Prosodic realization of focus in the discourse of Spanish learners and English native speakers

Dolores RAMÍREZ VERDUGO

Universidad Autónoma de Madrid
dolores.ramirez@uam.es

Recibido: noviembre, 2005
Aceptado: febrero, 2006

ABSTRACT
The function of tonic prominence or nuclear pitch accent in an intonation unit is mainly to mark the main burden or focus of the information of an utterance. However, in non-native speech the identification of the utterance focus is not always straightforward, which often obscures the intended pragmatic meaning and the understanding of the message. This study investigates how the tonic prominence is phonetically realized in non-native and English native discourse as one of the major markers of the communicative focus. The results reveal significant differences between the non-native and the English native discourse in the phonetic and phonological realization of the nuclear pitch accent in terms of pitch accent structure and pitch range, which may lead to cross-linguistic inaccuracies.

Key words: focus, cross-linguistic prosodic analysis, Spanish learners, English native speakers.

La realización prosódica del foco en el discurso de los aprendices españoles y los hablantes nativos de inglés

RESUMEN
La función principal de la prominencia tonal o acento nuclear en la unidad de entonación es la de marcar el foco informativo de la oración. En la producción lingüística de hablantes no nativos, sin embargo, no es siempre fácil identificar el foco de la información, lo que puede generar dificultades en la comprensión y transmisión del significado pragmático del mensaje. El presente artículo estudia algunos de los parámetros fundamentales que intervienen en la realización prosódica de la prominencia tonal en el discurso de hablantes nativos y no nativos de lengua inglesa, y que funcionan como marcadores del foco de la frase. Los resultados indican que existen diferencias significativas en la realización fonética y fonológica de la prominencia en cuanto a la estructura y el campo tonal del acento nuclear, lo que puede dar lugar a ciertos problemas comunicativos.

Palabras clave: foco informativo, análisis prosódico comparativo, aprendices españoles y hablantes nativos de lengua inglesa.

1. INTRODUCTION

Non-native speech is commonly characterized by the use of segmental and suprasegmental phonemes and allophones in the L2 that resemble those of their L1. This foreign accent is generally accepted as long as it does not interfere with communication (cf. Jenkins, 2000). However, Anderson-Hsieh and Koehler (1988) and Anderson-Hsieh, Johnson and Koehler (1992) showed that non-native deviant intonation may affect comprehension more negatively than does segmental foreign accent. Munro and Derwing (1995b: 74) argued that "although the strength of foreign-accent is correlated with perceived comprehensibility and intelligibility, a strong foreign-accent [at segmental level] does not necessarily reduce the comprehensibility or intelligibility of L2 speech". However, the use of L1 prosodic patterns often causes difficulties in the understanding of non-native speakers.

Prosodic deviance, then, seems to contribute not only to reveal a foreign accent but it also affects the degree of comprehensibility and hence, intelligibility. More specifically, differences in the choice and realization of the focus of an utterance represent a change in "the main point or burden of the message", affecting the pragmatic meaning of the utterance as well (cf. Halliday, 1970: 40; Lambrecht, 1996; Tench, 1996: 80-86). The present paper is concerned with a cross-linguistic comparison of the phonetic and phonological form of tonic prominence as a marker of focus in Spanish learners' and English native discourse. First, for presentation purposes, I provide a general overview of the concept of focus and the phonetic and phonological criteria involved in its realization. Then, I summarize the findings obtained in previous studies on the role of Spanish and English intonation in the expression of focus.

1.1. DEFINITION OF FOCUS

The focus of a message is generally defined as the part of the discourse the speaker emphasizes as being highlighted (Bolinger 1972) or foregrounded (Knowles 1984). Jackendoff (1972: 230) refers to it as "the information in the sentence that is assumed by the speaker not to be shared by him and the hearer". Similarly, Lambrecht (1996: 206) defines focus as an element in a discourse which is informatively new, asserted or "textually (and situationally) non-derivable" from the preceding context (cf. Halliday 1967: 204ff). That is, the element that is understood as the intended informative center of the utterance or the new information conveyed about a topic.

A distinction is usually drawn between two subsets of focus: broad focus and narrow focus (Ladd 1980). Broad focus corresponds to cases where the entire utterance is presented as new or equally important to the communicative intent of the message. In other words, the location of the tonic prominence is in default position: the last fully stressed syllable within the intonation phrase (cf. Halliday 1967, 1970). Narrow focus, on the other hand, refers to an element in the discourse that is more highlighted than the rest of the utterance (cf. Halliday 1967, 1970; Ladd

1980). Moreover, two further distinctions are often made within narrow focus: new information focus and contrastive focus. The main difference between these types of foci lies in the reasons why a particular element is highlighted in a discourse. While new information focus introduces information that is assumed not to be shared by the interlocutors (cf. Halliday 1970, Chafe 1974), contrastive focus involves "comparison within a limited set" (Cruttenden 1986: 90), or expresses a semantic relation of contrast between a pair of elements in an utterance (cf. Halliday 1970; Akmajian 1973; Taglicht 1982). Contrastive focus, hence, does not always convey new information, but presents a particular element, with maximum prominence, as an exponent of semantic contrast within the preceding context (cf. Wells 1986).

In this paper I analyze non-native and English native speakers' interpretation of the same contextualized utterances, statements and answers, in order to investigate their prosodic form, the realization of the tonic prominence or nuclear pitch accent and the likely communicative consequences in spoken discourse. The data include examples of both broad and narrow contrastive focus.

1.2. PHONETIC AND PHONOLOGICAL CRITERIA

As Lambrecht (1996: 218) notes, the focus of a proposition may be marked prosodically, morphologically, syntactically or via a combination of prosodic and morphosyntactic means. It has been suggested that sentence prosody can be interpreted in terms of communicative intentions based on the notion of a correlation between prosodic prominence and the relative communicative importance of the prosodically highlighted element (cf. Bolinger 1958a and b; Schmerling 1976: 41ff¸ Selkirk 1984: 206ff). The speaker must make assumptions about shared common knowledge in assessing how to signal the new or newsworthy piece of information, and the hearer must be aware of the preceding discourse in order to understand the significance of the speaker's prosodic signals.

Given the importance of the focus, a substantial number of linguists have directed their attention to the phonological and phonetic prosodic systems that intervene in the realization of the tonic prominence or nuclear pitch accent. Lehiste (1979: 107-108), Wells (1986: 59-64) and Tench (1990: 201-214; 1996: 53) among other scholars, have demonstrated that the phonetic features involving pitch seem to be always present in the identification of the focus of information: pitch peak, or the maximum pitch height within an intonation phrase, pitch range, or the maximum pitch movement exhibited by the tonic syllable, pitch obtrusion, or the step up or down in pitch immediately following the focused constituent, and kinetic tone. In addition, volume, duration, and either loudness peak, tempo marking or pause seem to be also involved in the expression of focus (cf. Vanderslice and Ladefoged 1972; Huss 1978; Beckman 1986; Lieberman and Blumstein 1988: 154; 't Hart, Collier and Cohen 1990: 96f; Crystal 1991; Campbell 1992; Van Heuven and Sluijter 1996: 248-261).

However, not all these cues need to be always available unless speakers wish to contrast parts of their messages with other items in the discourse. Pitch seems to be the most decisive cue in projecting and perceiving nuclear pitch accent (cf. Lea, 1973; Collier and 't Hart 1975; Scott 1980; Tench 1996; Nooteboom 1997; Grabe et al. 2000). As Cutler and Fodor (1979: 88) state, "sentence accent perception directly decodes the information which was encoded in the production of accent; accent represents focus, and perception of accent is perception of focus".

The realization and perception of the tonic prominence or nuclear pitch accent, nevertheless, are not only determined by those phonetic features. They depend crucially on the pattern of the intonation unit. In this respect, Beckman (1986) and Ladd (1981, 1996: 56) maintain that pitch accent has to be defined not only in phonetic terms, but also in terms of its phonological function as the element of organization in the chain of speech. Similarly, other scholars suggest that these prosodic features, like other elements of prosodic structure, cannot be studied as single phonetic parameters but depend on a hierarchical principle, their main function being within the syntagmatic organization of speech (cf. Halliday 1967, 1970, 1994; Lehiste 1979: 106; Tench 1996; Nooteboom 1997: 651; or Fox 2000: 150, 177-178).

