

L2 rhythm acquisition and rhythmic transfer in Galician learners of English: A pilot study

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ABSTRACT: Languages have been classified with regard to their rhythm into stress-timed, syllable-timed and mora-timed languages. The aim of this pilot study is to verify the existence of rhythmic transfer from a syllable-timed language, Galician (L1), to the English spoken by Galician learners (L2), as well as to determine whether the proficiency level in the L2 may have an effect on the degree of rhythmic transfer observed. Two groups of six Galician learners of English and two groups of six native speakers of Galician and Southern British English were recorded and analyzed. Rhythm metrics (ΔC , %V, ΔV , CrPVI, and VnPVI) were calculated for all four groups so as to have objective measures to compare the rhythm of the source language (Galician), the rhythm of the target language (English), and the rhythm of the learner language at different proficiency levels. The data show that there is rhythmic transfer between Galician and English L2, and that the degree of transfer decreases as the proficiency level in the L2 increases.

Keywords: Rhythmic transfer, L2 rhythm learning, English rhythm, rhythm metrics.

RESUMEN: *Adquisición del ritmo en L2 y transferencia rítmica en aprendices gallegos de inglés: Un estudio piloto.* - Las lenguas se han clasificado con respecto a su ritmo como lenguas de ritmo acentual, silábico o moraico. El objetivo de este estudio piloto es verificar la existencia de transferencia rítmica de una lengua de ritmo silábico, el gallego (L1), al inglés hablado por estudiantes gallegos (L2), así como determinar si el nivel de competencia en la L2 puede tener un efecto sobre el grado de transferencia rítmica observado. Se registraron y analizaron dos grupos de seis hablantes nativos de gallego, por un lado, y seis hablantes de inglés del Sur de Gran Bretaña, por otro. Se calcularon las métricas de ritmo (ΔC , %V, ΔV , CrPVI y VnPVI) para los cuatro grupos a fin de tener medidas objetivas para comparar el ritmo del idioma de origen (gallego), el ritmo del idioma de destino (inglés) y el ritmo del idioma del alumnado con diferentes niveles de competencia. Los datos muestran que existe transferencia rítmica entre el gallego y el inglés L2, y que el grado de transferencia disminuye a medida que aumenta el nivel de competencia en la L2.

Palabras clave: Transferencia rítmica, aprendizaje de ritmo L2, ritmo del inglés, métricas de ritmo.

1. INTRODUCTION

The concept of linguistic rhythm was first put forward in the 20th century by Pike (1945) and Abercrombie (1967), who defined it in general terms as isochrony of speech intervals. In the following decades, a substantial amount of phonological research (e.g. Dauer, 1983; Bertinetto, 1989) explored the rhythmic characterization of languages and suggested that languages perceived as “stress-timed” show complex consonant clusters and vocalic reduction, while languages perceived as “syllable-timed” do not show vowel reduction and have much simpler syllabic structures. In recent years, some researchers (e.g. Ramus, Nespó and Mehler, 1999; Grabe and Low, 2002; Dellwo, 2006) have discussed and put to practice various quantifiable measures to prove the phonetic reality of such classification and thus confirm the existence of objective, acoustically measurable differences between stress-timed and syllable-timed languages. Although the existing rhythm metrics have recently received some criticism (see Ross, Ferjan and Arvaniti, 2008; Arvaniti, 2009; Kohler, 2009; Arvaniti, 2012; Rathcke and Smith, 2015), they continue to be thoroughly applied in linguistic research, particularly when aimed at finding cross-linguistic rhythmic differences and looking into the differences in rhythmic patterns between L1 and L2 speech (Gabriel and Kireva, 2014). This paper presents an investigation into rhythm acquisition in a foreign language using what we could call the ‘classic’ metrics, developed by Ramus, Nespó and Mehler (1999), and Grabe and Low (2002), which will be explained in section 3.

It must be noted that as much as the research on cross-linguistic rhythmic differences has evolved, the attainment, production and evolution of L2 speech rhythm has been paid comparatively little attention in the literature on L2 acquisition and linguistic transfer, although some recent studies have focused on this issue (see, for instance, White and Mattys, 2007a and 2007b; Kinoshita and Sheppard, 2011; Gut, 2012; Ordin and Polyanskaya, 2015). In spite of the limited consideration that this topic has been given, the existing literature on L2 prosodic acquisition generally agrees that L2 rhythm is indeed a real challenge for language learners (Kinoshita and Sheppard, 2011). The fundamental reason why L2 rhythm acquisition is problematic is the existence of prosodic transfer from L1 to L2, an idea which is implicitly or explicitly supported by the view that the elements making up the phonetic subsystems of L1 and L2 exist in a common phonological space, and so will necessarily influence one another (Flege, Schirru and MacKay, 2003). As a natural consequence, L1 rhythmic transfer is taken to be a crucial factor in the process of L2 prosody learning (Rasier and Hiligsmann, 2007).

