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THE APPLICATION OF AMPER FRAMEWORK TO THE STUDY OF L2 PROSODY. INTONATIONAL NATIVE-LIKENESS OF ROMANIAN MIGRANTS LIVING IN PARMA

Maria Chiara Felloni, Daniele Avesani

Università di Modena e Reggio Emilia

mariachiara.felloni@unimore.it, xaveave@yahoo.com

ABSTRACT

This paper reports preliminary findings of a research project currently in progress about L2 intonation of migrants living in Italy. The focal point of present work is the application of AMPER theoretical framework to the study of the intonation of interlanguage. Prosodic-only audio stimuli were created and manipulated by means of software developed in MATLAB® environment starting from utterances produced by Romanian migrants living in Parma, Italy. The stimuli have been proposed in perception tests to Parma natives in order to evaluate the similarities between natives' and migrants' Italian language intonation features and, ultimately, understand if and to what extent intonation can be related to migrants' level of integration in the host community.

Keywords: AMPER, L2 Prosody, interlanguage, native-likeness, migrants.

1. AMPER PROJECT AND ITS APPLICATION TO L2 PROSODY

AMPER project (acronym for *Atlas Multimédia Prosodique de L'Espace Roman*) was created by the *Centre de Dialectologie de Grenoble* of *Université Stendhal de Grenoble* with the goal of creating phonetic maps that describe the sociolinguistic variation of intonation of Romance languages speaking communities (see [1] and [2]). A quantitative, acoustic-perceptive analysis method of intonation, inspired by the superpositional approach introduced in [6] and theoretically similar to IPO approach to intonation analysis (see [7]), was developed within AMPER project. AMPER approach to intonation, which has become very popular in the recent years especially in Latin America, has never been used for the study of non-native prosody. In this paper the authors describe the application of AMPER method to the study of the interlanguage intonation of Romanian migrants living in Parma, Italy.

1.1. AMPER method description

The AMPER framework allows prototypes of affirmative and global interrogative intonational patterns to be identified through the collection and analysis of a set of isolated sentences. Informants produce the sentences combining words represented by images proposed by the interviewer. The sentences and the words that informants are induced to produce are

characterized by specific phonetic, syllabic and syntactic restrictions but they have no lexical or semantic restrictions. The corpus for present work is composed by sentences that feature SVO syntactic structure, with O being a Noun or a Noun + Adjective group with different accentual structure (proparoxytone, paroxytone and oxytone). The acoustic prosodic-only global interrogative prototypes, one for each structure in the fixed set of isolated sentences, are obtained calculating the arithmetic mean of at least three repetitions produced by the informants. The acoustic stimuli created from the prosodic prototypes are composed of a sequence of generic vowel-like harmonic sounds. These sounds, one for each vowel of the sentence they represent, feature, at their initial, medial and final point, the arithmetic mean of fundamental frequency and intensity extracted by the vowels of actual repetitions. The duration of each sound is the mean of the duration of the corresponding vowel. The AMPER acoustic-perceptive framework also requires identification tests to validate the prototypes. Perceptive validation goal is twofold: while corroborating the goodness of the prototypes through their recognition and acceptance by the linguistic community, it gives solid acoustic bases to subjective perception. AMPER Italian corpus is composed by 42 types of sentences both with and without adjectival expansion in the two NPs. All the sentences were elicited at least three times in both modalities (affirmative and global interrogative) by the informants. In present work

the authors used only sentences without adjectival expansions, with different accentual structure only in the second NP and only of global-interrogative modality as this modality is considered in literature to be a more reliable indicator of geographical origin than affirmative modality.

1.2. Intonational analysis tools

In order to produce the prosodic stimuli used in perception tests a Graphical User Interface (GUI) was developed for a MATLAB® (© The MathWorks, Inc.) script (which was already been introduced in [3]). The new GUI, substituting the original command-line interface, makes AMPER files modifications more intuitive and easier to obtain for users not trained in MATLAB scripting language. The new tool receives as input AMPER-formatted text files containing the prosodic data extracted from the recordings and enables the user to perform manipulations of the duration of the single vowel and of fundamental frequency, both on a large scale (e.g. resetting to a specified Hertz value the mean fundamental frequency of all the sentence) and on a small scale (e.g. changing the F0 contour of a single vowel, operating with semitone scale values). The user can choose to flatten the intensity correlates and to save both audio files (that can be directly used in perception experiments) and graphical representation of both modified and original AMPER files, plotted on a F0-against-time graph (in the graph F0 is expressed in semitones and time in seconds). The tool produces also a new AMPER text file that can be re-fed into the algorithm for further modifications. The GUI is composed of three modules. In the first module of the GUI the user chooses the AMPER file to upload. Once loaded, the file will be graphically represented in a F0/Time graph embedded in the module. In the second module of the GUI window, split in two parts, the user chooses which vowel tract he wants to modify in duration and in F0. The last module accommodates the commands that let the user reset the mean F0 of the entire sentence, flatten the intensity, save the graphs and listen to the audio stimuli (both modified and non-modified).

