Prosodic transfer from Italian to Spanish: Rhythmic Properties of L2 Speech and Argentinean *Porteño*

Ariadna Benet, Christoph Gabriel, Elena Kireva, Andrea Pešková

Universität Hamburg, Institut für Romanistik (Germany)

ariadna.benet@uni-hamburg.de, christoph.gabriel@uni-hamburg.de.
elena_kireva2004@yahoo.de, andrea.peskova@uni-hamburg.de,

Abstract

This paper investigates the speech rhythm of *Porteño* (Buenos Aires) Spanish (PORTE), which is strongly influenced by Italian due to migration-induced contact, and L2 Peninsular Spanish, produced by Italian natives (SPA L2). It is hypothesized that Italian learners transfer the rhythmic values of their L1 to the target language Spanish and that the data produced by speakers of both the contact variety PORTE and the learner variety SPA L2 exhibit rhythmic values that pattern with Italian rather than with Peninsular Spanish. Speakers of L1 Peninsular Spanish (SPA L1) and L1 Italian (ITA), respectively, serve as control groups. Based on measurements of %V, VarcoΔV, VnPVI, and CnPVI ([1], [2], [3], [4]), performed on recordings of scripted and semi-spontaneous speech, it is shown that *Porteño* Spanish displays almost the same values as L1 Italian and L2 Spanish produced by Italian natives. This suggests that Italian speech rhythm was transferred from the immigrants' L1 to the target language Spanish.

Index Terms: speech rhythm, *Porteño* Spanish, Peninsular Spanish, Italian, language contact, L2, transfer.

1. Introduction

Spanish and Italian share important prosodic characteristics: They are both *intonation-only languages* [5] with the F0 contour determined by the position of metrically strong syllables, located on the penultimate syllable of the prosodic word in the unmarked case. Regarding speech rhythm, both languages are traditionally classified as being syllable-timed ([1], [6]). However, Italian has a strong tendency towards the use of lengthening effects, which results, as compared to Spanish, in a greater durational variability of vocalic/ consonantal intervals and in a generally higher proportion of vocalic material (%V) in the speech signal. Prosodic characteristics may be transferred when two linguistic systems interact, be it through L2 learning or/and in the context of (migration-induced) language contact ([7], [8], [2]). An example of prosodic transfer between Spanish and Italian induced by L2 learning is given by [9], who found that native speakers of Italian learning Spanish in Madrid keep crucial tonal features of their L1 in their Spanish L2. As for prosodic transfer resulting from migration-induced language contact, a remarkable example is that of *Porteño* Spanish which was strongly influenced by Italian due to massive streams of immigration between the 1860s and the beginning of the 20th century ([10]). *Porteño* prosody has generally been characterized as being 'Italianized' in several descriptions ([11]). Specific studies on *Porteño* intonation report that in pre-nuclear pitch accents the F0 peak is overwhelmingly located within the stressed syllable ([12], [13]), similar to the realization of pre-nuclear accents in several Italian dialects (e.g. [14]); further parallels between *Porteño* Spanish and Italian intonation show up in prosodic phrasing ([15]).

Historical evidence, demographic data, as well as several tonal characteristics of *Porteño* strongly support the language-contact/transfer hypothesis proposed by [8], which consists in interpreting the 'Italianization' of *Porteño* prosody as a result of transfer from L1 to L2 in the course of the acquisition of the target language Spanish by the Italian immigrants. The main goal of this paper is to test [8]'s hypothesis with respect to speech rhythm. We suggest that the rhythmic properties of Italian (i.e. higher values for durational variability and a higher proportion of vocalic material) will also be transferred from the L1 into the target language, that is, both into *Porteño* Spanish and into L2 Spanish by native Italian speakers. We thus expect a pattern with, on the one hand, high values for ITA, SPA L2 and PORTE and, on the other hand, low values for SPA L1. A second goal consists in examining whether there are rhythmic differences between languages that cannot directly be traced back to phonological properties such as complexity of syllable structures and vowel reduction, as proposed by [6]. The use of CV syllables and pseudo-words (see section 2) aims at eliminating the factor of syllable structure; the factor of vowel reduction is minimized because neither Spanish nor Italian exhibit vowel reduction.

