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PROSODIC INTERFERENCE IN L2 FRENCH SPOKEN BY ITALIANS: THE ROLE OF TONAL ALIGNMENT AND RHYTHMIC STRUCTURE

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ABSTRACT

Oral production in a second language (L2) is imprinted by native language phonetic system. Nevertheless the integration of the L2 prosodic features is often overlooked at didactic level. On the basis of the verbo tonal method that proposes an interactive phonetic correction of the errors when and where they are produced, this study aimed to identify the main prosodic errors in French L2 of the Italian speakers. Another objective was to verify the effect of intonation types (declarative, interrogative, exclamatory and imperative) on these prosodic errors. A further aim was to give some didactic inputs in order to concretely help teachers of French L2 to increase the oral skills of the Italian adult native speakers.
Sixty Italian adult native speakers participated to the study and repeated verbatim 44 recorded sentences. The analysis of the repetition characteristics showed interesting effects on prosodic rhythm (i.e. central vowels added in the utterance and the transformation of the nasal vowels closed by the corresponding nasal consonants). Moreover it highlighted a strong effect of the intonation type on the presence of the error types. The observations let us consider activities mainly based on the French isosyllabic rhythm.

Keywords: prosody acquisition, foreign accent, tonal alignment, rhythm.

1. INTRODUCTION

The purpose of our research is to identify the role of native prosodic features in cross-language similarity, namely to understand whether the process of French prosody acquisition (L2), by Italian speakers, can be explained through the persistence of the L1 intonation and rhythmic substratum. In other words our issue is: What are the elements of the intonational phonology and tonal/stress implementation strategies that remain in the productions of very advanced L2 speakers? As a secondary issue, we also question whether there exist a relationship between prosodic Foreign Accent and L1/L2 use.

We have started from the assumption that the main features of native-language prosody remain underlying in L2 production as a result of prosodic transfer or interference from Italian L1 to French L2. The facility or the difficulty in L2 prosody acquisition is often attributed to the influence of both L1 segmental phonology and phonetics [11]. However, given that intonation and stress are part of native language phonology, Foreign Accent (FA) features would not only stem from segmental differences, but also as a consequence of prosodic implementation errors. Incomplete L2 intonation acquisition might be revealed by differences in pitch accent placement, in phonological tune inventory or in the different phonetic realization of the same phonological category. Moreover, FA might also be due to an erroneous implementation of rhythmic structure on the part of the L2 speaker [8].

For the purpose of this study, segmental level differences will be ignored, though we are aware that several studies have shown that prosodic transfer is conditioned both at the segmental and the suprasegmental level. It is our future plan to investigate which of these levels dominates the other, or if they are equivalent in determining the perception of FA.

2. THEORETICAL BACKGROUND

In this paper, we propose an integrated method of research linking three different but complementary approaches to explore the FA phenomenon. We have applied the methodology framework draw from Selinker's Model [10]. Specifically, our method is based on the first two steps described by Selinker. These steps aim at a contrastive analysis of the L1 and L2 prosodic systems. Our claim is that such an approach is needed in order to determine whether L2 speakers have correctly acquired the native norms.

In our method we crucially employ the Autosegmental Model, or AM [6] (see also [7, 8]) for the contrastive analysis between L1 and L2. The AM model separates the phonological representation from its phonetic implementation, since "intonation is viewed as consisting of a phonological and a phonetic component" [6]. According to this view, at the suprasegmental level, phonological differences would also result from intonational differences in either the inventory of pitch accents, boundary tones and/or the implementation of domains for tonal and accentual realization. On the other hand, phonetic misproductions would result from difference in the phonetic implementation of an otherwise similar phonological tune or pitch accent. Moreover, rhythmic differences might be due to differences between global stressed syllable interval duration and the relative duration of vocal/consonant intervals [13].

We also aim to investigate the sociolinguistic factor of L1/L2 use in order to find out if this value the mechanism of prosody acquisition. This proposal builds on the results obtained by Flege (1995) showing that only the speakers who speak the L1 frequently have a recognizable FA. Flege concludes by saying that "the most important cues of FA did not depend on the age of first exposure to L2 but by the presence of another linguistic system" [4].