1.3. FOCUS IN ENGLISH AND SPANISH

The study of the phonetic and phonological characteristics of the prosodic parameters which contribute to the realization of focal information is well documented both in English (Pierrehumbert 1980, 2000; Nooteboom and Kruyt 1987; Ladd 1996; Xu and Xu 2005, inter alios) and in Spanish (Fant 1984; Ortiz Lira 1994; García Lecumberri 1995; Llisterri et al. 1995; Prieto et al. 1995; de la Mota, 1997; García Lecumberri et al. 1997; Sosa 1995, 1999; Hualde 2002; Nibert 2000; Face 2002; inter alios).

In her comparison of English and Spanish, García Lecumberri (1995) found that, in English and Spanish, intonational focus is realized by the same mechanism, namely nucleus placement, even though important differences were also detected. Her analysis revealed that focus for new information and focus for contrast did not behave as consistently in Spanish as in English (ibid. 335). Subsequent research indicates that the intonation pattern of broad and contrastive focus in Madrid Spanish is L*+H (the stressed syllable aligned with a low tone), the latter having a higher pitch range (Face 2002). The intonation pattern of English focus, on the other hand, is L+H* (the stressed syllable aligned with a rising tone). In this case, contrastive focus also exhibits wider pitch range than broad focus (Xu and Xu 2005: 189).

1.4. FOCUS IN THE DISCOURSE OF SPANISH LEARNERS OF ENGLISH: THE AIM OF THIS INVESTIGATION

All the foregoing studies enhance our understanding of the prosodic structure of the focus of information both in Spanish and English, our Spanish learners' first and foreign language respectively. However, although the scholars identified striking

similarities together with important differences in these two languages, it is not clear whether this distinction in the expression of focus may have consequences for the discourse of Spanish learners of English. Neither is it entirely clear which phonetic features are transferred during foreign language acquisition, which patterns may be universal, or the way the main prosodic features correlate in the non-native intonation patterns to express focus. Unfortunately, very few data are available on the non-native speakers' prosodic realization of focus in the English discourse produced by Spanish speakers (cf. Gutiérrez Díez 2001; Romero-Trillo and Llinares-García 2004).

Given such similarities and differences between English and Spanish, it would be interesting to examine how the tonic prominence is phonetic and phonologically realized in the interlanguage of Spanish learners of English. More concretely, to my knowledge, studies have not yet applied acoustic analysis to corpora of learner English, in order to identify the differences in both form and pragmatic meaning expressed. The present study uses a cross-linguistic corpus of learner and native English in order to provide experimental evidence for the phonetic realization of the tonic prominence or nuclear pitch accent. Taking into account previous research, as reviewed in sections 1.2 and 1.3, and recent findings on the most determinant cues to signal focus in English declarative intonation (cf. Xu and Xu 2005), the object of this study concerns the parameters of nuclear pitch accent structure and pitch range in native and non-native prosody. The aim of this investigation is to compare the phonetic and phonological realization of these two parameters in the expression of broad and narrow contrastive focus as produced by Spanish learners and English native speakers in statements and answers. I hypothesize that the phonetic and phonological features of the non-native intonation patterns may affect the realization of the focus of information in their messages.

2. METHODOLOGY

2.1. THE CORPUS

This study was designed to identify and analyze non-native prosodic features by comparing them with a control corpus of native English. This method allows us to contrast the intonation of the same utterance across speakers in order to obtain intra- and inter-speaker results (cf. Ladd 1996: 263-265; Grabe et al 2002). To my knowledge, there is no comparable research done on the prosody produced by Spanish learners and native speakers of English in the terms expounded here. Therefore, I decided to outline an initial set of hypotheses on the basis of the discourse mode of reading aloud and interpreting the same short scripted dialogues in context.

2.2. SUBJECTS

The subjects were 20 university students at Universidad Autónoma de Madrid (10 Spanish and 10 English –on an Erasmus Programme) of a similar age (between

19 and 22). I administered sociolinguistic questionnaires to select the subjects according to several variables. The Spanish students' mother tongue was standard Madrid Spanish and they had no competence in any other foreign language except English. All the participants presented a similar upper-intermediate proficiency level. The same sociolinguistic criteria were applied to the English speaking subjects. All came from Oxfordshire and spoke standard British English (obviously, the information about their knowledge of English was not applicable).

2.3. CORPUS COMPILATION AND RECORDING

The corpus analyzed here belongs to a larger corpus of spoken English as a foreign language (UAM Corpus) composed of natural conversations and scripted dialogues. The specific data analyzed here consist of 290 utterances contextualized in scripted dialogues between two interlocutors. These dialogues include the speech role of giving information and the speech functions of statements and answers: 190 statements, 100 answers. Each recording session took about half an hour to complete. Recordings were made in a language laboratory using a high-quality microphone connected to a Siemens-Fujitsu notebook computer. Each conversation was recorded and digitized using the commercial software package *Speech Analyzer* (version 1.5) at 16 bits, 16 kHz sampling rate and saved separately as WAV files.

Regarding the task setting for the scripted dialogues, the subjects were given the context for each conversation, and allowed time to rehearse and prepare the interactions. Each constructed text contained a headline and an introduction to inform the subjects about the situational, linguistic, and pragmatic context and the social relationship between interlocutors. The notion of reading and interpreting a text is to be understood here as "perform[ing]" it …, saying as it were "this is what the text means", taking into account the context provided (cf. Brazil et al. 1980: 83). Then, the subjects were asked to record their speech while they were interpreting the texts orally and in pairs of native speakers, on the one hand, and non-native speakers, on the other.

2.4. A PROSODIC MODEL OF ANALYSIS FOR A CROSS-LINGUISTIC COMPARISON

In order to carry out a cross-linguistic comparison between non-native and English native intonation patterns, I have applied a prosodic model of annotation which permits a detailed analysis and enables to detect similarities and differences. This model takes as its reference point the two most influential theoretical frameworks of English intonation: the British nuclear tone tradition and Autosegmental-metrical theory (AM). Both models were successfully applied in the phonological descriptions carried out in Roach (1994) and Ladd (1996: 81). Yet, apart from the phonological description proposed by these two approaches, the

present comparative study requires annotation of a phonetic level of analysis, as explained in this section (cf. Ramírez Verdugo 2003, 2005).

Within the British tradition, I take Halliday's systemic functional account of English intonation as a reference framework (1970; 1994). I find his distinction of three hierarchical intonation systems and their pragmatic meaning in discourse useful for the phonological analysis of the present investigation: tonicity, tonality and tone. Tonicity refers to "the construction of feet into tone groups, showing how the tone group serves to organize discourse into information units" (Halliday 1994: 292); within each unit of intonation, the most prominent word receives the tonic prominence indicating the focus of information. Tonality refers to the system that divides speech into its separate individual "tone groups" or intonation units. Each intonation unit contains a single unit of information and represents the speaker's perception and management of the whole message. Finally, tone, to referred here also as F0 contour, is defined as the system of contrasting pitch movements in each unit of intonation.

However, in order to describe the prosodic features detected during the first analysis of the Spanish learner data, it was necessary to annotate the sequence of pitch movements composing the unit of intonation. Autosegmental-Metrical phonology (henceforth AM) provides the principles for the more detailed annotation that I have adopted. Briefly, each intonational phrase or unit consists of a sequence of H and L tones. There are four components of each intonational phrase or tonal sequence: a boundary tone at the beginning, a pitch accent, a phrase tone, and a boundary tone at the end. Pitch accents consist of a single H or L tone or a combination of two tones. The location of the pitch accent is determined by the metrical structure of the utterance and aligned with the stressed syllables. The central tone of a pitch accent is indicated with an asterisk, as either H* or L*. In addition to the starred tone, a pitch accent may contain a preceding ('leading') or a following ('trailing') tone. Pitch accents then can be realized by a single tone (marked H* and L*) or bitonally (marked L*+H, L+H*, H*+L and H+L*). Phrase tones (marked L- or H-) occur near the end of the word that contains the last pitch accent. They account for any movement in pitch immediately following the last pitch accent. Boundary tones (marked L% or H%) occur at the very beginning of a phrase and on the very last syllable of the phrase (see Pierrehumbert (1980) and Ladd (1996) for more detailed explanation of AM approaches to intonation). Traditional British nuclear falls and rises would be transcribed in AM as H*+L and L*+H, respectively.