2. THE ORETICAL FRAMEWORK AND RESEARCH SCOPE

Through the application of AMPER method to the study of interlanguage, the authors aim to identify the role of prosodic correlates in foreign accent production and perception processes and, consequently, to evaluate their contribution and of sociolinguistic and sociodemographic variables to the linguistic visibility or invisibility of the non-

native speaker within the host community. In present work the idea of visibility of Rumanian migrants as speakers of Italian L2 is proposed as a synonym of native-likeness. The non-native speaker will be considered “invisible” with respect to the native speaker if the latter identifies the former as linguistically homogeneous in the local community. The central hypothesis of this research is that it is possible to evaluate the migrants’ social integration through the study of their L2 intonation. Intonation, in fact, conveys sociophonetic and geoproscopic indexes because it is a very interiorized aspect of speech and, consequently, it is less subject to the conscious control of the speaker. The sociodemographic and sociolinguistic variables considered by the authors are age, education, duration of stay in the host community and type of social network. Following Hannerz [4] definition, the notion of social network is here intended as the type of integration of an individual in the society. The proposal of Hannerz’s life-modes is analogous to the classical division in conservative (isolation and encapsulation life-modes) and innovative linguistic behaviour (segregation and integration life-modes), see also Milroy [5]. In order to know informants’ life-modes, the authors performed a number of interviews and collected sociolinguistic relevant data (e.g. country of origin, education, occupation) about informants’ life and the life of the people they usually meet. An “integration index”, ranging from 1 (isolation) to 5 (maximally integrated), was then assigned to every informant according to the answers given in the interviews.

3. DESCRIPTION OF INFORMANTS AND FIRST RESULTS

The results presented in this work are extracted from a sample of six informants who spontaneously learned the Italian language once arrived in Italy. The informants’ come from the cities of Braşov and Craiova, Romania. The authors chose Rumanian speakers living in Parma because this city hosts an important Rumanian community (composed mainly by women working as nurses for elder people) and because the description of the intonation of Parma regional Italian and of Braşov and Craiova Rumanian language are available in AMPER data base (see [8]).

3.1. AMPER data analysis

As previously observed, AMPER corpora sentences feature no semantic or lexical restrictions and this makes all the intonational data collected mutually comparable. As a result of this, Italian L1

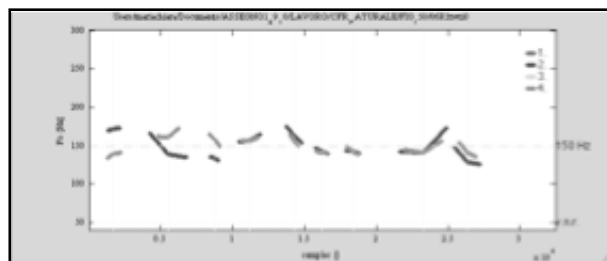
and L2 (interlanguage) and Rumanian L1 intonational abstract prototypes are directly comparable. Fundamental frequency (expressed in semitones and normalized at 150Hz), and duration data of global interrogative sentences extracted from Italian and Rumanian speakers were compared. The final intonational contour (Modality Final Contour, henceforth MFC) of the two Rumanian L1 varieties show a rising-falling movement, respectively on the last stressed vowel (henceforth LSV) and on the following vowel, as observed in [8]. The mean duration of Rumanian LSV is around 50% shorter than the duration of Parma LSV. The prototype of the global interrogative of Parma features a rising-falling base-structure, where a V-shaped bi-tonal falling-rising fundamental frequency contour occurs on the LSV. Due to the particular movement centered on the LSV, the ToBI-like representation for Parma global interrogative sentence involves a tri-tonal notation: the representation for the global interrogative sentence, respectively for paroxytone, paroxytone and oxytone structures of final nouns, is (H+L+H)*+H (where H is a trailing-tone) followed by HL% final tone, (H+L+H)* HL%, and (H+L+H)%. The duration of the LSV, that in Parma Italian constitutes usually the 10% of the duration of the entire sentence, is considered a typical feature of the linguistic community from both an acoustic-objective and diatopic point of view, and it is also a sociophonetic index (see [3]). Another feature of Parma linguistic community is that particular social groups (e.g. adult men that use local dialect, young men and adult women who don't use local dialect) recognize and use different intonational patterns for global interrogative sentences within the frame of the V-shaped structure described above. Informants' social networks influence their linguistic behavior with respect to intonation. While the informants with narrow social networks (encapsulation or isolation groups) tend to use more conservative intonational patterns, those who feature broad social networks (more integrated life style) use innovative, non-prototypical patterns.