Generally speaking, there seems to be a wide consensus with regard to the view that every adult learner’s point of departure when learning an L2 is their L1. In the process of L2 acquisition, especially when this commences after the childhood period, L2 phonological features interact with L1 phonology and are assumed to cause adult learners difficulty in acquiring native-like L2 phonology,

as their L1 phonological system makes it difficult for them to perceive and, therefore, produce, a number of phonic features in the target language (see Broselow and Kang, 2013). In fact, it has been observed that, although adult L2 learners often attain native-like proficiency in syntactic, morphological, and lexical systems of L2, they rarely or never master the complete L2 sound system (Scovel, 1969 and 1988). Moreover, the mastery of suprasegmentals seems to emerge at very advanced stages in L2 pronunciation (James, 1988; Brown, 2000).

In order to explore this issue further, Li and Post (2014) analyze the rhythm produced by Chinese (syllable-timed) and German (stress-timed) learners of English (also stress-timed) with intermediate or advanced proficiency level and conclude that while learners from both L1 backgrounds produce rhythm metric values that increasingly approach the L2 target—i.e. the higher their level of English, the more similar those measures are to the target—, their rhythmic development also shows signs of L1 transfer.

In a similar vein, Ordin and Polyanskaya (2015) compare French (syllable-timed) and German (stress-timed) L2 learners of English at beginner/intermediate, and advanced/proficiency levels and corroborate Li and Post’s (2014) conclusions in that rhythm metric values of both learner groups show that durational variability increases as L2 acquisition progresses. According to the authors, that could be an indicator of universal L2 acquisition development. Interestingly, though, they also show that while the most proficient German learners of English achieve target values, the French learners of English do not. This could indicate that L1 speakers of a syllable-timed language like French (and Chinese) find it more difficult to acquire the speech rhythm of a stress-timed language like English than L1 speakers of a different stress-timed language (like German), a statement that requires further exploration. In this regard, it is worth noting that Polyanskaya and Ordin (2015) have investigated the attainment of rhythmic patterns by monolingual English children and adults to show that the speech rhythm of children universally develops from more syllable-timed to more stress-timed as language acquisition progresses. In other words, the existence of a stress-timed rhythm implies the existence of a syllable-timed rhythm in an earlier developmental stage, but not vice versa, which proves that stress-timed rhythm is typologically more marked than syllable-timed rhythm (see Van Maastricht et al., 2019).

Although the general L2 adult learners’ goal as non-native speakers of the language is the quality of pronunciation that will not detract from their ability to communicate (Celce-Murcia, 1991), native-like pronunciation is taken to be the somewhat abstract ideal that L2 learners aim at, as it is automatically judged to be a synonym for “understandable pronunciation” or, in more general terms, “good pronunciation” (see Leather and James, 1991; Ryu, 2002). L2 speech usually exhibits a certain degree of foreign accent resulting from the production of specific segmental and prosodic characteristics that differ from those produced by L1 speakers and is thus easily perceived by L1 speakers (see Polyanskaya, Ordin and Busa, 2016).

The judgements regarding the level of native-like quality of a learner's pronunciation have been complemented by the use of rhythm metrics to actually detect to what extent L2 rhythm resembles that of native speakers. The crucial study in this direction was carried out by White and Mattys (2007a), who first investigated how some metrics—chiefly, %V and VarcoV—reflect the evolution in the process of L2 acquisition in speakers of English and Spanish. In a later study (White and Mattys, 2007b), the same authors compare those results to L1 English speakers' judgements and conclude that L1 English speakers rate Spanish speakers of English as more non-native-like when their VarcoV values are lower, i.e., when they are farther away from the typical native values for that metric (both American and British English yield higher VarcoV values than American and Iberian Spanish (Espinosa, 2019)). In order to master native English pronunciation, L2 learners must improve their production of vowel reduction in unstressed syllables as much as possible, as this is “a meaningful sign of the ongoing acquisition of English speech rhythm” (Wenk, 1986, p. 125). This is confirmed by rhythm metrics, as acquiring a more stress-timed rhythm necessarily implies a greater degree of variation in vowel duration.