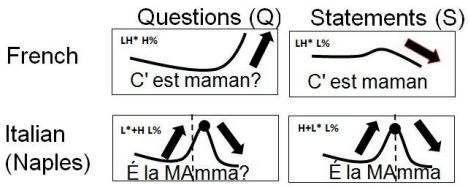
3. PITCH ACCENT INVENTORIES

As we know, French and Italian are both Romance languages though they are typologically very different from a prosodic point of view. Also, both languages exhibit diatopic differences. In our study we employed Southern French and Neapolitan Italian speakers, though little is known about the intonation system of Southern French. However, Southern French shares with Standard French the main phonological features, which we compare to those of Italian. For instance, at the phonological level, the domain for stress is the phrase (the Accentual Phrase) [5] in French, while in Italian this domain is the word. Moreover, French places stress on the last full syllable of the phrase while Italian places stress mainly on the penultimate syllable [3], though lexical stress position can be contrastive. Yet, note that since the French participants were speakers of a Southern variety, they had a tendency to produce a final syllable containing a schwa (e.g. "marmeLAde" /marməlad/), while the accentual LH* rise (final rise) is hence located on the penultimate syllable (that is the last FULL syllable) of the phrase.

At the phonetic level, a possible difference between the two languages might reside in the exact alignment of the H target of the LH* pitch accent, typical of the AP final rise in French, as opposed to a more stably anchored H target in Italian rising accents which are found in both yes/no questions and narrow focus statements [2]. For the Italian speakers generally the peak is positioned earlier within the stressed syllable than for French native speakers. Specifically, it is aligned close to the offset of the penultimate syllable for the Neapolitan L*+H of yes/no questions. In yes/no questions, standard French is mainly characterized by a final rising contour (though variability due to different morphosyntactic forms [9] can be found) in which the H target is aligned with the final portion of the stressed syllable (when the final syllable is full), or on the penultimate syllable when the stressed syllable is a schwa [12]. On the contrary, in Southern Italian dialects the direction of the final contour in questions depends on the particular variety, being generally rising-falling in Southern varieties and rising in Northern varieties.

To summarize, the most notable differences in the intonation contours of questions and statements between French and Italian are, first, that in French the contrast between questions and statements is indicated by the presence or absence of a rising edge tone, while in Neapolitan Italian there is an alignment difference between the rise-fall of narrow focus statements and questions (Figure 1, cf. [2]).

Figure 1: stylization of pitch contour in French and Italian question and statement.



Italian and French do also differ regarding the inventory of pitch accent types specifically for the question (see Figure 1). Finally, at a rhythmic level, the phonetic implementation of stress might be different, since stress in Italian is mainly implemented as increased duration in the penultimate syllable [2].

4. HYPOTHESES

The main hypothesis tested in this study is that Italian L2 speakers (ITS) accent placement will be mainly at the penultimate syllable position. As for the phonetic features, we predicted that the H

target would be aligned later (at values typical for French) only by ITS who are also frequent users of the L2.

We also formulated two hypotheses regarding structural features of the tune. First, we predicted that all ITS would be unable to suppress the production of a prenuclear H* accent (since this is a typical feature of Italian). Moreover, we predicted that all ITS would be able to produce H% edge tones, since they are not present in Italian Neapolitan questions, while they would be unable to reproduce the same stressed syllable duration as French native speakers. Note that all effects were expected to be correlated with L1/L2 use.

5. METHOD

5.1. Corpus

The production of sentences uttered with two modalities (declarative questions vs. statement) was compared. Specifically, declarative questions were chosen in order to have a similar corpus for Italian and French. In while French usually employs morphosyntactic devices to signal a question (i.e., "est-ce que", etc.), Italian only employs intonational devices.

5.2. Participants

Two groups of 5 native Italian speakers (3 Neapolitan and 3 Bari speakers), and 5 native French speakers (FRS), all with normal hearing, participated in the experiment. They were homogeneous from the point of the sociolinguistic characteristics such as age of first exposure to the L2, age of arrival in the foreign country and period of residence except for L1/L2 use. For this reason, the ITS group was subdivided as follows: 4 speakers as "L2-users" (using the L2 very frequently at work and in the family) and 1 as "L1-user" (using the L1 more frequently at work and with the family). They were recruited from the graduate population at the Laboratoire Parole et Langage (LPL) of Aix-Marseille University by the first author, and they were not paid for their participation.

