Methodological Perspectives on Second Language Prosody

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FROM PROSODIC SKILLS TO L2 READING PROFICIENCY: AN EXPERIMENTAL APPROACH TO L2 PHONETICS TEACHING METHODS

Charlotte Alazard, Corine Astésano, Michel Billières

Université de Toulouse - Octogone-Lordat, EA 4156
alazard@univ-tlse2.fr; astesano@univ-tlse2.fr; billieres@univ-tlse2.fr;

ABSTRACT

This paper aims at testing the positive incidence of *oral* skills' training on *reading* abilities for English learners of French as a Foreign Language. A recent preliminary study indicates that emphasis on the assimilation of the L2 prosodic system - especially at an early stage of the learning process - not only improves students' oral fluency but also allows them to develop L2 (prosodic) strategies to decode written speech [2]. In the present study, we follow up on these results on a larger-scale longitudinal study, designed to systematically compare the impact of two phonetics' teaching methods on reading skills for L2 learners of French: the Articulatory Method (AM) and the Verbo-Tonal Method (VTM).
Our data, still under statistical analyses, already show the same tendencies as in the previous study, which is a strong correlation between L2 reading fluency and L2 prosodic skills.

Keywords: prosodic transfers, reading proficiency, L2 acquisition, Verbo-Tonal Method.

1. INTRODUCTION

It is now well established that prosody plays a fundamental role in first language acquisition and structuring [8]. It is the first element one acquires when learning one's native language [15] and one of the last elements to be lost in some cases of aphasiology (*cf.* phonemic jargon, [13]). Prosody is such a central aspect of language that it has been recently shown to play a role in decoding read scripts [10]. Indeed, in silent reading, default prosodic contours are projected onto the script and help encoding and decoding the written text. Namely, prosody operates along with other linguistic levels such as semantics and syntactic structure to maximize the comprehension of the sentence [9]. Hence, not only does the reader use bottom-up processes to decode the visual information, but s/he will also use implicitly memorized prosodic structures (top down processes), as well as previous syntactic or semantic knowledge. Those 'silent' prosodic contours are thus treated as part of the input.

In the case of Second Language Acquisition, it is questionable whether the skills involved in the combined processing of different linguistic levels are available to L2 learners during the reading process. More particularly, empirical observations show that phonological transfers (prosodic and segmental) still largely impact advanced students' speech, and even more so in reading out loud, resulting in non-fluent, hesitant speech. Recently, a psycholinguistic study also showed that Level B L2 readers are still influenced by their L1 prosodic phonology in a silent reading disambiguation task [7]. These observations contradict the statement of the CEFRL (Common European Framework of Reference for Languages), according to which advanced level students should have '*a clear and natural intonation'* and read with fluency. No reference is however made to the teaching of prosodic - or more globally phonetic - skills even though these are now known to impact on both reading and spontaneous speech skills. On the contrary, the CEFRL seems to imply that those abilities should be naturally acquired thanks to mere repeated contacts with the L2.

As a whole, phonetics is rarely taught in L2 classes, mainly due to its perceived high degree of technicality. Although some L2 segmental aspects may be taught through explicit articulatory exercises, almost no time is dedicated to the teaching of the L2 prosodic system. Therefore, it comes as no surprise that L1 prosodic structure should interfere in the decoding process of written texts. To follow up on the role of silent prosody in decoding written texts in L1, more time should be dedicated to prosodic features' teaching so that proper L2 prosodic structuring could be properly used to support reading decoding.

2. PREVIOUS WORK AND FOLLOW-UP

In order to test the positive incidence of *oral* skills' training on *reading* abilities for L2 learners, we ran a pilot longitudinal study [2] on four English learners of French (2 advanced and 2 beginners), equally divided into two groups: a *Control Group* where the language training was based on traditional teaching methods, and a *Test Group* based on a prosodic oriented teaching method (*Verbo-Tonal Method, hereafter VTM) (*see below for a description of the method).

The speakers were tested twice - before and after the 8 weeks' training - on the same text material, in the same experimental conditions.

We measured the number distribution and duration of the different types of pauses, the number, distribution (initial *vs*. final) and duration of perceived accents, and the duration of unaccented syllables. Recordings were analyzed both acoustically and perceptively.

Our acoustic and perceptive analyses confirmed that only the two speakers of the *Test Group* (prosodic training) had significally improved their reading fluency between the 2 tests: they showed significant shortening of breathing and silent pauses duration, as well as shortening of accented and unaccented syllables' duration, revealing a better planning process and a faster speech rate.