As stated above, studies point to the idea that speech rhythm development proceeds from syllable- to stress-timed characteristics for L2 speakers and native-speaking children alike (see Ordín and Polyanskaya, 2014). Arguably, it is thanks to input analysis and practice that learners finally produce the prosodic properties of the target language. Indeed, although it has been acknowledged that “[p]ronunciation of adult L2 learners is particularly resistant to change, even if those learners have received targeted pronunciation instruction” (Kennedy and Trofimovich, 2010, p. 171), studies like Tsiartsioni's (2011) analyze vocalic and consonant variability measures and observe an adaptation of a more English-like rhythm by those having received rhythm instruction. The question remains whether before getting to that final stage learners develop a phonological system which shows characteristics of their L1 and their L2, thus giving rise to an intermediate stage where the rhythm of the L2 is neither completely the same as that of the speakers' L1 nor exactly the same as the rhythm of the target language (see Eckman, 2012; Espinosa, 2018). The investigation of systematic similarities and differences between L1 and L2 speech rhythm has not yet shed any definitive findings, which entails that maybe the L2 speakers' level of competence is indeed one of the most important variables to be borne in mind. More research needs to be carried out to show evidence for rhythmic differences between L2 learners of different proficiency levels or with different native language backgrounds (see Li and Post, 2014). This leads to the question whether the rhythm metrics are actually able to differentiate between beginners' and more advanced language learners' speech rhythm, and whether they can trace rhythmic developments in language acquisition (Gut, 2012).

The present article analyzes the process of rhythm acquisition in two groups of Galician learners of English

with different levels of proficiency in order to determine i) the existence of L1 rhythmic transfer in the acquisition of L2 rhythm, and ii) the influence of L2 proficiency level on the degree of rhythmic mastery on the adult learners' part. The structure of the article is as follows: Section 2 delves into the objectives and hypotheses that conduct this study. Section 3 explains the methodology of the research study conducted. Section 4 explores the results obtained, and section 5 presents the discussion of those results. Finally, section 6 deals with the final conclusions of the study.

2. OBJECTIVES AND HYPOTHESES

As mentioned in the Introduction, this study analyzes the production of speech rhythm in the English language classroom by two groups of bilingual Galician/European Spanish learners whose dominant language is Galician and certified, at the moment of recording, a B1 and C1 level of English according to the Common European Framework of Reference for Languages [CEFR] (Council of Europe, 2001). Crucially for our study, while British English is generally described as a stress-timed language (see, for instance, Ramus, Nespór and Mehler (1999), and Grabe and Low (2002)), Galician has been shown to be a syllable-timed language in the few studies that have analyzed its rhythmic make-up (Roseano, 2021).

The objectives of the study go as follows:

- a. To compare rhythmically the production of English L1 and L2 so as to verify whether the production of English L2 is affected by rhythmic transfer from the learners' L1.
- b. To explore the development of non-native rhythm at different stages in the process of acquisition so as to find out whether the degree of rhythmic transfer decreases as the proficiency level in the foreign language increases (Gutiérrez Díez et al., 2008; Gass and Selinker, 2008; Major, 2008).

The hypotheses that conduct the research work and give rise to the above objectives are two, namely:

- a. Galician learners of English will show intermediate rhythm scores between their L1 and their L2.
- b. The degree of rhythmic transfer will be shown to be negatively correlated with the level of proficiency in the foreign language; in other words, increased L2 proficiency will lead to the production of more native-like rhythmic patterns.

3. METHODOLOGY

In order to conduct this investigation, two groups of native speakers of Galician currently studying a degree in Translation and Interpreting at the University of Vigo were handed a questionnaire to determine their language profile, and subsequently recorded in the soundproof booth at the Language and Cognition Lab of the Univer-

sity of Vigo with a Sennheiser MK4 Digital microphone connected to a Toshiba Satellite Click 2 Pro P30W-B.

The first group (henceforth, group A) comprised 6 subjects who, at the moment of being recorded, were doing their first year of the Translation and Interpreting degree at the University of Vigo, had received English lessons in primary and secondary school for a total twelve years, certified a B1 level of English (Table 1)—a necessary condition to enter the above-mentioned degree—and had not received any phonetic instruction prior to their first term at university. The second group (henceforth, group C) comprised 6 subjects who were doing their fourth year at university and certified a C1 level of English (Table 1)—i.e. they had passed their first year at university. In order to ascertain that the level of English reported by the subjects in groups A and C was accurate, they were evaluated by the first author of this article prior to the completion of the task that this investigation comprised. Group C individuals received explicit phonetic instruction for a period of twelve weeks during which they sat through one two-hour theoretical session per week where they were taught English segmental and prosodic phonology, and two two-hour practical sessions per week where they were instructed to improve their listening and speaking skills putting into practice the theoretical knowledge acquired in the theoretical sessions. In addition to the twelve-week period of formal instruction, group C subjects had lived in the UK for a period of four months.