2. Methods

2.1. Subjects

We analyzed data from eight speakers in total, two per variety: L1 Peninsular Spanish (SPA L1), *Porteño* Spanish (PORTE), L1 Italian (ITA) and L2 Peninsular Spanish (produced by Italian natives; SPA L2). All speakers were natively monolingual. The data for ITA and SPA L2 were collected from the same subjects, two advanced learners of Spanish from Genoa and Frosinone (Lazio), respectively, living in Madrid since a couple of years (recordings made in Madrid, Sept 2011). The subjects for SPA L1 are two speakers from Madrid; the PORTE speakers are born and raised in Buenos Aires. All speakers are aged 24 to 33 years and male, except for the female ITA/SPA L2 speaker from Frosinone.

2.2. Materials

The data consist of four kinds of materials, including scripted and semi-spontaneous speech: (1) reading of the fable *The North Wind and the Sun* in Spanish and Italian, respectively (number of syllables per subject [σ]: Spanish ca. 205; Italian ca. 225, slightly varying according to the speakers' individual production); (2) reading of 14 sentences containing exclusively CV syllables (example for Spanish: *Lili come la pera* 'L. eats the pear'; Spanish: 128σ; Italian: 129σ); (3)

reading of 10 identical pseudo-words for both languages, consisting of CV syllables only and embedded in scripted carrier dialogues (example from the Italian dialogue: *Ho mangiato un piatto che si chiama* *Foleminu Molenu* 'I ate a dish called Foleminu Molenu', Spanish/Italian: 69σ); and (4) a subset of 16 situations taken from the so-called *intonation survey* ([16]), an inductive method which consists in presenting a set of every day situations to the speakers and asking them to respond accordingly (example for Spanish: *Llamas a casa de tu amigo Manuel y preguntas si está* 'You call your friend Manuel at home and ask if he is there'; expected production, e.g.: *¿Está Manuel en casa?* 'Is Manuel home?'). Note that for the latter data type, the number of syllables produced by the speakers considerably varies according to the way they phrased their answers (SPA L1: 113+107=220σ; SPA L2: 153+137=290σ; PORTE: 115+110=225σ; ITA: 181+143=324σ).

The analysis of the data of type (1; reading text) aims at obtaining neutrally read speech as a basis for the cross-linguistic comparison. Data set (2) is designed to detect whether there are rhythmic differences between the varieties under discussion that are independent of language-specific constraints on syllable structures (e.g., CCC clusters as in Italian *strazio* 'pain' [str] necessarily result in high values for CnPVI). The CV sentences were controlled for the occurrences of vowels in order to avoid effects of intrinsic vowel length (Spanish: 31% [a]; 27% [i]; 21% [e]; 15% [o]; 2% [u]; 3% [aj]; 1% [ɔj]; Italian: 30% [a]; 28% [i]; 21% [e]; 15% [o]; 2% [u]; 3% [aj]; 1% [ɔj]). The objective pursued with data type (3) is comparable, but in this case the target words are exactly the same for all four varieties, which aims at neutralizing even more potential effects of the language-specific phenomena. Finally, data type (4) was selected to obtain semi-spontaneous speech which can be compared among varieties, since the productions from all speakers result in quite similar sentences. During the recording sessions, the participants were given sufficient time for familiarizing themselves with the scripted materials (tasks 1−3) and the presented situations (task 4). The recordings were made with a Marantz hard disk recorder (PMD671) and a Sennheiser microphone (ME64), transferred to computer and analyzed using Praat ([17]).

2.3. Measures

For the varieties under consideration, the whole material recorded was segmented into consonantal and vocalic intervals. Among the numerous criteria defined in order to proceed with the segmentation, it is worth mentioning the following. First, we did consider phrase-final intervals for the counting (in accordance with [2]), since effects of final lengthening belong to the set of properties of the languages of our sample and thus should be reflected in the measures taken from the speech data. Second, the beginning of plosives following a pause was set at 0.05 seconds before the burst ([18]). Third, glides were interpreted as belonging to vocalic intervals if there was no friction attested ([3]). We finally excluded syllables terminating in fricatives because of the difficulties in detecting their right edge. We also discarded material affected by any kind of speech disfluency.