In addition to this phonological level of analysis, it was necessary to include a phonetic annotation of pitch. My decision was supported by previous research on comparative intonation. In this respect, Grabe et al.'s (2002) found it relevant to include new levels of annotation in the original ToBI (*Tone and Break Index*, cf. Silverman et al. 1992*)* system in their study of British varieties of intonation (the so-called IViE, *Intonational Variation in English*)). This new level permits a step-by-step decomposition of the tonal transcription into a phonetic level distinguishing high, low and medium (h, l, m) pitch targets. Besides, in view of the results from

the first analysis of the data, I considered that this comparative study also required the annotation of the subjects' pitch range (in semitones). Figure 3 in section 3.1., for instance, displays this model of prosodic annotation. These phonetic and phonological parameters, I assumed, would facilitate the description and understanding of the distinctive prosodic nature of the utterances produced by the two language user groups.

2.5. VARIABLES

As mentioned in the introduction, nuclear pitch accent cannot be defined with one simple parameter but requires several interrelated phonetic and phonological features in its description (cf. Fox, 2000). One attempt to handle this complexity is by defining a set of variables that represent the most relevant phonetic and phonological prosodic features involved in its expression. Only an accurate comparison of form based on acoustic and statistical data will provide an inventory of each of those features as produced by the Spanish learners and the English native speakers of this study. In this way, similarity and variation will be explicitly noted with respect to each group. Therefore, the present research was designed to determine the effect and relationship of the independent variables (two groups of speakers and the speech functions of statements and answers) and the dependent variables (tonicity, tonality, tone, pitch accent structure and pitch range) in the expression of focus.

2.6. STATISTICAL ANALYSES

To investigate whether there is a significant difference in the phonetic form of the non-native and English native intonation units several statistical analyses were carried out using SPSS for Windows. Firstly, the scores on pitch range in each group of speakers were plotted and examined. They appeared to be normally distributed as results obtained by the Levene test indicate ($p>0.05$). Secondly, I performed a T-test for independent samples on the dependent variable of pitch range. The comparison of means of this ordinal variable indicates whether there exist significant differences between the two groups of speakers. Finally, contingency tables show the percentage of type of pitch accent structures found in the data.

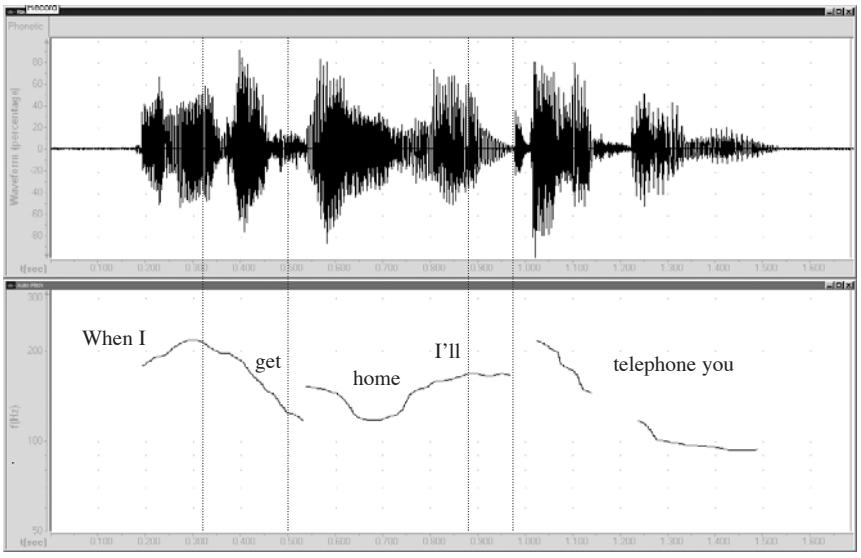
3. RESULTS

A global analysis shows that, in general, native and non-native speakers use a falling contour to express most of the statements and answers included in this study. However, simply through visual inspection of the F0 contours we can observe differences in pitch height and pitch structure in the native and non-native intonation units. A more detailed analysis provides revealing data in this respect. In

the case of the English native speakers, the realization of the tonic prominence is always clearly marked both in broad and in narrow focus utterances. The nuclear pitch accent structure at a phonological level in these two types of focus is L+H*L-L%. The phonetic analysis indicates that the peak in the nuclear pitch accent is higher than in the rest of the pitch accents composing the intonation unit. In the case of narrow focus, the peak is expanded to a higher degree than in broad focus utterances. The analysis of the Spanish learners' discourse indicates that these non-native speakers use different intonation features to mark the focus of their utterances as the following cross-linguistic comparison shows.

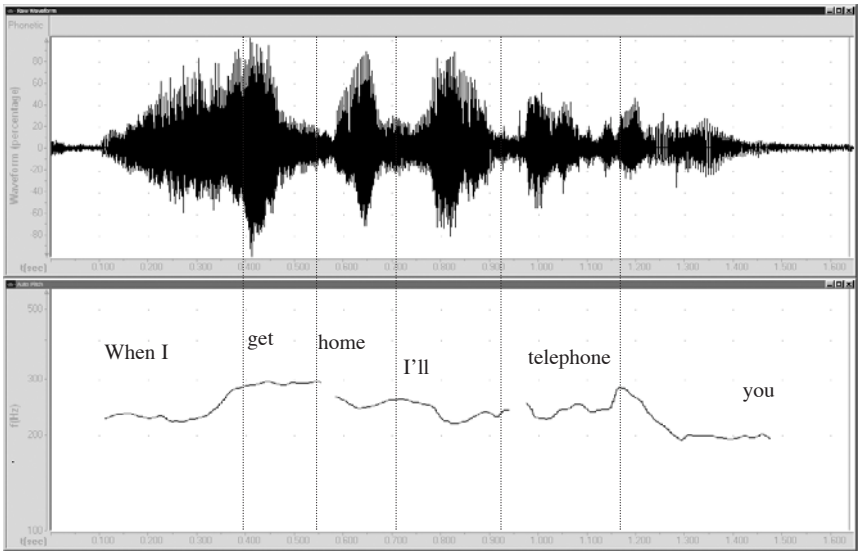
3.1. RESULTS ON BROAD FOCUS

The nuclear pitch accent or tonic prominence in broad focus utterances is placed on the last stressed lexical element as its default position. In our broad focus data, when the tonic prominence contains a lexical word, both native and non-native speakers globally coincide in this default placement of the nucleus. However, when the last stressed element is a non-lexical word differences are detected. While native speakers locate the tonic prominence on the preceding lexical word, non-native speakers keep placing the prominence on that last word. Figures 1 and 2 illustrate these native and non-native features. English speakers locate the prominence on the action (telephone). Spanish learners, however, locate the prominence on the recipient, a grammatical and non-contrastive word in the immediate linguistic context, the pronoun *you* in this case.



NSs // 4 when I / get / <u>home</u> // // 1 ∧ I'll / <u>te</u>lephone you //

Figure 1. Annotation of the response *When I get home I'll telephone you* produced by English native speakers.