All twelve subjects had pursued primary and secondary education in Galicia and had taken the exam to access Galician universities, which includes Galician and Spanish tests, so they reported a very good command of both languages. In addition, they all reported to be Galician-dominant, as they had been raised with Galician as their primary language and continued to use it far more regularly than Spanish. Also, they were learning French as their second foreign language and did not speak any further languages. As far as gender is concerned, the majority of the subjects were female, since the majority

Table 1: Group A (6 subjects studying Translation and Interpreting at the University of Vigo with a B1 level of English; none of them had spent any time in the UK) and Group C (6 subjects studying Translation and Interpreting at the University of Vigo with a C1 level of English; they had spent one term studying in the UK).

Group	Group A		Group C	
Subject	Gender	Age	Gender	Age
1	Female	19	Male	21
2	Female	18	Male	21
3	Female	18	Female	21
4	Female	18	Female	21
5	Female	19	Female	21
6	Male	18	Female	21
	M = 18.3			
	SD = 0.52			

of students of the above-mentioned faculty are female. Their age ranged from 18-19 (first year students belonging to group A) to 21 (third-year students belonging to group C).

Besides, a control group of 6 Southern British English (SBE) speakers (Table 2), and another control group of 6 Galician (GAL) speakers (Table 2) were recorded in order to be able to compare the rhythm of the experimental subjects' L1 and L2, and facilitate the observation of developmental patterns in the production of the subjects' L2 rhythm. In this regard, the degree of difference or similarity with the target language (in this case, SBE) allows us to observe the evolution in L2 rhythm production on the part of the two experimental groups. It must also be noted that the English control group comprised 6 speakers of Southern British English because this variety is representative of the largest amount of input that learners receive in an instructional context (classroom videos and audios) and is the variety that was spoken in the geographical areas in the UK where C1 subjects spent their study-abroad period.

Table 2: Control group 1 (6 Southern British English recorded in the Phonetics Lab at the University of Barcelona) and Control group 2 (6 Galician speakers recorded in the Language and Cognition Lab at the University of Vigo).

Group	Control group 1		Control group 2	
Subject	Gender	Age	Gender	Age
1	Male	43	Female	19
2	Male	35	Female	18
3	Male	21	Female	18
4	Female	21	Female	18
5	Female	22	Female	19
6	Female	31	Male	18
	M = 28.8		M = 18.3	
	SD = 9.1		SD = 0.52	

The recordings of the subjects in the SBE control group were carried out in a soundproof booth at the Phonetics Lab of the University of Barcelona using a Zoom H4n Pro digital recorder and a Shure SM58 microphone, while those of the subjects in the GAL control group were done in the Language and Cognition Lab of the University of Vigo with the same equipment used for groups A and C.

The data were obtained by means of a reading task where subjects had to read the text *The North Wind and the Sun* (*Handbook of the IPA*, 1999, p. 39) in Galician and/or in English (Figure 1). Speakers were asked to read aloud at a normal speech rate and the resulting readings of the text took approximately 30 seconds for each informant, which implied that reading pace was spontaneously controlled for. They were asked to make pauses only where commas or full stops appeared in the text (this requirement is due to the fact that we wanted to have the

same number of pauses in all recordings of each language, since pre-pausal lengthening might have an effect on the duration of intervals). If a speaker hesitated, mispronounced, made extra pauses, etc., we asked them to read the sentence again.

Figure 1: The North Wind and the Sun in Galician and in English.

Galician text
O vento do norte e mailo sol porfiaban sobre cal deles era o máis forte, cando cadrou de pasar un viaxeiro envolto nunha ampla capa. Conviñeron en que o que antes conseguise facerlle quitar a capa ao viaxeiro sería considerado o máis forte. O vento do norte soprou con gran furia, e canto máis sopraba máis se envolvía o viaxeiro na súa capa; finalmente o vento do norte abandonou o seu empeño. Entón o sol quentou con forza e inmediatamente o viaxeiro sacou a capa. E daquela o vento do norte tivo que recoñecer a superioridade do sol.
English text
The North Wind and the Sun were disputing which was the stronger, when a traveller came along wrapped in a warm cloak. They agreed that the one who first succeeded in making the traveller take his cloak off should be considered stronger than the other. Then the North Wind blew as hard as he could, but the more he blew the more closely did the traveller fold his cloak around him, and at last the North Wind gave up the attempt. Then the Sun shone out warmly, and immediately the traveller took off his cloak. And so the North Wind was obliged to confess that the Sun was the stronger of the two.

The acoustic analysis was carried out with *Praat* (Boersma and Weenink, 2019). For each recording, the vocalic and consonantal intervals were annotated in a textgrid following the same criteria as in Kireva and Gabriel (2015), namely:

- boundaries between V and C intervals were determined on the basis of formant structure and pitch;
- we treated glides as belonging to the V intervals;
- for unvoiced plosives and affricates following a pause, the beginning was placed at 0.05s prior to the burst, given that their boundaries can hardly be determined on the basis of other criteria;
- pauses and material affected by any kind of speech disfluency were excluded from the analysis.