5.3. Stimuli

As for the stimuli, we created two corpora (60 French target words and 60 Italian target words per 2 pitch accents plus 3 repetitions). Each target word was inserted in a carrier sentence preceded by a context sentence. The recordings were made in the sound-booth of the LPL. For methodological reasons we decide to only employ utterances containing late focus.

Table 1: Example of French corpus: "Will Paolo give the bicycle?"; "Dad will eat the MARMALADE?"; "Rémy will drink BEER?".

DECLARATIVE QUESTION	STATEMENTS
a. Qu'est-ce qu'il prêtera à son fils? b.Paolo prêtera le **VÉLO**?	a.Qu'est-ce qu'il prêtera à son fils? b.Paolo prêtera le **VÉLO.**
a.Qu'est-ce qu'il mangera pour le déjeuner ? b.Papa mangera de la **MARMELADE** ?	a.Qu'est-ce qu'il mangera pour le déjeuner ? b.Papa mangera de la **MARMELADE**.
a. Qu'est-ce qu'il fera ce soir? b.Remy boira de la **BIÈRE**?	a.Qu'est-ce qu'il fera ce soir? b.Remy boira de la **BIÈRE**.

5.4. Procedure

Each subject was seated in front of a computer in the sound-booth with the microphone positioned three inches from her/his mouth. Subjects were recorded in only one session. During the session, words were presented on a printed sheet in random order for each subject. Subjects were instructed to read aloud only the second sentence in the sequence (the first one, setting up the context).

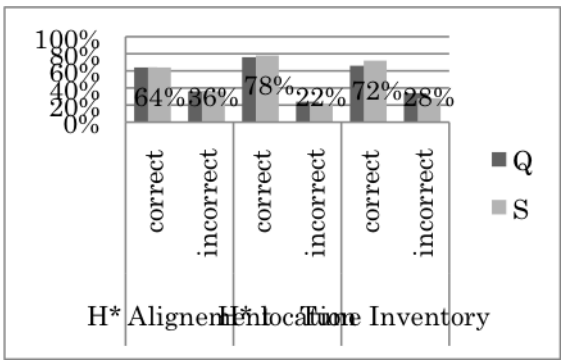
6. ANALYSIS

Sound files were automatically extracted and saved as a separate file through PRAAT. Subsequently, each utterance was segmented with SPPAS (SPeech Phonetization Alignment and Syllabification) [1], to automatically produce annotations including utterance, word, syllable and phoneme. The following intonational features were hand labeled: prenuclear accent (H0), peak accent (H*) and boundary tones (H%). The following measures were performed: alignment of the H* peak in the final LH*, location of H*, duration of stressed syllable (ΔCV1), standard deviation of the vocalic/consonantal interval duration (ΔV-ΔC) plus the percentage of of occurrence of the prenuclear H* (H0), of H% and L% [6].

7. PRELIMINARY RESULTS

Figure 2 summarizes the percentages of correct or incorrect prosodic elements produced by ITS.

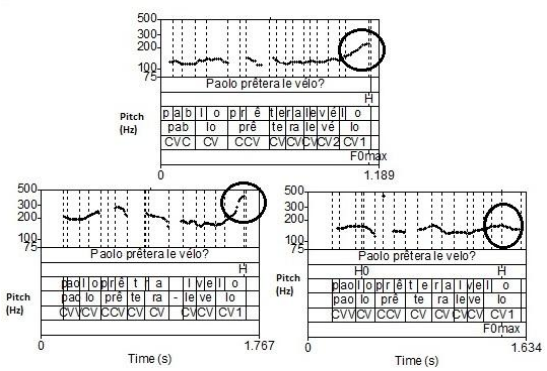
Figure 2: Percentages of correct/wrong H* alignment, distribution of tonal elements and phonological association.



As Figure 2 shows, correct alignment for H* was found in 64% of the ITS utterances. Specifically out of the total of 36% incorrect (Q+S) H* alignment more than 22% was derived from the data of L1 user. It is interesting to note that the results are very similar for Questions and Statements and that the percentage of incorrect tonal alignment appears to be related with L1 use.

Figure 2 and 3 show that ITS correctly produced accent placement values, in both Q and S, in that they were able to shift stress form the penultimate syllable to last syllable in the 78% of the cases. Of this 78%, 66% of the ITS used the French tonal inventory (LH* and H%). In the rest of the cases (34%) the tonal features were those of Italian (L*+H and L%).