On the basis of the individual V and C intervals thus obtained, we calculated for all four data types a) the proportion of vocalic material in the speech signal (%V) and the durational variability of vocalic intervals ((normalized) VarcoΔV) as well as the pair-wise variability indices, both normalized with respect to speech rate (VnPVI, CnPVI). In using the measures of %V and VarcoΔV, we follow [2] who have shown the adequateness of these measures for a comparison of L1 with L2. Regarding the use of pair-wise variability indices, these measures were originally developed by [3] in order to classify a set of given languages according to the traditional rhythmic typology (i.e. stressed-timed vs. syllable-timed). As distinct from [3], who considered normalization necessary only for the V intervals, we adopt the normalized version of both C and V PVI, following [19] and [20], who showed that speech rate also plays a crucial role for C intervals and thus proposed normalization for calculations based on C intervals as well (though not for PVI, but for ΔC, resulting in the proposal of the variability coefficient VarcoΔC). We finally follow [4] in using the normalized version of the PVI for both C and V intervals, which has been shown in their study to be a meaningful diagnostic tool for the analysis of the rhythmic properties of L2 speech.

The respective values for the rhythm metrics mentioned above were obtained by using the software *Correlatore* ([21]), which automatically calculates them on the basis of the segmented speech signal and the relevant Praat TextGrids containing the individual durations of the C and V intervals.

3. Results

In what follows we present the results of the materials (types 1−4). For each kind of material, we show the results of the calculations of %V/Varco ΔV and VnPVI/CnPVI metrics (figures a/b, respectively).

3.1. Read text *The North Wind and the Sun*

Figure 1a shows that the %V and VarcoΔV values for ITA (%V: 44.36, VarcoΔV: 54.7), PORTE (%V: 43.92, VarcoΔV: 56.06) and SPA L2 (%V: 46.55, VarcoΔV: 59.17) cluster in the higher right part of the diagram, while SPA L1 exhibits lower values for both the proportion of vocalic material in the speech signal and the variability of vocalic intervals (%V: 41.52, VarcoΔV: 42.99). SPA L1 thus strongly contrasts with ITA, PORTE, and SPA L2.

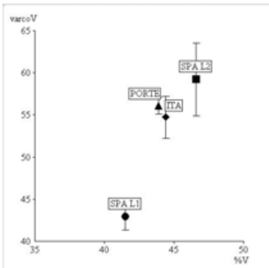

Figure 1a: *%V/VarcoΔV scores (reading of* The North Wind and the Sun*) in Spanish (SPA L1, SPA L2, PORTE) and Italian (ITA).*

According to Figure 1b, the CnPVI values for PORTE (49.06) and SPA L2 (53.41) are situated between the ones for ITA (61.65) and SPA L1 (47.04); see the vertical axis. As for the VnPVI values, both the contact variety *Porteño* and L2 speech pattern with Italian rather than with native Peninsular Spanish (ITA: 46.24, PORTE: 48.39, SPA L2: 46.62; SPA L1: 39.21). Again, Peninsular Spanish clearly contrasts with the other varieties. The high values for CnPVI in the Italian data can be explained by referring to the presence of geminates and more complex syllable structures and in Italian ([22]), which automatically results in a greater variability of C intervals.

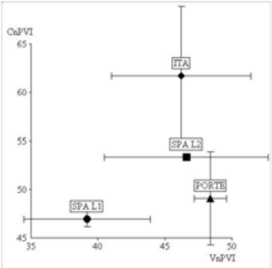

Figure 1b: *VnPVI/ CnPVI scores* (North Wind).