The textgrids were then processed by means of *Correlatore* (Mairano and Romano, 2010) in order to calculate and plot vocalic and consonantal rhythm metrics. The metrics used in this study are, as mentioned in the Introduction, the ‘classic’ metrics created by Ramus, Ne-

spor and Mehler (1999) (Figure 2), and by Grabe and Low (2002) (Figure 3), thus leaving to future experiments other prosodic factors—i.e. stress/intensity, pitch, speech rate, etc.—which may arguably have an effect on L1 and L2 rhythm as well as rhythm transfer. The metrics proposed by the previously mentioned authors are complementary, as Ramus, Nespors and Mehler (1999) propose “global” rhythm metrics (insofar as the duration of each interval is compared with the duration of all other intervals in the recording), while Grabe and Low (2002) use “local” rhythm metrics (in the sense that the duration of each interval is compared with the duration of the following interval).

For the interpretation of the results presented in section 4, it is useful to remember that ΔV and VnPVI measure the variability of vocalic intervals, while ΔC and CrPVI measure the variability of consonant intervals. Finally, %V is related to both consonant and vocalic intervals. Ramus, Nespors and Mehler (1999) suggest that the rhythm metrics reflect the phonological rhythmic properties of the languages. As stated above, given that stress-timed languages have a greater variety of syllable structures and favor consonant clusters, they present a comparatively higher ΔC value and, consequently, a lower %V value. In contrast to this, syllable-timed languages tend towards simpler syllable structures and disfavor consonant clusters, which translates into a lower ΔC value, and a higher %V value. With reference to ΔV , stress-timed languages allow for a comparatively greater number of phonological processes which affect vowels—vowel reduction, long-vs-short vowel contrast, vowel lengthening in certain phonological contexts—and thus have a higher ΔV value than syllable-timed languages, in which these phonological processes are not productive.

Figure 2: Formulae for the global metrics in Ramus, Nespors and Mehler (1999).

$$\%V = \frac{\sum_{i=1}^n V_i}{\sum_{i=1}^n V_i + \sum_{i=1}^n C_i} * 100$$

$$\Delta V = \sqrt{\frac{\sum_{i=1}^n (V_i - \bar{V})^2}{n - 1}}$$

$$\Delta C = \sqrt{\frac{\sum_{i=1}^n (C_i - \bar{C})^2}{n - 1}}$$

Figure 3: Formulae for the global metrics in Grabe and Low (2002).

$$\text{CrPVI} = \left[\sum_{k=1}^{m-1} |C_k - C_{k+1}| / (m - 1) \right]$$

$$\text{VnPVI} = \left[\sum_{k=1}^{m-1} \left| \frac{V_k - V_{k+1}}{(V_k + V_{k+1}) / 2} \right| / (m - 1) \right]$$

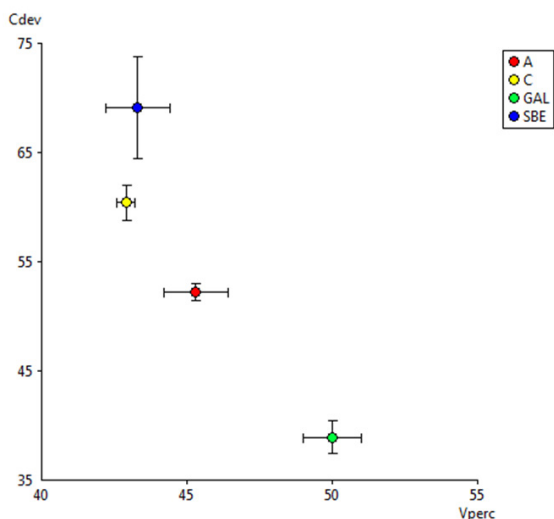
The metrics in Figures 2 and 3 capture the durational variability of speech intervals that corresponds to the auditory impression of stress- and syllable-timing. Romance languages like Spanish or Galician have been shown to have an overall lower degree of durational variability (i.e. low ΔV , ΔC , CrPVI and VnPVI values) and higher proportion of vocalic material (i.e. high %V) compared to Germanic languages like English, where high ΔV , ΔC , CrPVI and VnPVI values and low %V have been reported (e.g. Bunta and Ingram, 2007; Payne et al., 2012; Prieto et al., 2012; Ramus, Nespors and Mehler, 1999; White and Mattys, 2007a and 2007b), which corresponds to a lower degree of stress-timing. Differences in rhythmic metrics between L1 and L2 speech have also been confirmed in several studies (Bond and Fokes, 1985; Grenon and White, 2008; Ordin and Polyanskaya, 2015; White and Mattys, 2007a and 2007b). L2 English exhibits a lesser degree of stress-timing compared to L1 English, irrespective of the L1 of the learner (Li and Post, 2014; Ordin and Polyanskaya, 2015).

