

## The role of orthography on vowel lengthening in L2 Spanish produced by L1 Czech learners

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### ABSTRACT

*This paper shows that the native orthography may influence the duration of stressed vowels in L2 speech. Since the acute accent (´) signalizes a long vowel in Czech, but a lexical stress in Spanish, we discovered that Czech learners lengthen orthographically marked vowels in their L2 Spanish. For purposes of the study, we recorded twenty adult learners reading a list with 70 Spanish words. These were controlled for stress position, type of word, and use of orthographic accent. Additionally, we investigated whether stress position has an impact on vowel duration. Considering that Spanish has variable stress and Czech has a fixed stress on the first syllable, we examined durational strategies Czech learners use to produce Spanish non-initial and initial stress. The results show that the learners' stressed vowels in word-initial position are longer in paroxytones, but shorter in proparoxytones than their stressed vowels in non-initial positions.*

**Keywords:** L2 Spanish, L1 Czech, vowel quantity, orthography, transfer hypothesis.

### 1. INTRODUCTION

In spite of the fact that Czech speakers show no particular problems acquiring Spanish vowel phonemes /a e i o u/, slight phonetic differences in vowel quality as well as vowel quantity can lead to difficulty during acquisition and cause what we might call a “foreign accent”. The goal of this paper is to examine how L1 Czech adult learners produce stressed vowels in L2 Spanish, with respect to vowel quantity. It is expected that durational aspects of L1 vowels are implemented in the production of L2 vowels and that this transfer has orthographic explanations (for the role of orthography in L2 speech learning see, e.g., Nimz 2015, and general overviews in Tarone et al. 2013; Colantoni et al. 2015).

The following differences between the two languages should be presented: Whereas Spanish displays no phonemic opposition between short and long vowels, Czech includes vowel quantity as a distinctive feature. This opposition of vowel length in Czech is present in stressed (1), as well as in unstressed positions (2):

- |     |                |           |                  |
|-----|----------------|-----------|------------------|
| (1) | a. <i>vila</i> | /ˈviː.la/ | ‘fairy’          |
|     | b. <i>vila</i> | /ˈvi.la/  | ‘villa’          |
| (2) | a. <i>noší</i> | /ˈno.siː/ | ‘(s/he) carries’ |
|     | b. <i>nosy</i> | /ˈno.si/  | ‘noses’          |

Czech orthography signalizes a long vowel with an acute accent (´) (1–2) or, in a few cases, with a ring (°) above the letter <u> (e.g., *sůl* [ˈsuːl], ‘salt’). In contrast, the acute accent in Spanish serves for marking lexical stress in words that deviate from the default stress patterns (e.g., *libélula* [li.ˈβe.lu.la], ‘dragonfly’). The fact that orthography may shape L2 learners’ production (Bassetti 2009) leads to our first question: *Do Czech learners produce orthographically marked vowels with a longer duration in L2 Spanish?*

A further objective is to investigate whether stress location may also impact the durational properties in L2 speech. Whereas Spanish has variable stress, Czech lexical stress is fixed on the first syllable. Together with F0, duration is an important acoustic correlate of Spanish lexical stress, i.e. stressed vowels tend to have a longer duration (see, e.g., Llisterri 1991; Llisterri et al. 2003; Hualde 2013). In contrast, duration plays no relevant role for Czech lexical stress (see, e.g., Volín 2010; Šimáčková et al. 2012). But, since Czech speakers are sensitive to the vowel quantity in their L1, we might expect that they hear and thus produce Spanish stressed vowels with a longer duration. Interestingly, several Czech borrowings from Spanish (see, e.g., Ježková 2000) have a long vowel corresponding to the position where the original Spanish word bears stress, as we can see in (3–4):

- |     |                    |               |           |
|-----|--------------------|---------------|-----------|
| (3) | Cz. <i>armáda</i>  | /ˈar.maː.da/  | ‘army’    |
|     | Sp. <i>armada</i>  | /ar.ˈma.ða/   | ‘army’    |
| (4) | Cz. <i>generál</i> | /ˈge.ne.raːl/ | ‘general’ |

Sp. *general* /xe.ne.'ral/ 'general'

This raises our second question: *Do Czech learners tend to lengthen target stressed vowels in non-initial position in their L2 Spanish* (e.g., *sistema*)?