This study confirmed that the emphasis on the assimilation of the L2 prosodic system - especially at an early stage of the learning process –not only improves students' oral fluency but also allows them to develop L2 (prosodic) strategies to decode written speech.

In the present study, we follow up on these results on a larger-scale longitudinal study, designed to systematically compare the impact of two phonetics' teaching methods on reading skills for L2 learners of French: the Articulatory Method (hereafter AM) and the Verbo-Tonal Method. According to AM, by far the most widespread method, a good production implies the metalinguistic knowledge of sounds' articulation. The teacher thus provides explicit articulatory descriptions of the different L2 sounds, and then prompts the student to repeat the correct articulatory gestures in order to produce the target sound. No focus is put on prosodic parameters such as rhythm and intonation. VTM, on the contrary, uses the prosodic structure of the target language as the 'shell' for pronunciation skills' improvement. More specifically, the rhythmic pattern of the target language is used to bring to light the phonetic specificities of the target language. The teacher first helps the learners familiarize with the prosodic structure of the target language through the repetition of prosodic patterns using logatoms (/dadada/) or the use of facilitating gestures (for example rising hand movement for salient syllables). In a second phase, the prosodic structure is used to facilitate phoneme perception (clearer spectral characteristics in stressed syllable) and re-production, on the basis that there is a phonological loop between the production and the perception of phonetic features [3] and [11]. VTM is grounded on the strong assumption that mastering the L2 prosodic system allows for the automatization of lower-level processes, hence facilitating the learning of higher-level processes. Thus, this method suggests that phonetics should be taught prior to any other linguistic aspects in a foreign language.

Despite extremely positive empirical results both in didactics and speech therapy, VTM is still unknown and quite confidential. Our goal is to experimentally validate its benefits on L2 speech fluency, particularly in reading.

3. METHODOLOGY

3.1. Material and experimental design

In order to achieve this goal and to test the positive influence of oral skill's training on reading abilities for L2 learners, we ran a larger longitudinal study over eight weeks. We recorded phonetics' teaching classes, with twenty participants, all English Speakers (15 female; mean age: 32; age range: 20-60). An oral interview allowed us to evaluate their level in French according to the CEFRL: ten of the participants were judged to have an elementary level in French (level A) and ten were judged to have an advanced level in French (level B).

The participants were equally divided into four groups: two groups per method according to their level. Each group received two pronunciation trainings per week - lasting one hour and a half each - for eight weeks.

Both methods were taught by the same teacher –the first author– and recorded in the same experimental conditions. All these recordings constitute a large multimodal database (96 hours of audio-video recording) that will be made shortly available for L2 researchers [1].

The training phase was divided into two parts for both methods. During the first three weeks, the teacher focused on oral practice only: the AM group had explicit articulatory exercises, while emphasis was put on prosodic exercises in the VTM group. Written activities were only introduced after the first three weeks.

Participants undertook three different reading tests: before the training, after three weeks –before

the introduction of written activities - and at the end of the eight weeks.

All the texts were informative and adapted from reading activities from FFL's teaching methods. Their content and their complexity in terms of vocabulary and sentence construction were adapted to each level (level A and B). The texts were presented in a different order for each speaker as they were randomized for each group throughout the 3 different recording sessions.

In each level, speakers were asked to read the text for themselves as many times as they needed before reading it aloud to be recorded. The tests were taken in the same conditions in the three recording sessions.

3.2. Experimental procedure

Speakers were tested individually and recorded in a double-walled sound- isolation booth using Soundtrack-Pro © (16 bits/44kHz).

To begin with, the data were automatically and manually annotated. The acoustic analyses will then allow us to determine the prosodic parameters that are most representative of *FFL* speakers' fluency.

3.2.1. Annotation of the database

The phonetic annotations have been done with the Speech Phonetization Alignment and Syllabification (SPPAS) tool [5]. The aim of this tool is to provide automatic segmentation annotation of utterances, words, syllables and phonemes from a speech recording transcription.

SPPAS produces a phonetic transcription based on a phonetic dictionary. The program offers the possibility to select (automatically or manually) among all the phonemics variants that are proposed.

To complement SPPAS' automatic annotation, the first two authors listened to the recorded texts and labeled manually the different types of accents and the different types of pauses for each speaker, using Praat.