4. RESULTS

In this section, we shall present the results of our study by discussing the plots of the rhythm metrics obtained by means of *Correlatore*. We shall first present the results of the mean values for “global” rhythm metrics, and later the results of “local” rhythm metrics. At the end of the section, we will present the results of the speakers individually.

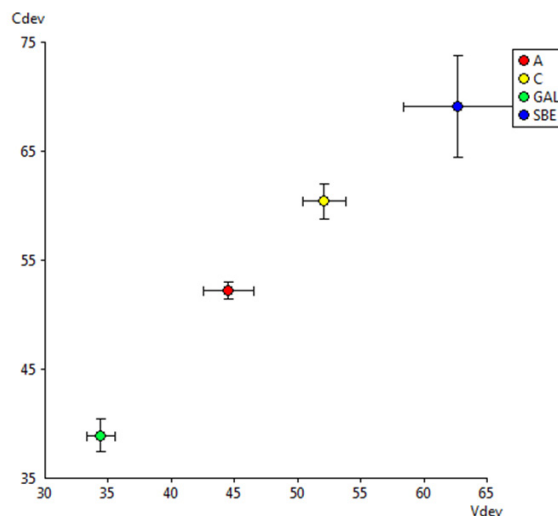
Figure 4 shows the mean values obtained for the ΔC , ΔV metrics for the four groups analyzed. i.e. SBE, GAL, A and C, while Figure 5 indicates the mean values rendered for the ΔC , %V metrics for the same four groups.

Figure 4: ΔC (Cdev), ΔV (Vperc).



Figures 4 and 5 show, firstly, that GAL and SBE appear at the opposite corners of each plot. This is consistent with the fact that GAL is classified as a syllable-timed language

Figure 5: ΔC (Cdev), %V (Vdev).



(like Central Peninsular Spanish), while SBE is stress-timed. Secondly, English L2 groups (A in red, C in yellow) appear in an intermediate position between the speakers’ L1 and those same speakers’ foreign language (only the value of %V for C-speakers is slightly out of the diagonal, though not dramatically far). Furthermore, if we consider the level of EFL speakers, we observe that group A in red (subjects with a B1 level of English) is closer to L1, while group C, in yellow (students with a C1 level of English) is closer to L2.

Given the results obtained, three preliminary conclusions may be inferred. To start with, there is rhythmic transfer from the speakers’ L1 (Galician, syllable-timed) to their L2 (English, stress-timed). Not unimportantly, either, the level of proficiency has an effect on the degree of rhythmic transfer, as both consonantal and vocalic intervals are affected by transfer. Thus, the areas where groups A and C stand could be considered ‘interlanguage’ areas where the produced rhythm is neither the rhythm of the subjects’ L1 nor the rhythm of the target language.

The “local” metrics used by Grabe and Low (2002) provide results that are completely in line with those of the “global” metrics used by Ramus, Nespors and Mehler (1999). These results are desirable, insofar as all metrics give a cohesive picture of the phenomenon under study, and also foreseeable, since—like Ramus (2002) pointed out—the different rhythm metrics should give comparable results when the quantity of data analyzed is large enough. The mean values obtained for the CrPVI and Vn-PVI metrics in this study are offered in Figure 6.

Figure 6 shows that, like for ΔC , ΔV (Figure 4), GAL and SBE appear at the opposite corners of the plot. Once again, this is consistent with the fact that GAL is indeed syllable-timed (like Central Peninsular Spanish), while SBE is stress-timed. Again, English L2 groups appear in an intermediate position between the speakers’ L1 and the speakers’ foreign language. Similarly, if the level of English L2 speakers is considered, we observe, once again, that A is closer to L1, while C is closer to L2.

Figure 6: CrPVI & VnPVI.

