A new approach to the analysis and annotation of speech and prosody based on computerized cross-linguistic corpora

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In the present paper, corpus linguistics becomes a valuable methodological tool for cross-linguistic research on speech and prosody. The inherent complexity of speech analysis and prosodic annotation increases when the object of study is a longitudinal computerized corpus of native and non-native varieties of English. The lack of generally accepted prosodic transcription systems adds further difficulty to the task. The fact that the most popular transcription models such as INTSINT or ToBI are intended for Standard varieties of a language led us propose a multi-dimensional level of annotation which has proved to be effective in identifying the non-native speakers' main prosodic characteristics and their implications in the discourse.

I present a new approach to the acoustic, and discourse analysis of two computerized corpora of non-native and English native language speakers (460 hours of spoken language, 3.32.400 words). These parallel corpora belong to an on-going longitudinal research project: the UAM Corpus of Spoken English as a Second Language, funded by Autonomous Community of Madrid (CAM, 06/0027/2001).

I survey and annotate the prosodic patterns used by both native and non-native language speakers aiming at describing the extent to which the intonation systems used by non-native speakers may affect the information structure and the discourse meaning of their messages. I propose new levels of annotation as Figures 1 and 2 illustrate.
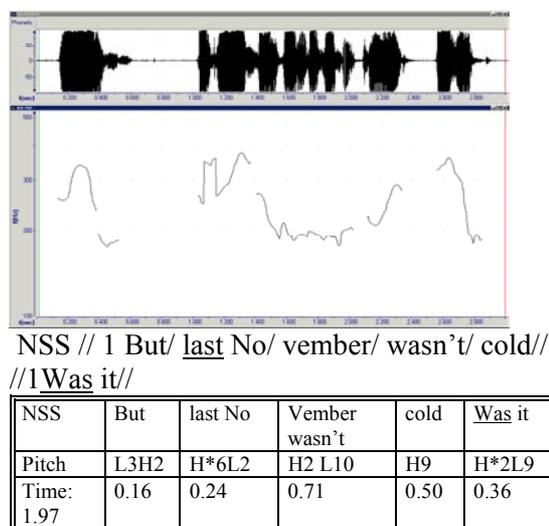

NSS // 1 But/ last No/ vember/ wasn't/ cold// //1Was it//

NSS	But	last No	Vember wasn't	cold	Was it
Pitch	L3H2	H*6L2	H2 L10	H9	H*2L9
Time: 1.97	0.16	0.24	0.71	0.50	0.36

Figure 1: Native speaker's utterance annotated prosodically.

NNSS // 1 But/ last No/ vember/ wasn 't / cold// //2 Was/ It//

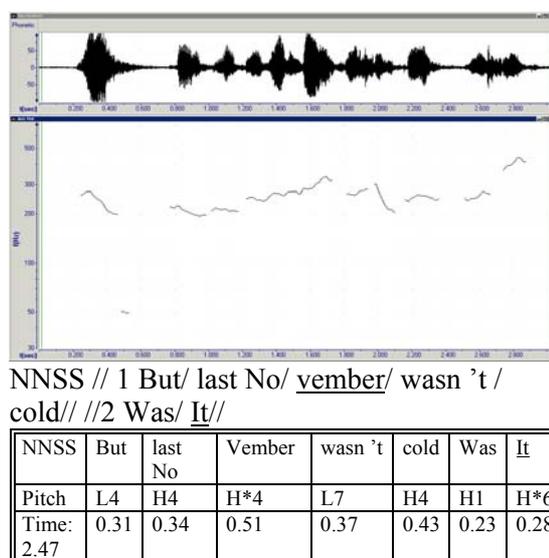| NNSS	But	last No	Vember	wasn 't	cold	Was	It
Pitch	L4	H4	H*4	L7	H4	H1	H*6
Time: 2.47	0.31	0.34	0.51	0.37	0.43	0.23	0.28

Figure 2: Native speaker's utterance annotated prosodically.

This approach to the analysis of speech and prosody includes the waveform and pitch contour, a phonological level of analysis, an acoustic level of annotation (pitch range in semitones, pitch accent (*) and tone (H/L)) and finally the annotation of duration, or temporal pattern, in seconds. This multiple-level annotation system allows us to identify similarities, differences and variability in the cross-linguistic corpora.

The results obtained assist us in interpreting pragmatically the effects of their prosodic systems on their spoken discourse. Figure 3 shows the results obtained from the comparison of means in pitch range, pitch movement and duration between the two language user groups.
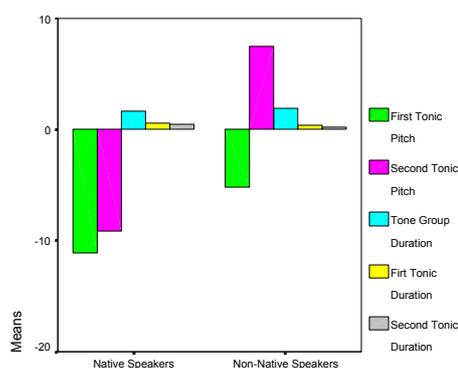

Figure 3: Comparison of Means: Pitch Range, Pitch Movement and Duration in Statements and Questions Tags.

The presentation of the project will demonstrate how the approach works illustrating it with annotated examples from the two corpora.

Bibliography

Brazil, D. 1997. *The Communicative Value of Intonation in English*. Cambridge: Cambridge University Press.

Chun, D. M. 2002. *Discourse Intonation in L2. From Theory and Research to Practice*. Language Learning & Language Teaching.

Fawcett, R. 1990. The computer generation of speech with semantically and discoursally motivated intonation. *The 5th International Workshop on Natural Language Generation. Pittsburgh*.

Granger, S. Hung, J. and Petch-Tyson, S. 2002. Computer Learner Corpora, Second Language Acquisition and Foreign Language Teaching. Netherlands: John Benjamins.

Harrington, J. and Cassidy, S. 1999. *Techniques in Speech Acoustics*. London: Kluwer.

Hirst, D. 1986. Phonological and acoustic parameters of English intonation. In Johns-Lewis, C. (ed). *Intonation in Discourse*. London: Croom Helm, pages 19-33.

Kelm, O. 1995. Acoustic measurement of Spanish and English pitch contours: native and non-native speakers. In *Hispanic Linguistics* 6/7: 435-448.