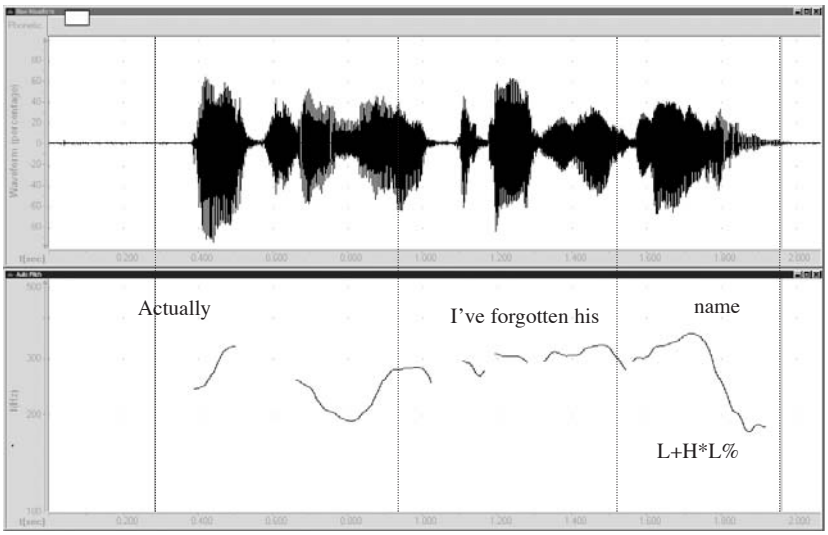
NSs // 1 when I / get / home // // 1 ∧ I'll / telephone / you //

Figure 2. Annotation of the response *When I get home I'll telephone you* produced by English non-native speakers.

Furthermore, even in those cases where there is global coincidence in the location of the tonic, the nuclear pitch accent is realized differently. At a phonological level, the nuclear pitch accent generally presents the structure H*L or L+ H*L. The phonetic analysis indicates that the peak in the English native nuclear pitch accent is higher than in the rest of the pitch accents composing the intonation unit (Figure 3). By contrast, the peak in the non-native nuclear pitch accent is not consistently higher than in the rest of the unit pitch accents (Figure 4). In fact, the F0 contour is characterized by a progressive lowering feature towards the end of the intonation unit. As a result, since different pitch accents are produced with a similar pitch range, the identification of the tonic segment is not as clearly marked as in the case of the English native intonation units.

3.2. RESULTS ON NARROW CONTRASTIVE FOCUS

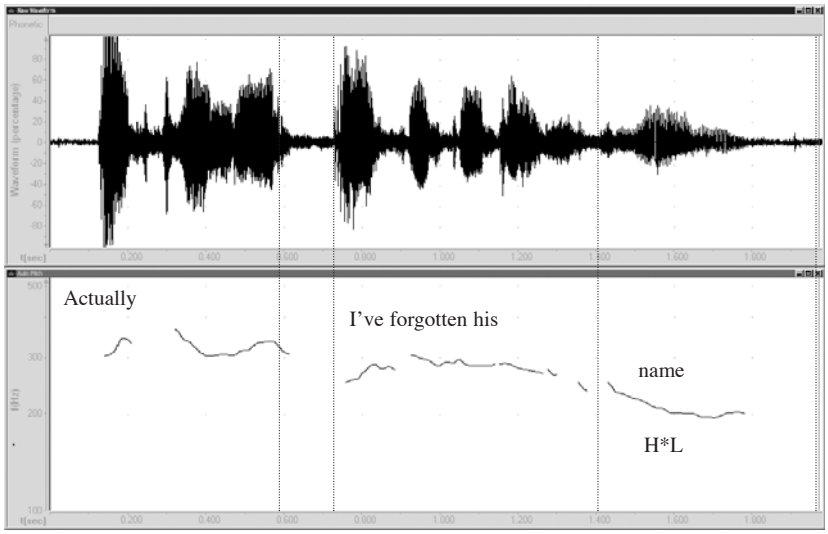
The results obtained on narrow contrastive focus indicate that English native speakers interpret the linguistic and pragmatic context of the conversation and mark the word containing the contrastive focus prosodically: expanded pitch range (an average of 2 semitones higher than in broad focus) and L+H*L- structure. Figure 5 illustrates this prosodic strategy.



NSs // 3 actually // // 1 ∧ I've for/gotten his/ name //

Figure 3. Prosodic annotation of the response *Actually, I've forgotten his name* produced by native speakers.

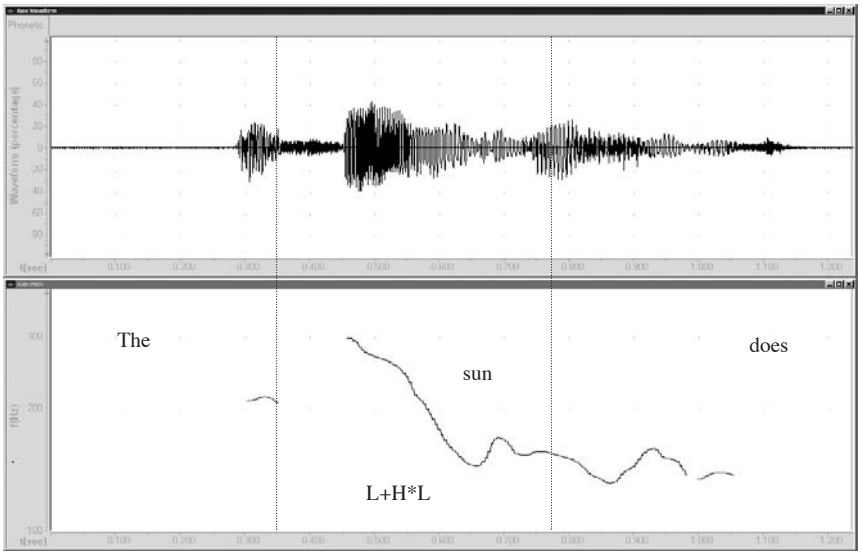
Native Speakers	Actually	I've for	gotten his	name
Phonological Analysis	L%HL*H		H*L	L+H*L%
Phonetic Analysis	lhlh	hl	lhl	mhl
Mean F0 difference between high and low targets (in semitones)	+5-11+6	+1-2	+4-3	+3-11



NNSs // 1 actually// //1 I've for/gotten his/ name//

Figure 4. Prosodic annotation of the response *Actually, I've forgotten his name* produced by non-native speakers.

Non-Native Speakers	Actually	I've for	gotten his	name
Phonological Analysis	L%H*L		H*L	H*L
Phonetic Analysis	lhl	lhl	lhl	hl
Mean F0 difference between high and low targets (in semitones)	+3-2	+3-1	+1-4	+1-4



NSs // 1+ ∧ The / sun does //

Native Speakers	The	sun	does
Phonological Analysis	L%	L+H*L-	L%
Phonetic Analysis	l	mhl	lml
Mean F0 difference between high and low targets (in semitones)	0	+6-12	+2-3

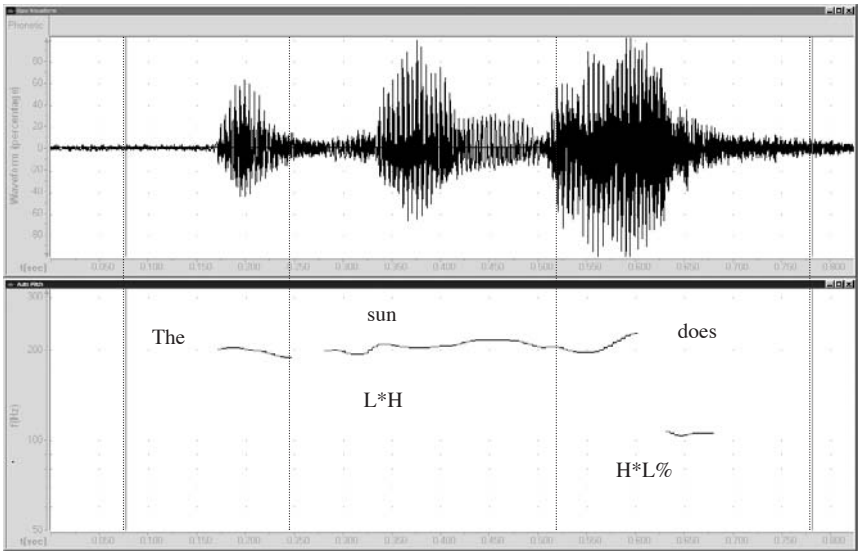
Figure 5. Prosodic annotation of the response *The sun does* produced by native speakers.