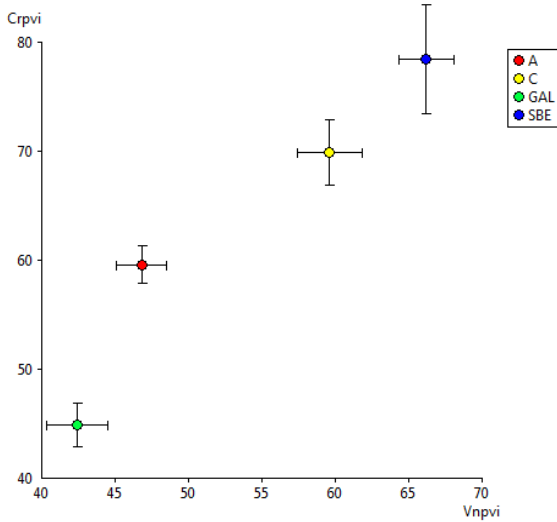
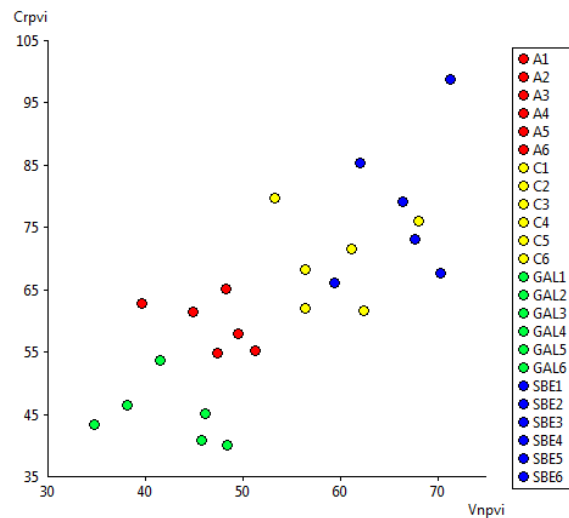


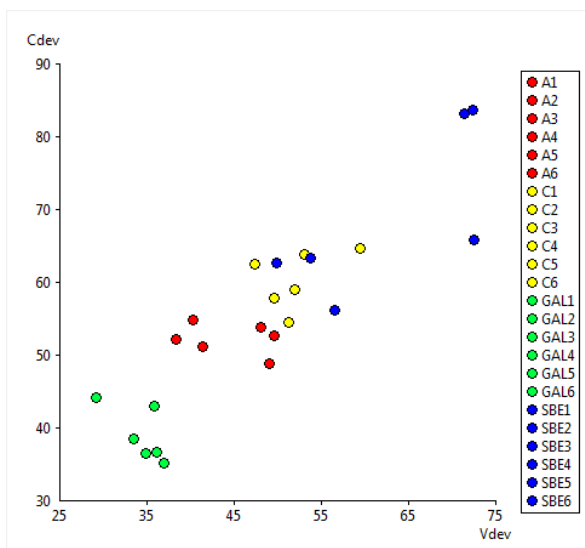
Figure 8: PVIIs.



The above observations provide us with information that confirms the preliminary conclusions previously stated, namely that there is rhythmic transfer from the speakers' L1 to their L2, that both consonantal and vocalic intervals are affected by transfer, and that the level of proficiency has an effect on the degree of rhythmic transfer—the higher the proficiency level of the learners, the lesser the degree of rhythmic transfer observed.

If we analyze speakers one by one (Figures 7 and 8) a few more detailed considerations can be made. To begin with, on the whole, the distribution along the diagonal does not change in comparison to the data in Figures 4, 5 and 6. Nevertheless, in both Figures there is an area where the clouds of SBE speakers and C speakers overlap. This might mean that some C speakers display near native-like rhythm, which is consistent with the fact that they had a C1 level of English.

Figure 7: Deltas.



5. DISCUSSION

The objective of this study is twofold, as it aims at comparing the production of English L1 and L2 rhythmically so as to verify whether the production of English L2 is affected by rhythmic transfer from the learners' L1, i.e. syllable-timed Galician, and determining whether the degree of rhythmic transfer decreases as the level of proficiency increases.

The initial hypotheses were that a) the transfer of the rhythm from Galician to English spoken by Galician speakers would be visible—English L2 would lie in an intermediate rhythmic position between GAL and SBE—and b) that the degree of rhythmic transfer would prove variable and directly linked to the learners' proficiency level (group-C speakers would be closer to L2, while group-A speakers would be closer to GAL).

The statistical analysis carried out by means of Correlatore shows that both hypotheses are confirmed, insofar as the variety of English spoken by Galician speakers is predominantly located in an intermediate rhythmic position between GAL and SBE. As the degree of proficiency increases thanks to the explicit instruction—i.e. conducted in the classroom—and the non-explicit instruction—i.e. connected to the learners' experience abroad—received by learners, the rhythm of L2 English resembles more and more that of SBE.

The results obtained may be summarized as follows:

- a. There is rhythmic transfer from a syllable-timed L1 (GAL) to a stress-timed foreign language (ENG);
- b. both C and V intervals are affected by rhythmic transfer;
- c. the level of proficiency in the foreign language has an effect on the level of rhythmic transfer, i.e. the degree of rhythmic transfer from Galician L1 to English L2 decreases as the level of the foreign language increases;

- d. there are individual differences (some C speakers have reached native-like rhythm).