## 2. METHODOLOGY

For the purposes of the present study, we recorded 20 Czech adult learners (CZ; 10: B1/B2 level of proficiency, 10: C1/C2 level of proficiency; Common European Framework of Reference for Languages, CEFR), and five L1 European Spanish (ES) speakers (control group), who read a list with 70 target and 21 filler words. All the participants were (highly) educated and, thus, literate learners who acquired Spanish at school or in language courses, i.e. they were exposed to written input from the very beginning. We also noticed that the learners of both proficiency levels had a very high knowledge of Spanish orthography, including the use of the acute accent. In order to control for the duration of the vowels, we set the following three variables:

- (a) presence/absence of an orthographic accent,
- (b) type of word (proparoxytone, paroxytone, oxytone),
- (c) initial/non-initial position of stress.

The data (see examples in Table 1) include all vowel phonemes of Spanish /a e i o u/. We are aware that vowels have intrinsic duration variation as a function of their place of articulation (degree of jaw openness); the open vowels (e.g., [a]) are, for instance, longer than close vowels (e.g., [i]). But since all the speakers produced exactly the same words, we did not control the data for this variable.

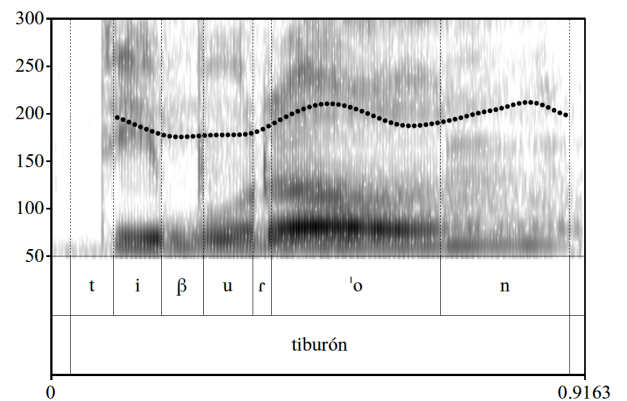
**Table 1:** Examples of tokens.

| Word  | N  |
|---|----|
| Oxytone with orthographic accent<br>e.g., <i>café</i> s [ka.'fes], 'coffee'                 | 10 |
| Oxytone without orthographic accent<br>e.g., <i>pastel</i> [pas.'tel], 'cake'               | 10 |
| Proparoxytone (initial stress) <sup>1</sup><br>e.g., <i>sí</i> laba ['si.la.βa], 'syllable' | 10 |
| Proparoxytone (non-initial stress)<br>e.g., <i>pelí</i> cula [pe.'li.ku.la], 'movie'        | 10 |

<sup>1</sup> Note that Spanish proparoxytones always bear an orthographic accent in Spanish.

|   |    |
|---|----|
| Paroxytone with orthographic accent (initial stress)<br>e.g., <i>lí</i> der ['li.ðer], 'leader'             | 5  |
| Paroxytone with orthographic accent (non-initial stress)<br>e.g., <i>difí</i> cil [di.'fi.θil], 'difficult' | 5  |
| Paroxytone without orthographic accent (initial stress)<br>e.g., <i>pe</i> ro ['pe.ro], 'but'               | 10 |
| Paroxytone without orthographic accent (non-initial stress)<br>e.g., <i>siste</i> ma [sis.'te.ma], 'system' | 10 |

In the next step, we transcribed and segmented the files by performing an acoustic analysis of all tokens using Praat (Boersma & Weenink 2016). The results were extracted by means of a Praat script created ad hoc for the purposes of the research. Figure 1 illustrates an example of the token *tiburón* ('shark'), produced by a Czech learner. As we can see, the speaker pronounced the word with a long stressed vowel [o]: The duration of this segment was 0.29s, which is 34% of the whole word (0.86s).<sup>2</sup>