By contrast, three main prosodic features are detected in the non-native intonation units: firstly, the overgeneralization of broad focus default position and structure also in utterances intended to foster contrastive focus: H*L (47.06%); secondly, a different pitch accent structure: L*+H L- (41.18%) and a similar pitch range in all intonation unit pitch accents; and thirdly, cases where a low rising contour is used to express focus: L*+H% (11.76%). These three strategies are described in detail in the following subsections.

3.2.1. Overgeneralization of broad focus default position

Spanish learners tend to prefer the last stressed word as the exponent of tonic prominence. That is, a broad focus default position is over-generalized to most of

the utterances even when the immediate linguistic context indicates that a different word should be selected as tonic instead. The answer *the sun does* to the question *and which one gives the earth its energy?* (Text 1 in Appendix) will serve us to illustrate this finding. In the answer, the focus should be on *sun*, as the selected element within a limited set offered in the previous linguistic context: *the sun or the moon* (Figure 5). These Spanish learners, however, place their tonic prominence on *does* (Figure 6). The expected semantic contrast within the preceding context (cf. Halliday 1970; Cruttenden 1986; Wells 1986) is, thus, not expressed in the non-native discourse. As a result, the location of the tonic prominence differs in both groups of subjects. The differences in the tonicity system also affect the system of tonality. In other words, the utterances are also structured differently. The intonation unit of the answer *the sun does*, for instance, is divided into two feet in the native discourse: // 1 the / sun does//. The tonic on *sun* and *does* is simply the tail. In the non-native utterance the intonation unit is divided into three feet (Figure 6): // 1 the / sun / does//. The tonic is located on *does*. The rhythm perceived is different as well.



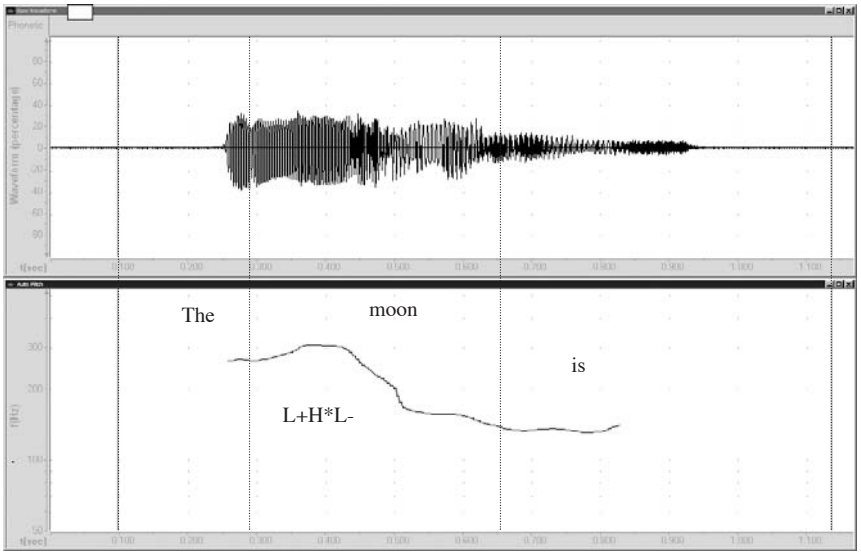
NNSs // 1 The / sun /does //

Non-Native Speakers	The	sun	does
Phonological Analysis	H%	L*H-	H*L%
Phonetic Analysis	ml	lm	mhl
Mean F0 difference between high and low targets (in semitones)	-1	+2	+2-8

Figure 6. Prosodic annotation of the response *The sun does* produced by non-native speakers.

3.2.2. Results on pitch structure and pitch range

The second characteristic found in the Spanish learners' discourse is difference in pitch accent structure and pitch range. The phonological analysis shows that the most common structure of the nuclear pitch accent is L+H*L-L% in the native intonation units. The pitch accent structure found in non-native discourse, as stated earlier, shows a wider variety of patterns: H*L (47.06%); L*+H L- (41.18%) and L*+H% (11.76%). In this section, Figure 8 exemplifies the non-native structure L*+H L-L% in comparison with the structure of the native contrastive narrow focus in Figure 7. A global analysis would suggest similarities between the native and the non-native intonation units: a falling contour to express this short answer. However, as the phonetic level of annotation illustrates, the pitch accent structure and the pitch targets associated with the stressed syllables are different.

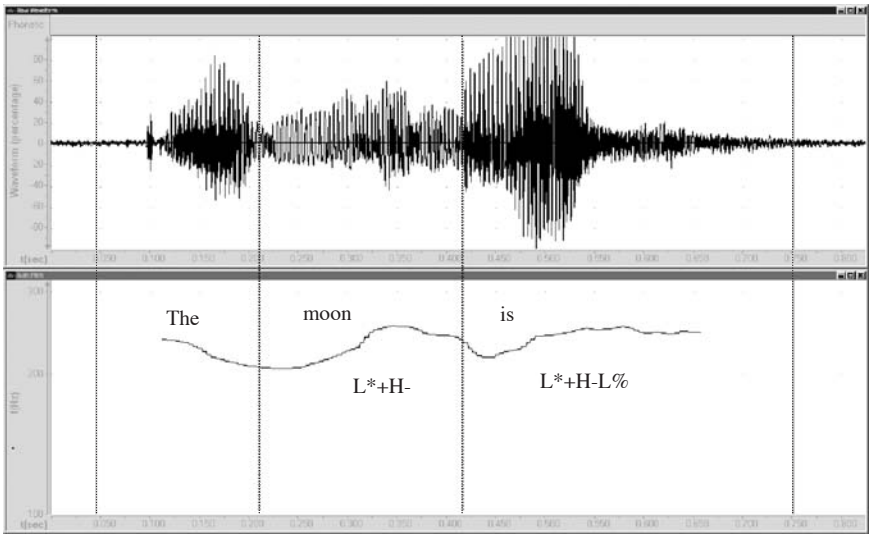


NSs // 1+ ∧ The / moon is //

Native Speakers	The	sun	is
Phonological Analysis	L%	L+H*L-	L%
Phonetic Analysis	m	mhl	ml
Mean F0 difference between high and low targets (in semitones)	0	+3-12	-2

Figure. 7. Prosodic annotation of the response *The moon is* produced by native speakers.

In addition, the results obtained in the T-test for independent samples performed revealed significant differences ($p<0.05$) in the pitch range of the intonation units produced by the two language user groups, as summarized in Table 1.



NNSs // 3 The / moon / is //

Non-Native Speakers	The	moon	is
Phonological Analysis	H%	L*+H-	L*+H%
Phonetic Analysis	hl	lh	lhl
Mean F0 difference between high and low targets (in semitones)	-2	+3	+2-1

Figure 8. Prosodic annotation of the response *The moon is* produced by non-native speakers.

Speech Function	N	Pitch range Tonic prominent segment
Statements	190	T = 6.090, p=0.001: Significant
Answers	100	T = -14.162, p = 0 Significant

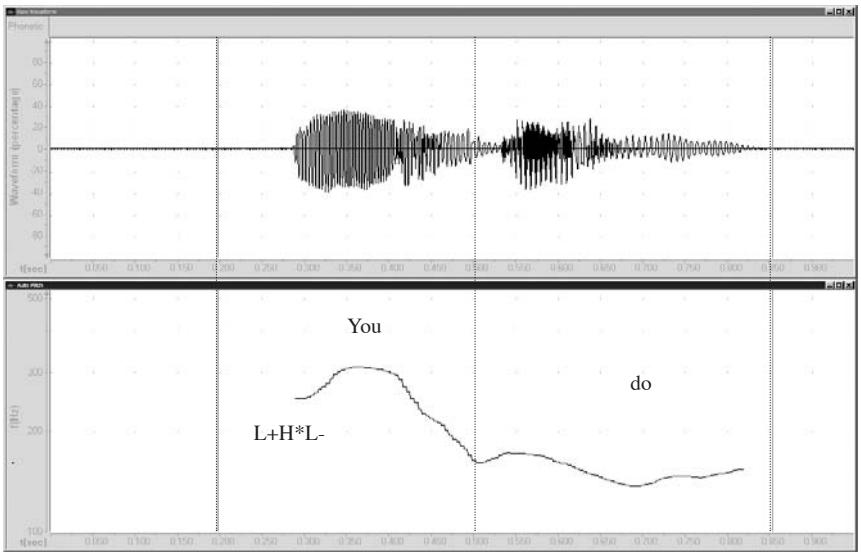
Table 1. Results of the T-Test on the pitch range of the tonic prominence segment.