The above results confirm previous research (Li and Post, 2014; Ordin and Polyanskaya, 2015) conducted with young adult speakers of different native tongues in that the higher the level of English on the part of the learners, the more similar the rhythm measures are to the target, no matter the learners' L1. These results also prove that the signs of L1 transfer are present, albeit with a higher or lower predominance, at all stages of the learning process. Additionally, in line with Ordin and Polyanskaya's (2015) observation, the present study shows that successfully acquiring stress-timed rhythm and, hence, a greater degree of variation in vowel duration, tends to prove considerably difficult for speakers of a syllable-timed language—in this case, Galician. Besides, in line with Espinosa's (2018) observations, the present study corroborates Tsiartsioni's (2011) observation that learners who receive rhythm instruction adapt to a more English-like rhythm when speaking the language. Moreover, the data obtained and analyzed offers an answer to Tsiartsioni's (2011) question whether learners develop a phonological system that may give rise to an intermediate stage where the rhythm of the L2 is neither totally the same as that of the speakers' L1 nor completely equal to the rhythm of the target language. In this regard, it does seem to be the case that learner English sits at a point in between the speakers' L1 (Galician) and their L2 (British English) and moves towards their L2 as the level of proficiency increases.

6. CONCLUSIONS

The present study has looked into the production of English L1 and L2 rhythm by two groups of Galician-dominant learners with a B1 and a C1 level of English. The study pursued two main objectives, namely to determine i) whether a certain degree of rhythmic transfer from the learners' L1 would show in the results of the rhythmic measurements and, ii) if so, whether the degree of rhythmic transfer observed would be lower in the case of students with a higher proficiency level of English who had also received explicit phonetic instruction for twelve weeks and have spent a university term in England. The initial hypotheses stated that a certain amount of transfer would be revealed in the results of the measurements, and that the degree of transfer would be negatively correlated with the level of proficiency in English.

The twelve experimental subjects were made to read a text in Galician and in English, and the results obtained were compared to the readings made by a control group of six native Galician speakers and another control group of six native British English speakers. The measurements conducted replicated Ramus, Nespor and Mehler's (1999) "global" rhythm metrics ΔV , ΔC , and $\%V$, comparing the duration of each vocalic and consonantal interval with the duration of all other intervals in the recording, and Grabe and Low's (2002) "local" rhythm metrics VnPVI and CrPVI, where the duration of each interval was compared with the duration of the following interval.

The results prove that the rhythm of the foreign language is affected by the rhythmic properties of L1, particularly when the two have different rhythmic structures—as is the case with Galician and British English—and especially at low and intermediate levels of language proficiency. Moreover, as shown by the results of the global and local metrics put to the test, the evinced rhythmic transfer phenomenon from syllable-timed Galician to stress-timed English has an effect on both the consonant and the vowel intervals. This finding ratifies previous observations that L2 English exhibits a lesser degree of stress-timing compared to L1 English (Li and Post, 2014; Ordin and Polyanskaya, 2015). Crucially, the results prove that the degree of rhythmic transfer from Galician to English decreases as the level of the foreign language increases, which corroborates the conclusions in previous studies (Espinosa, 2018; Quesada, 2019). Specifically, these data endorse the results obtained by Li and Post (2014) and by Ordin and Polyanskaya (2015), who argue that the rhythm metric values of the learner groups get closer to native speakers during the acquisition process.

Given that the research work presented has dealt with group results without delving into fine-grained individual analyses, it evinces the necessity to investigate in detail which specific elements within the acquisition process allow certain individuals to reach a more native-like rhythm than others and, more specifically, to what extent the combined facts that some individuals have received explicit phonetic instruction and have spent a term studying in the UK exert the same amount of influence on their overall performance or one of those two variables has a higher degree of influence on their performance with respect to rhythm. In this regard, although individual differences could be accounted for in terms of overseas experience, explicit phonetic instruction and/or proficiency level, it could also be the case that, all things being equal, differences regarding the acquisition of L2 rhythm may be due to individual aptitude, a variable that should also be addressed in future research.

Since the learner population where the experiment was conducted is bilingual Galician/Spanish, the effect of Spanish L3 on the rhythm of L2 English should not be underestimated. Given that Spanish, like Galician, is a syllable-timed language, future research may aim at determining whether any notable differences exist between Galician-dominant speakers, Spanish monolinguals and Galician/Spanish bilinguals regarding the process (i.e. time, performance level) of acquisition of English rhythm.

Last, the findings obtained may shed some light on what to prioritize in English pronunciation teaching, as they show that the gradual improvement in the pronunciation of segmentals in general and, more specifically, the mastering of vowel durations, may be taught as a corollary of rhythm instruction, since the two are intimately connected.

7. REFERENCES

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