3.2. Intonational analysis results: interlanguage varieties

Despite the fact that a corpus collected from only two informants can obviously not be considered as representative of the linguistic behavior of a community, especially when the object of the research is intonation, the following data are presented here with the sole purpose of introducing and testing the application of AMPER framework to interlanguage study. Further data collection and

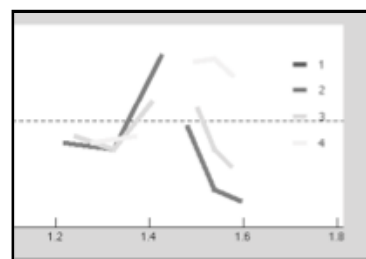
analysis are currently under way and the results will be discussed in future works. A preliminary analysis of the productions reveals that the two informants, F1 and F2, both born in Craiova (Romania) and featuring the same sociolinguistic features (i.e. age, education, occupation and duration of stay in the city of Parma), differ only for their degree of integration in the host community: F1 is maximally integrated (broad social network) while F2 tends to isolation (narrow social network).

Graph 1: F1 (black) and Parma (grey) native intonation.



The fundamental frequency contours extracted from the same Italian utterances with final paroxitone accentual structure produced by informant F1 and Parma native speaker are represented in graph 1. The graph shows that the characteristics of F0 and of duration are very similar in the production of the two individuals, especially in the MFC, where intonation conveys most of the social and diatopic information.

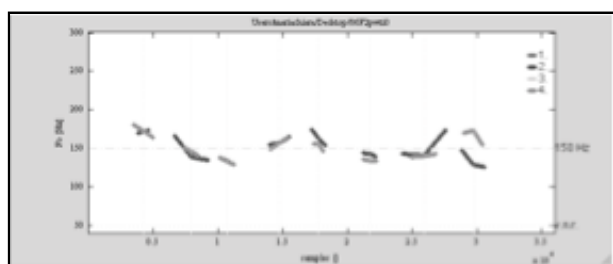
Graph 2: F1 (grey), Parma (black) and Craiova native (light grey) MFC.



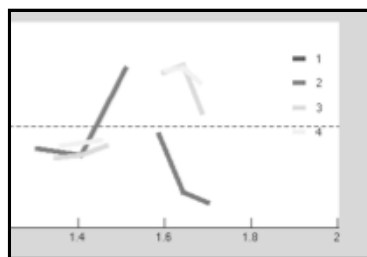
Graph 2 represents the data of the last three vowels of same stimuli and is centered on the LSV. It shows in addition the F0 contour extracted from Craiova native speaker utterances in Rumanian language (light grey) with syllabic and accentual structure corresponding to those of the sentence in Italian language. Craiova Rumanian variety compared to Parma Italian features different F0 contour in the MFC and a reduced duration of the final vowels, especially of the LSV. As noted in [4], LSV duration is important to characterize

Parma local variety Italian language and the perception tests performed in precedent researches suggested that Parma natives perceive as non Parma typical Italian the stimuli that, given the L (H+L+H)* H-L% F0 structure, present an LSV duration equal or less than the 70% of the Parma typical one. Informant F1, the maximally integrated in the host community, features an LSV duration that is around the 78% of Parma typical LSV duration while Craiova Rumanian LSV duration is approximately the 40% of Parma one. This last diagram highlights how F1 reproduces Italian L2 typical intonational features and sets apart from her L1 ones. This fact supports the idea that intonation reflects the migrants' integration in the host community and that it helps Italian L2 speakers to be "less visible/marked".