In the native intonation units the average values of the tonic prominence oscillate between +5 and -10 semitones. By contrast, the average values of the non-native tonic prominence are +3 and -4 semitones. That is, the falling contour (H*L) is level or shallow in the non-native discourse. A similar narrow pitch range is also exhibited in the majority of pitch accents in the intonation unit.

The phonetic analysis, hence, reveals that the nuclear pitch accent in both examples is realized differently. The English native nuclear fall presents a higher peak and a greater pitch range than that produced by the Spanish learners of English.

3.2.3. A LOW RISING CONTOUR

A third non-native intonation strategy is utterances intended to prompt narrow contrastive focus, which are intoned with a low rising contour and have the tonic prominence at the end of the intonation unit (Figure 10), in other words, again in broad focus default position. In contrast, native speakers produce this utterance with the common contrastive focus pitch accent structure as Figure 9 displays. Once again, the native and the non-native tonal structures differ.



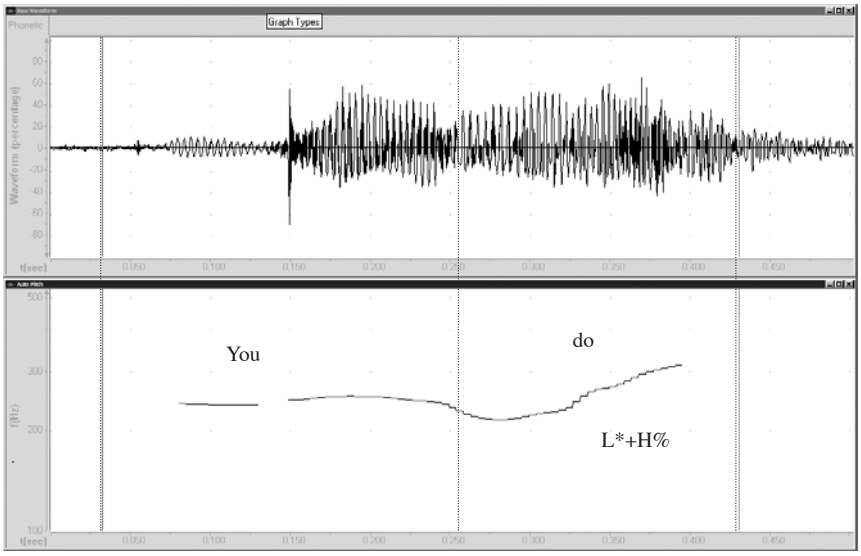
NSs // 1 You do//

Native Speakers	You	do
Phonological Analysis	L+H*L-	L%
Phonetic Analysis	mhl	lml
Mean F0 difference between high and low targets (in semitones)	+4-11	+1-2

Figure 9. Prosodic annotation of the response *You do* produced by native speakers.

4. DISCUSSION

The analyses performed provide us with better insights into the origin of the distinct nature of the speech produced by the Spanish learners of English in the present study. A global analysis would suggest phonological similarities between the native and non-native intonation patterns. Statements, for instance, are generally intoned with a falling contour. The universal tendency employed to highlight a



NNSs // 3 ∧ You / <u>do</u>//

Non-Native Speakers	You	do
Phonological Analysis	L%	L*+H%
Phonetic Analysis	lm	mlh
Mean F0 difference between high and low targets (in semitones)	+1	-1+5

Figure 10. Prosodic annotation of the response *You do* produced by non-native speakers.

particular element within the utterance (cf. Bolinger 1978; Gussenhoven 1984), is also detectable in the interlanguage of the Spanish speakers of English. However, a more detailed analysis reveals important differences. Firstly, at a phonetic level of analysis, the data show that the pitch range exhibited by the Spanish learners of English is lower than that of the English native subjects. This finding echoes the results obtained by García Lecumberri (1995) and Kelm (1995) in their acoustic study of Spanish and English pitch contours. Kelm reports that the pitch range score for the English native subjects when speaking English (150Hz) was significantly higher than that of the native speakers of Spanish in English (86Hz). Nevertheless, those pitch ranges were not significantly different when the subjects were speaking their native languages. That is, the range of Spanish speakers in Spanish (109 Hz), even if it is narrower, is not significantly lower than the range of English speakers in English (150 Hz). It appears then, that both groups of speakers "reduced their pitch range when speaking their non-native language" (cf. ibid.).

Secondly, the analysis of the pitch accent structure of broad and narrow focus in statements and answers shows differences in their phonetic realization. Nuclear pitch accents in English native intonation present the sequence of tones L+H*L-;¡ whereas the nuclear pitch accents produced by the Spanish learners present the

sequences of tones H*L; L*+H L- and L*+H%. Therefore, the intonational strategy to express the focus of information is different in the discourse of the two groups of language users.

Thirdly, the possible transfer of a marked final lowering feature from Spanish intonation, as documented in previous research (cf. Navarro Tomás 1944; de la Mota 1997; Face 2002; Fernández Planas and Martínez Celdrán 2003; etc.), to the non-native English discourse could explain the fact that each pitch peak in the intonation unit is lower that the previous one. This is a noticeable lowering phenomenon that makes it difficult to identify the pitch peaks of the intonation unit, and consequently the nuclear pitch accent as well.

Fourthly, differences were also detected in the location of the nuclear pitch accent in narrow contrastive focus. Non-native speakers tend to prefer to place the prominence at the end of the intonation unit. This broad focus default position is generalized to intonation units which, taking into account the immediate linguistic context, would require placement of the tonic on the element under contrast, instead, in order to express a narrow contrastive focus. This has consequences for the intonational structure. The utterance is divided and distributed differently by the Spanish learner from that of the English native discourse of this study. These differences in the rhythmic pattern and the division of speech will probably require more processing time for the utterances produced by the non-native speakers to be understood (cf. Eimas et al. 1990; Munro and Derwing 1995b; Munro, 1998 or Bürki-Conen et al. 2001). This finding, however, requires future research on the perception of the spoken discourse of the Spanish learners of English.

Finally, it could be suggested that, in view of the results obtained in previous research on Madrid Spanish (Face 2002) and English (Xu and Xu 2005), Spanish learners might be partly transferring their mother tongue intonation patterns to their L2 discourse. The differences between Spanish and English intonation systems may help us to understand the distinct prosodic performance found in the discourse of Spanish learners of English.

6. CONCLUSION

The different levels of annotation and analyses, including not only phonological but also phonetic data, have helped us identify significant differences between the intonation of the Spanish learners and the English native speakers. This study has attempted to present a wider perspective on the commonly assumed idea that the consequences of a non-native intonation are only a matter of foreign accent. On the contrary, this research has proved that the non-native English intonation patterns examined affect the structure of the information transmitted. In fact, the analysis of the data suggests cues to understanding why the utterances produced by the Spanish learners of English may give the impression of being to a certain extent communicatively confusing. One of these cues is the fact that the nuclear pitch accent is not as distinctively realized by the Spanish learners as by the English

native speakers. The focus of information, hence, is not so clearly conveyed either. The results of this experimental investigation, therefore, suggest a cross-linguistic disparity in the phonetic realization of the tonic prominence in the non-native and English native discourse.