3.2. Read CV sentences

Figures 2a and 2b, below, depict the rhythmic values obtained from the analysis of the controlled CV sentences. As shown in Figure 2a (V/VarcoΔV), ITA, PORTE, and SPA L2 again cluster together in the right upper part of the graph, in contrast to SPA L1 (ITA: %V: 52.73, VarcoΔV: 44.49; PORTE: %V: 48.55, VarcoΔV: 42.1; SPA L2: %V: 51.87, VarcoΔV: 38.85; SPA L1: %V: 44.74, VarcoΔV: 26.31). In accordance with the distribution found by [2] for L2 speech, the data produced by speakers of SPA L2 display intermediate values between those of their L1 (ITA) and the target language (SPA L1). Interestingly, the scores for the contact variety (PORTE) are quite similar to those of the L2 speech (SPA L2).

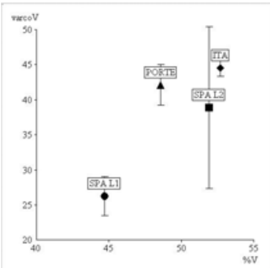

Figure 2a: *%V/VarcoΔV scores (read CV sentences).*

Figure 2b shows a distribution comparable to the one depicted in Figure 2a, insofar as, once again, ITA, PORTE, and SPA L2 cluster together in the upper right part of the graph (ITA: VnPVI: 37.02, CnPVI: 42.4; PORTE: VnPVI: 39.15, CnPVI: 40.14; SPA L2: VnPVI: 33.41, CnPVI: 42.55; SPA L1: VnPVI: 25.66, CnPVI: 38.74).

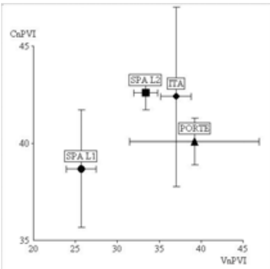

Figure 2b: *VnPVI/CnPVI scores (read CV sentences).*

3.3. Read pseudo-words

The overall picture doesn't change when material is taken into account which is exactly the same for all varieties under consideration (identical pseudo-words embedded in language-specific carrier dialogues): As can be seen in Figure 3a, once again, SPA L1 clearly differs from the other three varieties in displaying lower values for both %V and VarcoΔV (ITA: %V: 50.67, VarcoΔV: 40.97; PORTE: %V: 47.98, VarcoΔV: 41.58; SPA L2: %V: 50.34, VarcoΔV: 39.85; SPA L1: %V: 44.34, VarcoΔV: 30.57).

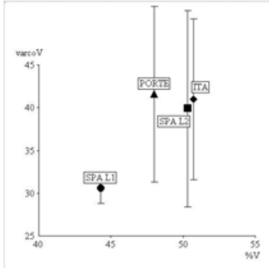

Figure 3a: *%V/VarcoΔV scores (read pseudo-words).*

In Figure 3b, SPA L1 exhibits the lowest vocalic and intervocalic nPVI scores, while the other varieties form a cluster. In contrast to the previous figures, PORTE displays the highest values on both axes (ITA: VnPVI: 33.58, CnPVI: 40.5; PORTE: VnPVI: 42.63, CnPVI: 42.25; SPA L2: VnPVI: 37.08, CnPVI: 37.23; SPA L1: VnPVI: 26.4, CnPVI: 32.4).

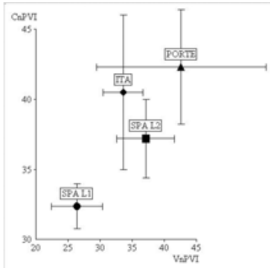

Figure 3b: *VnPVI/CnPVI scores (read pseudo-words).*

3.4. Semi-spontaneous speech

When semi-spontaneous speech is taken into account, the general picture doesn't change: As can be seen in Figures 4a and 4b, both for the %V/VarcoVΔ and the VnPVI/CnPVI plane, SPA L2, PORTE, ITA exhibit higher values than SPA L2 in all conditions (ITA: %V: 51.29, VarcoΔV: 54.32, VnPVI: 50.8, CnPVI: 59.32; PORTE: %V: 49.57, VarcoΔV: 57.18, VnPVI: 49.48, CnPVI: 48.12; SPA L2: %V: 47.23, VarcoΔV: 48.74, VnPVI: 47.74, CnPVI: 55.95; SPA L1: %V: 42.79, VarcoΔV: 45.09, VnPVI: 43.76, CnPVI: 46.13).