Figure 3: « Paolo prêtera le velo? » (Will Paolo give the bicycle?). In the upper pitch contour a French male speaker, in the bottom left pictures a L1user male speaker and in the upper right pictures a L2 users male Italian speaker. Example of a question with different H* alignment.



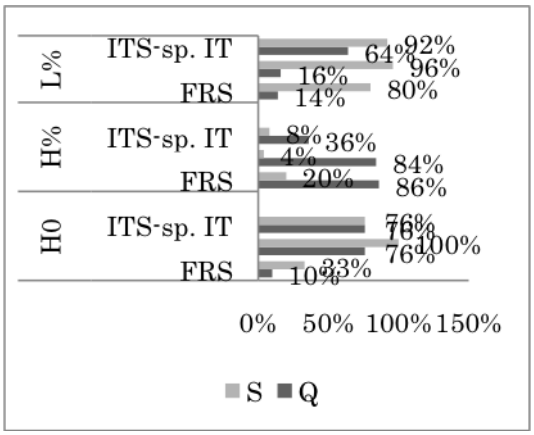
About Table 2, mean ΔCV1, ΔV and ΔC were extracted for each utterance using PRAAT. The obtained values were normalized by calculating the mean value for the 3 repetitions of the Q/S renditions (per talker, utterance and language condition) and by dividing the remaining rendition by this mean value, a value below 20ms representing a French standard duration while a value greater than 20ms indicates an increase of the parameter and hence maintenance of ITS standard duration.

Table 2: measures of rhythmic features about stressed last syllable.

MEASURE	SPEAKERS	Q	S
ΔCV1 (ms)	ITS-sp. IT	**34**	30
	ITS-sp. FR	**24**	25
	FRS	16	18
ΔCV1 V (ms)	ITS-sp. IT	**20**	20
	ITS-sp. FR	**18**	17
	FRS	10	14
ΔCV1 C (ms)	ITS-sp. IT	**14**	10
	ITS-sp. FR	**8**	8
	FRS	6	4

About the global measures (see Table 2), for all speakers placing the H target on the last syllable, with correct H* alignment (64%), the differences occurred in terms of syllable and vowel duration. Generally all ITS were able to reduce the ΔCV1 when they spoke in French, but are always 10ms of difference respect native French speakers. The same proportion of longer stressed syllable duration is reflected in the overall duration of the sentence, which was longer for the ITS than FRS (1,176/s Fr.; 1,421/s It.) and for ΔC – ΔV.

FIGURE 4: percentage of L%, H% and H0 elbow.



About the percentage of the prenuclear accent, the Figure 4 shows that ITS mainteins H0 for Q/S while producing the same percentage of H% for Q (as FRS).

8. GENERAL DISCUSSION

In this preliminary study and pilot experiment our priority was to underline the fact that the influence of the native intonational features might be related to L1 use and that this factor is one of the variables responsible for FA (apart from segmental differences), together with rhythmical features. In fact, in our data it appears that ITS were able to reproduce the correct phonological association (i.e. H* peak associates with the last syllable), but only L1user failed to produce the correct phonetic detail (i.e. tonal alignment). On the other hand, all ITS maintained the Italian stressed syllable duration.

Through this preliminary result it is not possible to quantify the exact role played by prosody as opposed to segmental features in FA perception, though emphasizing the importance of suprasegmental aspects, notably rhythm, due to the lengthening of stressed syllables. In the light of our results, we believe that it is equally important to consider the rhythmic and temporal properties as the backbone of the intonation contour because the phenomenon of duration is a key to the distribution of intonational features. Also, this type of

prominence participates in the characterization of linguistic varieties.

Our results open many new avenues of research. As claimed by Mennen [7], it is conceivable that "those L2 learners may acquire phonological properties of intonation earlier than their phonetic implementation or otherwise that they may implement this structure by using L1 phonetic implementation" [7]. According to this view, L2 learners may go through different stages in the learning process and may first acquire phonological patters of L2 intonation before they acquire the correct phonetic implementation of these patterns [8].

However, this appears to be true only for the L1user, while all 4 L2user were able to reproduce the correct phonological patterns and the phonetic implementation (H* alignment). On the other hand, all five ITS were unable to reproduce the exact rhythm characteristics of French, in that they employed longer stressed syllables.

Additional research is needed with more ITS (L1users) to explore the trajectory of acquisition the phonological patterns in relation of segmental level and this sociolinguistic factor.

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