One possible explanation for this prosodic performance is that these Spanish learners have already achieved a good command of all the intonational resources available in their mother tongue to express meaning. At this stage of their linguistic development, it is assumed that they use those resources subconsciously and automatically, paying attention to other morphosyntactic, semantic and pragmatic features to transmit meaning instead (cf. Berkovits, 1980, Cutler, 1984, Halliday, 1994; Snow, 1995). Spanish learners might, then, be applying these acquired L1 linguistic strategies to the spoken discourse of their L2. A limited use of the target language in a largely monolingual context might affect the accurate acquisition and realization of the English intonation systems. Their lack of confidence and fluency in the foreign language seem to influence their L2 intonation negatively (cf. Flege et al. 1995; Flege and Liu 2001). Therefore, it appears that the Spanish learners of this study will need to employ specific prosodic features in their foreign language, different to those of their mother tongue, in order to realize and locate nuclear pitch accent clearly in their English discourse. Some of those prosodic features have been identified in the present research. Even though this premise still requires empirical study, the results from this analysis suggest that it might be worth focusing attention on this area. Further research on different discourse modes will hopefully shed new light on the prosodic strategies Spanish learners employ when communicating in English.

The findings of the present study have implications beyond the identification and analysis of the nuclear pitch accents of the Spanish learners and the English native speakers. The first is that the intonation patterns reported provide more objective criteria for determining the origin of the distinct nature of this group of non-native English speakers. In addition, this research provides hints as how best to understand the possible cross-linguistic interferences the prosodic behaviour of the Spanish learners of English may produce when expressing their communicative intent in English. This is, notwithstanding, a wide field open to further investigate the perception and production of non-native intonation. In this respect, different studies conclude that improvement in non-native speaker comprehensibility is more likely to occur with improvement in prosodic proficiency than with a sole focus on correction of phonemic errors (cf. Jenkins 2000).

Intonation is complex in its phonetic, phonological and functional nature, but necessary for language to be understood in spoken discourse. Future research is needed in order to gain further insight into the way speakers are subconsciously able to use intonation to structure and mark the main burden of the information in their messages and interactions. This knowledge, I believe, may help us to also understand the way learners acquire a foreign language, and hence, propose possible remedial strategies for improving the acquisition of foreign language intonation, reducing as much as possible the learners' communicative inaccuracies in their speech.

ACKNOWLEDGMENTS

The present study belongs to a larger research project awarded the first national prize in Educational Research by the Spanish Ministry of Education and Culture and the Centre for Research and Educational Documentation (MECD-CIDE 2003, 28-11-200). The research reported on here was supported by the Spanish Ministry of Education through research project no. BFF 1003-08381. I am grateful to Gerry Docherty, Brechtje Post, Pilar Prieto, Ana María Fernández and two anonymous reviewers for helpful comments and suggestions on earlier versions of this paper. I owe a debt of gratitude to Ian Thompson for granting permission to publish freely from the extracts of *Intonation Practice* (1990).

REFERENCES

Akmajian, A. (1973). The role of focus in the interpretation of anaphoric expressions. In Anderson, S. and Kiparsky, P. (eds.). *A Festschrift for Morris Halle*, 215-226. New York: Hold, Rinehart and Winston.

Anderson-Hsieh, J., Johnson, R. and Koehler, K. (1992). The relationship between native speakers judgements of non-native pronunciation and deviance in segmentals, prosody and syllable structure. *Language Learning* 42: 529-555.

Anderson-Hsieh, J. and Koehler, K. (1988). The effect of foreign accent and speaking rate on native speaker comprehension. *Language Learning* 38: 561-605.

Beckman, M. (1986). *Stress and Non-Stress Accent*. Dordrecht: Foris.

Berkovits, R. (1980). Perception of intonation in native and non-native speakers of English. *Language and Speech*, Vol. 23, Part 3: 271-280.

Bolinger, D. (1958a). A theory of pitch accent in English. *Word* 14: 109-149.

Bolinger, D. (1958b). Stress and information. *American Speech* 33: 5-20.

Bolinger, D. (1972). Accent is predictable (if you're a mind reader). *Language* 48: 633-644.

Bolinger, D. (1978). Intonation across languages. In J.H, Greenberg, C.A. Ferguson and E.A. Moravcik, (eds.), *Universals of Human Language: Phonology*, Vol. 2, 471-524. Stanford: Stanford University Press.

Brazil, D., Coulthard, M. and Johns, C. (1980). *Discourse Intonation and Language Teaching*. London: Longman.

Bürki-Cohen, J., Miller, J.L. and Eimas, P.D. (2001). Perceiving non-native speech. *Language and Speech*, 44(2): 149-169.

Campbell, N. (1992). Syllable-based segmental duration. In G. Bailly and C. Benôit (eds.), *Talking Machines*, 211-224. Amsterdam: North-Holland.

Chafe, W. L. (1974). *Meaning and the Structure of Language*. Chicago: University of Chicago Press.

Collier, R. and 't Hart. (1975). The role of intonation in speech perception. In A. Cohen, and S. Nooteboom (eds), *Structure and Process in Speech Perception,* 107-121. Heidelberg: Springer.

Cruttenden, A. (1986). *Intonation*. Cambridge: Cambridge University Press.

Crystal, D. (1991). *A Dictionary of Linguistics and Phonetics* (3rd edn).Oxford: Blackwell.

Cutler, A. (1984). Stress and accent in language production and understanding. In D. Gibbon, and H. Richter (eds.), *Intonation, Accent and Rhythm*, 77-90. Berlin: De Gruyter.

Cutler, A. and Fodor J. (1979). Semantic focus and sentence comprehension. *Cognition* 7: 49-59.

De la Mota, C. (1997). Prosody of sentences with contrastive new information in Spanish. In A. Botinis, G. Kouroupetroglou and G. Carayiannis (eds.) *Intonation: Theory, Models and Applications*. Proceedings of an ESCA Workshop, 75-78.

Eimas, P.D. Marcovitz H. Ornstein, S.F. and Payton, P. (1990). Attention ad the role of dual codes in phonem monitoring. *Journal of Memory and Language*, 29: 160-180.

Face, T. L. (2002). *Intonational Marking of Contrastive Focus in Madrid Spanish*. Muenchen: Lincon Europa.

Fant, L. (1984). *Estructura Informativa en Español. Estudio Sintáctico y Entonativo*. Acta Universitatis Upsaliensis, 34. Uppsala.

Fernández Planas, A.M. and Martínez Celdrán, E. (2003). El tono fundamental y la duración: dos aspectos de la taxonomía prosódica en dos modalidades de habla (enunciativa e interrogativa) del español. *Estudios de Fonética Experimental* XII, 165-200. Barcelona: Universitat de Barcelona.

Flege, J. E. and Liu, S. (2001). The effect of experience on adults' acquisition of a second language. *Studies on Second Language Acquisition* 23: 527-552.

Flege, J. E., Munro, J. J. and Mackay, I. R. (1995). Factors affecting degree of perceived foreign accent in a second language. *Journal of the Acoustical Society of America* 97: 3125-3134.

Fox, A. (2000). *Prosodic features and prosodic structure. The phonology of suprasegmentals*. Oxford: Oxford University Press.

García Lecumberri, M.L. (1995*). Intonational Signaling of Information Structure in English and Spanish: A Contrastive Analysis*. PhD. Universidad del País Vasco.

García Lecumberri, L., Cabrera Abreu, M. Maidment, J.A. (1997). The realization of focal accent in English and Spanish. *ESCA Workshop on Intonation*: *Theory, Models and Applications*, 141-143.

Grabe, E. and Post, B. (2002). Intonational variation in English. In B. Bel, and I. Marlin (eds.), *Proceedings of the Speech Prosody 2002 Conference*, 343-346.Aix-en–Provence.

Gussenhoven, C. (1984). *On the Grammar and Semantics of Sentence Accents*. Dordrecht: Foris.

Gutierrez Díez, F. (2001). The acquisition of English timing by native Spanish learners of English. An empirical study. *International Journal of English Studies*, 1(1): 93-115. Universidad de Murcia: Murcia

Halliday, M.A.K. (1967). *Intonation and Grammar in British English*. The Hague: Mouton.