Graph 3: F2 (grey) and Parma (black) native intonation.



Graph 4: F2 (grey), Parma (black) and Craiova native (light grey) MFC.



Graphs 3 and 4 are based on the precedent stimuli but now F1 data have been substituted with F2 ones. The informant F2 is the less integrated in the host community and, featuring a narrow social network, tends to isolation. Again, intonation seems to reflect F2 integration in the host community because while her Italian L2 intonation features an overall ascending-descending final movement (common to F1, Parma native and Craiova native speakers) the shape of F0 on the last vowel is completely different from Parma native contour and much more similar to her L1. The similarity between Italian L2 and L1 of F2 informant is not limited to fundamental frequency contour: the duration of Italian L2 LSV is

practically the same of Rumanian L1 and well below the 70% duration perceptual acceptance level described above.

4. PERCEPTIVE ANALYSIS

In present work perception tests were not performed with the intention to validate AMPER prototypes but only to verify whether prosody of interlanguage could constitute an index of migrants' linguistic visibility in the host community. Three perception tests were designed for different purposes. The first test aimed to verify if the perceptually relevant information about the origin of the speaker are conveyed by the prosody of an entire stimulus (thus of an entire sentence) or only in the MFC. The second test, the identification test, aimed to identify which Rumanian informants are considered "invisible" (i.e. considered as Parma local speakers) by the host linguistic community. The last test was performed in order to assign a "degree of Parma typicality" to the stimuli produced by the Rumanian informants and consequently give a rate of Parma typicality to Rumanian speakers, ranging from "absolutely Parma typical" to "absolutely not from Parma". According to the scheme described in section 1.1, acoustic prosodic-only global interrogative stimuli were used in the experiments. As previously stated the sociolinguistic difference between the two informants is their social network (F1 broad, F2 narrow). In present work only the results of the second tests will be discussed.

4.1. Identification test results

Ten Parma native speakers informants were asked to listen to a number of stimuli extracted from speech of F1 and F2 and say whether these sounds were from their language community or not. The results confirmed the observations of the researchers based on acoustic perception: informant F1 stimuli have been judged as "from Parma community" in the 99% of the answers while F2 stimuli have been excluded from Parma linguistic space in the 98% of the answers. These results, compared to results of similar tests performed in Parma community with stimuli produced by Parma natives (see [4]) let the researchers to compare the linguistic behavior of locals and migrants in the light of social network theory. If, on the one hand, Parma native speakers that feature a narrow social network (i.e. limited contacts and low integration with their own community life) use an Italian language with strong suprasegmental regional traits and Parma native speakers with a broad social network use an Italian language that is more innovative and closer

to standard Italian, on the other hand Rumanian migrants featuring a narrow social network lifestyle use an interlanguage with intonation closer to their L1 one while more integrated migrants (broad social network) are characterized by an interlanguage with suprasegmental traits of Parma regional Italian language that, evidently, they perceive as their target language. For Rumanian migrants in Parma being linguistically innovative means setting apart from L1 intonation features and adapting to the target L2 features.

5. CONCLUSIONS

The results of perception experiments suggest that identity-related and community-related values conveyed by prosody are always perceived by migrants who, on their turn, can achieve total prosodic native-likeness, thus becoming “prosodically invisible” in the host community. Intonation, again, seems to constitute a social index both for native speakers and for migrants. The analysis also indicates that migrants’ level of social integration may play a significant role in the process of acquisition of L2 intonational features. The authors suggest that in the process of L2 prosody acquisition the degree of integration of the migrants may be more important than other factors such as their age and their duration of permanence in the host country. Given the small size of the corpus used in present work and the natural presence of psychological and individual factors which were not accounted for, further data collection and analysis are necessary to better understand the role of integration in L2 prosody acquisition. In conclusion, this analysis corroborates the validity of AMPER as a prosodic research framework even when applied to interlanguage and L2 prosody. AMPER prosodic-only synthesized sounds, although not directly accessible to the conscious competence of the speakers, appears to be accepted and recognized as a good representation of actual speech intonation in the experiments. AMPER-based data extracted from different languages are mutually comparable and this fact helps the researchers to identify which prosodic features of migrants’ interlanguage are influenced by native or target language.

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