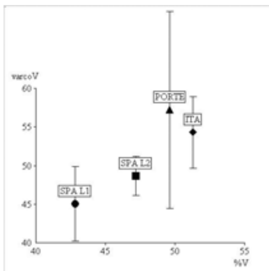

Figure 4a: *%V/VarcoΔV scores (semi-spontaneous data).*

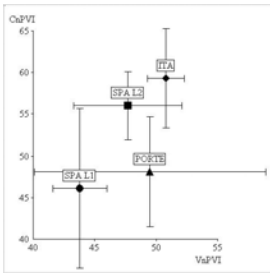

Figure 4b: *VnPVI/CnPVI scores (semi-spontaneous data).*

In sum, it can be said that both the learner variety SPA L2 and the contact variety PORTE are characterized by a high degree of durational variability, which probably can be traced back to transfer from Italian.

4. Discussion

The fact that SPA L1 exhibits considerably lower values for both %V and the variability of C/V intervals (VarcoΔV, PVIs) and that both PORTE and SPA L2 pattern alike, suggests that the Italian immigrants transferred the rhythmic properties of their L1 to Spanish during the process of L2 acquisition and thus largely confirms the contact/transfer hypothesis proposed by [8]. Interestingly, this feature of 'foreign accent' was not lost during the process of sociolinguistic upgrading of the variety and seems to function nowadays, along with other tonal and segmental particularities, as a marker of *Porteño* identity ([23]). As for the question of whether the rhythmic differences between Spanish and Italian preferably show up in the *North Wind* and the semi-spontaneous data, i.e. where the more complex syllable structures of Italian may come into effect, it can be said that the higher values (for ITA vs. SPA L1 in all materials) for both the proportion of vocalic material and the variability of C/V intervals suggest that there are cross-linguistic rhythmic differences that cannot be traced back to syllabic complexity. Recall in this context that the factor of vowel reduction can be largely disregarded given that neither Italian nor Spanish exhibit this feature. At this point, the strong tendency of Italian towards lengthening of stressed and phrase-final syllables comes into play, which [22] interprets as a stress-dependent phonological rule. Interestingly, the values for ITA are considerably lower when the stressed and phrase-final syllables are not taken into account: Taking the results for the CV sentences as an example, %V considerably decreases as soon as only the vocalic intervals belonging to unstressed syllables are taken into account (49.4 instead of 52.7). The same holds for the variability of vocalic intervals (VarcoΔV: 30.7 instead of 44.5; VnPVI: 27.6 instead of 37). Interestingly, the PORTE and SPA L2 data pattern alike (V%: 43.8 instead of 48.5 for PORTE and 48.1 instead of 51.9 for SPA L2; VarcoΔV: 30.1 instead of 42.1 for PORTE and 23.4 instead of 38.9 for SPA L2; VnPVI: 29.7 instead of 39.2 for PORTE and 24.8 instead of 33.4 for SPA L2). In contrast, the values for SPA L1 remain more or less stable (%V: 44.7 instead of 45.4, VarcoΔV: 25.8 instead of 26.3, VnPVI: 25.7 instead of 26). That means: Having excluded syllable structure, the rhythmic properties seem to directly depend on other phonological properties such as a lengthening rule for stressed vowels. This rule seems to be transferred from Italian to PORTE and to SPA L2 (for support of this view see [24]; regarding lengthening effects in *Porteño* see [15]).

5. Conclusion

We have shown on the basis of read and semi-spontaneous speech that both the learner variety (L2 Spanish, produced by Italian natives) and the contact variety *Porteño* exhibit rhythmic values that pattern with Italian rather than with Peninsular Spanish. This suggests that the rhythmic properties of *Porteño* can be explained as an effect of transfer from the immigrants' L1 that occurred in the course of their acquisition of Spanish as an L2. Furthermore, the results from the CV sentences suggest that language-specific rhythmic differences occur independently of syllabic complexity, but can be traced back to other phonological factors such as a lengthening rule for stressed syllables.

6. References

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