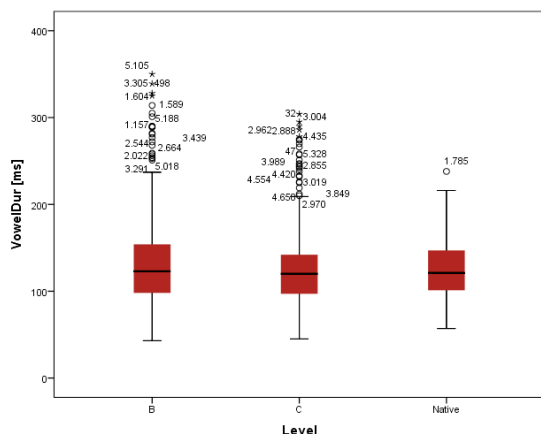


**Figure 1:** Example of analysis of the word *tiburón* ('shark') produced by a female Czech learner (B2).

## 4. RESULTS & DISCUSSION

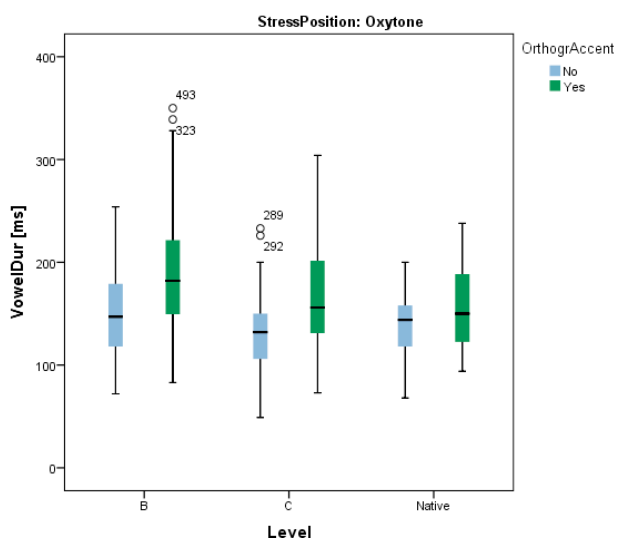
The results show that stressed vowels are slightly longer in Czech learners (ES: 125.52 ms; CZ: 127.49 ms) CZ-ES U(268462, p=.666). Students with a lower degree of proficiency (CEFR B) showed significantly longer stressed syllables (131.07ms) than C students (123.93ms) U(250369, p=.009) (Figure 2). And these two groups show significant differences in comparison with the native group (df=2, p=.027).

<sup>2</sup> In the Spanish native speakers' data, the duration of the vowel [o] amounts to approximately 18-20% of this word.

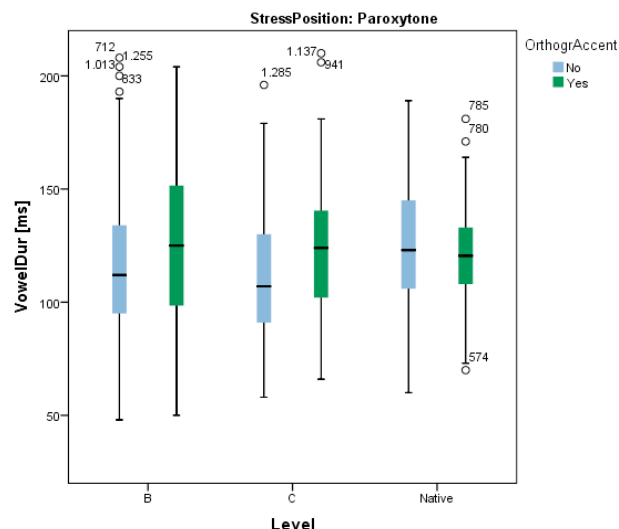


**Figure 2:** *Durational differences of stressed vowels between the three groups of speakers.*

Not surprisingly, the data exhibit a large amount of (interlearner as well as intralearner) variability, and there are several outliers, known to be characteristic of interlanguage production. We therefore included two linguistic factors into the analysis: the orthography and the type of word, which could both be potential sources of this variability. As expected, Czech learners tend to lengthen orthographically marked vowels, with statistically significant differences in oxytone (U(26470,  $p < .001$ )), as well as in paroxytone words (U(48478,  $p < .001$ )). Figures 3 and 4 show these differences in correlation with the learners' levels. The performance of B and C learners differs only for oxytones (mean duration of stressed vowels in B-level 191.59ms and in C-level 169.08ms U=4593,  $p = .001$ ). The proparoxytone words were not controlled for this variable, as they always have an acute accent.



