>  |
| 3. El saxofón se toca con pánico.       | <i>The saxophone is played with fear.</i>      |
| 4. La guitarra se toca con obsesión.    | <i>The guitar is played with obsession.</i>    |
| 5. La guitarra se toca con paciencia.   | <i>The guitar is played with patience.</i>     |
| 6. La guitarra se toca con pánico.      | <i>The guitar is played with fear.</i>         |
| 7. La cítara se toca con obsesión.      | <i>The zither is played with obsession.</i>    |
| 8. La cítara se toca con paciencia.     | <i>The zither is played with patience.</i>     |
| 9. La cítara se toca con pánico.        | <i>The zither is played with fear.</i>         |
| 10. ¿El saxofón se toca con obsesión?   | <i>Is the saxophone played with obsession?</i> |
| 11. ¿El saxofón se toca con paciencia?  | <i>Is the saxophone played with patience?</i>  |
| 12. ¿El saxofón se toca con pánico?     | <i>Is the saxophone played with fear?</i>      |
| 13. ¿La guitarra se toca con obsesión?  | <i>Is the guitar played with obsession?</i>    |
| 14. ¿La guitarra se toca con paciencia? | <i>Is the guitar played with patience?</i>     |
| 15. ¿La guitarra se toca con pánico?    | <i>Is the guitar played with fear?</i>         |
| 16. ¿La cítara se toca con obsesión?    | <i>Is the zither played with obsession?</i>    |
| 17. ¿La cítara se toca con paciencia?   | <i>Is the zither played with patience?</i>     |

- |   |   |
|---|---|
| 18. ¿La cítara se toca con pánico?          | <i>Is the zither played with fear?</i>              |
| 19. ¿Que se toca con obsesión el saxofón?   | <i>That is played with obsession the saxophone?</i> |
| 20. ¿Que se toca con paciencia el saxofón?  | <i>That is played with patience the saxophone?</i>  |
| 21. ¿Que se toca con pánico el saxofón?     | <i>That is played with fear the saxophone?</i>      |
| 22. ¿Que se toca con obsesión la guitarra?  | <i>That is played with obsession the guitar?</i>    |
| 23. ¿Que se toca con paciencia la guitarra? | <i>That is played with patience the guitar?</i>     |
| 24. ¿Que se toca con pánico la guitarra?    | <i>That is played with fear the guitar?</i>         |
| 25. ¿Que se toca con obsesión la cítara?    | <i>That is played with obsession the zither?</i>    |
| 26. ¿Que se toca con paciencia la cítara?   | <i>That is played with patience the zither?</i>     |
| 27. ¿Qué se toca con pánico la cítara?      | <i>That is played with fear the zither?</i>         |

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