According to our previous results (*i.e* significant duration shortening of breathing and silent pauses, accented and unaccented syllables) and the literature (for a review of the literature see [12] and [16]), the prosodic parameters chosen to best reflect speakers' fluency were the following:

- Number, distribution and duration of the different types of pauses (breathing and empty pauses, vocal hesitations and false starts). Break phenomena that were found inside a word or phrase were labeled as non-grammatical, whatever their type. Glottal stops replacing obligatory liaisons were also labeled as non-grammatical pauses.
- Number, distribution (initial *vs*. final) and duration of perceived accents, and duration of unaccented syllables.
- Final accents were labeled according to the strength of the associated prosodic boundary (minor vs. major). However, FFL student do produce a lot of non-standard accents, especially on final accents that are realized with an interrogative intonative contours, characteristic of a confirmation request. We have thus differentiated final accents produced with the expected degree of boundary and final accents realized with the non-expected degree of boundary (longer F0-excursion and longer syllable's duration) typical of a L2 learner's confirmation request. The expected degree of boundaries was determined for each sentence before the annotation, using our expertise of native French speakers.
- Speech and articulation rates (syllables/min)
- Phonation-time ratio (percentage ratio of time speaking to time to take the whole speech sample)
- Mean length of runs (average number of syllables between pauses > 220 ms)
- Dysfluencies per minute (times total number of dysfluencies (false starts, repetitions…) divided by the total time speaking in seconds)
- The number of self-corrections [6]
- The duration ratio between accented and unaccented syllables
- The local F0 patterns on linguistic relevant points [14] and [4]. We compared the peak alignment and the pitch range on accented syllables at the three different stages (before the training, after three weeks and at the end of the eight weeks training) for each speaker.

3.2.2. First tendencies

Our data, still under statistical analyses, already show the same tendencies as in the previous study. Globally, only the two *Test Groups* (advanced and beginner, VTM) showed a reduction of the duration of pausing, accented and unaccented syllables, and a better speech and articulation rate between the first and the second test, indicating a better planning process and a better reading fluency.

However, the differences between the *Test* and *Control groups* appear to be less obvious between the second and the third test, that is after the introduction of reading activities. The introduction of reading activities could have interfered with the

automatization of the prosodic transfers. Indeed, the VTM postulated that reading and writing activities should not be introduced before the L2 phonetics system (both segmental and suprasegmental) is acquired, as reading activities (especially the explicit introduction of grapheme/phoneme correspondence) may slow down the acquisition of the L2 prosodic system and the establishment of the L2 implicit prosodic transfers.

Nevertheless, we noticed a higher utilization of rising F0 patterns on continuative phrases (more similar to native French production) and a higher utilization of self-corrections for the students of the *Test Groups*, between the two last tests (especially for the advanced students), indicative of a higher degree of L2 proficiency for the students of the *Test Groups* after the VTM training.

4. CONCLUSION

Our preliminary results tend to confirm our hypotheses: the acquisition of the L2 prosodic system improves students' reading fluency. Indeed, both the advanced and the beginner students of the *Test Groups*, who received VTM classes, acquired several French prosodic characteristics and were able to transfer and to use them when reading. Indeed, their readings appeared to be more fluent (higher speech rate, reduction of the duration of pauses, accents and unaccented syllables, less disfluencies and more accurate self-repairs), indicating a better planning process.

Therefore, a non-explicit training of the prosodic structure seems to facilitate the automatization of lower-level processes, as both the segmental and the prosodic systems are closer to those of the L2.

The follow-up of this study is planned at two levels: first we want to compare these acoustic results with a perceptual analysis. Forty native French Speakers (20 experts and 20 non experts) will be asked to evaluate the reading fluency and the degree of perceived foreign accents on significant reading extracts randomized by speaker and by time of reading (before the classes, after three weeks and at the end of the 8 week classes). As in our preliminary work, we expect to see a significantly better judgment of readers' fluency for the Test Group (VTM), especially before the introduction of the reading activities.

Then, we would like to compare the measures of the local (accentual) F0 patterns of our English participants with measures of local F0 patterns of native French speakers in order to determine if our results can really be interpreted as positive L2 prosodic transfers or if an 'interlanguage' prosodic system is still partly present after the training. We hypothesize that the Test Groups' students will have closer acoustic prosodic cues to the target L2 language than the Control Group.

Our results will ultimately be interpreted in favor of a late introduction of the teaching of grapheme-phoneme correspondence, which seems to hinder our Test Group fluency performances.

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