Halliday, M.A.K. (1970). *A Course in Spoken English: Intonation*. London: Oxford University Press.

Halliday, M.A.K. (1994). *An Introduction to Functional Grammar*. London: Arnold.

Heuven, V. J. and van Sluijter, A. 1996. Notes on the phonetics of word prosody. In R., Goedemans, H. van der Hulst, and E. Visch, (eds.), *Stress patterns of the world*, Part 1: Background. Holland Academic Graphics. The Hague, 233-269.

Hualde, J. I. (2002). Intonation in Spanish and the other Ibero-Romance languages: Overview and status quaestionis. In C. Wilstshire, J. Camps (eds.), Romance Phonology and Variation. *Selected papers from the 30th Linguistic Symposium on Romance Languages*, 101-116. Amsterdam: John Benjamins.

Huss, V. (1978). English word stress in the postnuclear position. *Phonetica* 35: 86-105.

Jackendoff, R. (1972). *Semantic Interpretation in Generative Grammar. Cambridge, Mass.: MIT Press*.

Jenkins, J. (2000). *The Phonology of English as an International Language*. Oxford: Oxford University Press.
Kelm, O. (1995). Acoustic measurement of Spanish and English pitch contours: native and non-native speakers. In *Hispanic Linguistics* 6/7: 435-448.
Knowles, G. (1984). Variable strategies in intonation. In D. Gibbom and H. Richter (eds.), *Intonation, Accent and Rhythm: Studies in Discourse Phonology*, 226-242. Berlin: Walter de Gruyter.
Ladd, R. (1980). The Structure of Intonational Meaning. Bloomington: Indiana University Press.
Ladd, R. (1981). On intonational universals. In T. Myers, J. Laver and J. Anderson (eds.), *The Cognitive Representation of Speech*, 389-397. Amsterdam: North Holland.
Ladd, R. (1996). *Intonational Phonology*. Cambridge: Cambridge University Press.
Lambrecht, K. (1996). *Information Structure*. Cambridge: Cambridge University Press.
Lea, W. (1973). *Prosodic Aids to Speech Recognition II: Syntactic Segmentation and Stressed Syllable Location*. Sperry Univac Technical Report No. PX 10232.
Lehiste, I. (1979). Perception of sentence and paragraph boundaries. In Lindblom, G. and S. Ohman (eds.), *Frontiers of Speech Research*, 191-201. London: Academic Press.
Lieberman, P. and Blumstein, S. (1988). Speech physiology, Speech Perception, and Acoustic Phonetics. Cambridge: Cambridge University Press.
Llisterri, J. Marín R., de la Mota, C. and Ríos A. (1995). Factors affecting F0 peak displacement in Spanish. *Eurospeech*'95: 2061-2064.
Munro, M.J. (1998). The effects of noice on the intelligibility of foreign-accented speech. *Studies in Second language Acquisition*, 20: 139-154.
Munro, M.J. and Derwing, T.M. (1995a). Processing time, accent, and comprehensibility in the perception of native and foreign-accented speech. *Language and Speech* 38: 289-306.
Munro, M.J. and Derwing, T.M. (1995b). Foreign accent, comprehensibility and intelligibility in the speech of second language learners. *Language Learning* 45: 73-97.
Nooteboom, S. (1997). The prosody of speech: melody and rhythm. In W. Hardcastle, and J. Laver (eds.), *The Handbook of Phonetic Sciences*, 640-673. Oxford: Blackwell Publishers.
Ortiz Lira, H. (1994). A Contrastive Analysis of English and Spanish Sentence Accentuation. Unpublished PhD thesis. Manchester: Univeristiy of Manchester.
Pierrehumbert, J. (1980). *ThePhonology and Phonetics of English Intonation*. PhD, MIT.
Pierrehumbert, J. (2000). Tonal elements and their alignment. In Horne, M. (ed). *Prosody, Theory and Experiments: Studies Presented to Gösta Bruce*, 11-36. Dordrecht: Kluwer.
Prieto, P., J. Santen, J. and Hirschberg, J. (1995). Tonal alignment pattersn in Spanish. *Journal of Phonetics* 23 (pp. 429-451).
Ramírez Verdugo, Dolores (2003). A Contrastive Analysis of Non-native Interlanguage English Intonation Systems and their Implication in the Organization of Information from a Functional Perspective. A Study based on a Computerized Corpus of Spanish Learners of English. PhD thesis. Universidad Autónoma de Madrid, Madrid. Summary published in *Premios Nacionales de Investigación* 2003. CIDE-MEC (2005), 385-422.
Ramírez Verdugo, D. (2005). The nature and patterning of native and non-native intonation in the expression of certainty and uncertainty: pragmatic effects. *Journal of Pragmatics*, 37/12, 2086-2115.
Roach, P. (1994). Conversion between prosodic transcription systems: Standard British and ToBI. *Speech and Communication* 15 (pp. 91-99).

Romero Trillo, J. and Llinares García, A. (2004). Prosodic competence in reading aloud: an acoustic corpus-based study of native and non-native (Spanish) speakers of English. *Estudios Ingleses de la Universidad Complutense*: 63-77.
Scott, B.L. (1980). Speech as patterns in time in R.A. Cole (ed.), *Perception and Production of Fluent Speech*. Hillsdale: Eilbaum.
Schmerling, S. (1976). *Aspects of English Sentence Stress*. Austin: University of Texas Press.
Selkirk, E. (1984). *Phonology and Syntax: The Relation between Sound and Structure*. Cambridge, Mass.: MIT Press.
Silverman, K., Beckman, M., Pitrelli, J., Pierrehumbert, J. and Hirschberg, J. (1992). ToBI: A standard four labelling English prosody. *Proceedings of the 1992 international conference on spoken language processing*: 867-870.
Snow, D. (1995). Formal regularity of the falling tone in children's early meaningful speech. *Journal of Phonetics* 23: 387-405.
Sosa, J. M. (1995). Nuclear and pre-nuclear tonal inventories and the phonology of Spanish declarative intonation. *Proceedings of the International Conference of Phonetics Science*, 13.4: 646-649.
Sosa, J. M. (1999). *La entonación del español. Su estructura fónica, variabilidad y dialectología*. Madrid: Cátedra.
Speech Analyzer Software Tools, Version 1.5. Developed by Summer Linguistic Institute, 1996-2002. JAARS-CCS, Waxhaw, NC.
Taglicht, J. (1982). Intonation and the assessment of information. *Journal of Linguistics* 18: 213-230.
Tench, Paul. (1990). *The Roles of English Intonation*. Frankfurt: Peter Lang.
Tench, Paul. (1996). *The Intonation Systems of English*. London: Cassell.
't Hart, J., Collier, R. and Cohen, A. (1990). *A Perceptual Study of Intonation. An Experimental-Phonetic Approach to Speech Melody*. Cambridge: Cambridge University Press.
Thompson, I. (1990). *Intonation Practice*. Oxford: Oxford University press.
UAM Corpus of Spoken English as a Second Language. Departamento de Filología Inglesa, Universidad Autónoma de Madrid. Directed by Dr. Romero Trillo.
Vanderslice, R. and Ladefoged, P. (1972). Binary suprasegmental features and transformational word-accentuation rule. *Language* 48: 819-838.
Wells, W.H.G. (1986). An experimental approach to the interpretation of focus in spoken English. In C. Johns-Lewis (ed.), *Intonation in Discourse*: 53-75. London: Croom Helm.
Xu, Y. and Xu, Ch. (2005). Phonetic realization of focus in English declarative intonation. *Journal of Phonetics* 33: 159-197.

APPENDIX

TEXT 1: SHORT ANSWERS

Sarah and David are friends. Sarah is asking David some questions. David answers them.

1.1.A. Hey, I've been wondering about the sun and the moon. Which one is nearer the earth?

1.1.B. The moon is.
1.2.A. And which gives the earth its energy?
1.2.B. The sun does.
1.3.A. Oh. And who's older, Jo, you or me?
1.3.B. I am.
1.4.A. Who goes to bed earlier, Jo, you or me?
1.4.B. You do.