**Figure 3:** *Durational differences between the languages: Variable 'Orthographic accent' for oxytone words.*



**Figure 4:** *Durational differences between the languages: Variable 'Orthographic accent' for paroxytone words.*

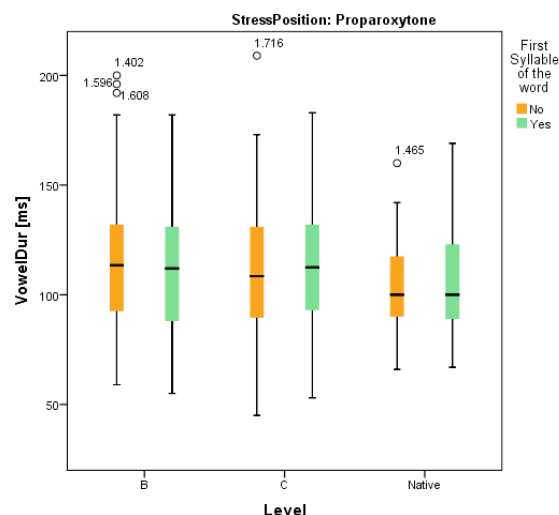
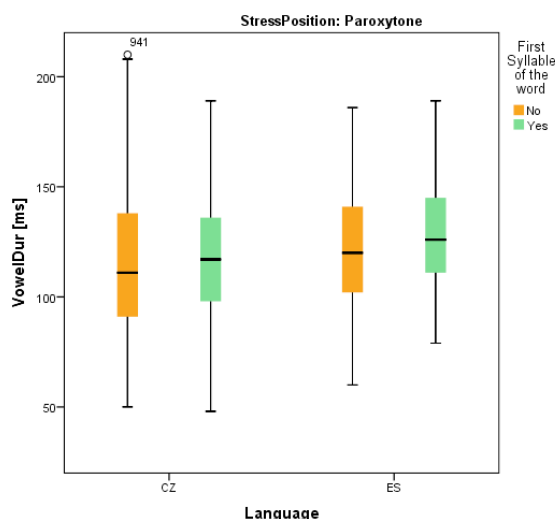
We can thus say that Czech orthography has negative effects on the production of the vowel quantity in Spanish. Interestingly, some Czech learners even lengthened orthographically marked vowels in Spanish (e.g., *teléfono* [te.'le:fo.no], 'phone') in another (imitation) task, in which they were hearing and repeating common Spanish words after a native Spanish speaker. This impressionistic observation, which needs to be examined in detail in the future, supports results from some previous studies (e.g., Escudero et al. 2008) which showed that literacy and orthography might influence L2 speech without a written input being at play.

In the next step, we examined whether the stress location in L2 Spanish impacts the durational properties as well.<sup>3</sup> Contrary to expectations, Czech learners produced stressed vowels of paroxytone words only slightly longer when they were word-initial (and shorter when they were in non-initial position).<sup>4</sup> The word-initial position coincides with the lexical stress in Czech. Czech learners show a median difference of 6ms between initial and non-initial syllables, whereas Spanish speakers show a median difference of 1ms (U(18311,  $p = .004$ )) (Figures 5).<sup>5</sup> As for proparoxytone words (with an orthographic accent) (Figures 6), we found that only some B-level learners use lengthening strategies to express the target stressed vowels in non-initial positions, but the result is not significant (level B: U(5344.5,  $p = 0.710$ ); level C: U(5930,  $p = 0.648$ ); natives U(1381;  $p = .465$ )).

<sup>3</sup> We did not examine the combined effect of duration and F0, a factor that should be taken into account in future research.

<sup>4</sup> Here we tested only paroxytone words without an orthographic accent.

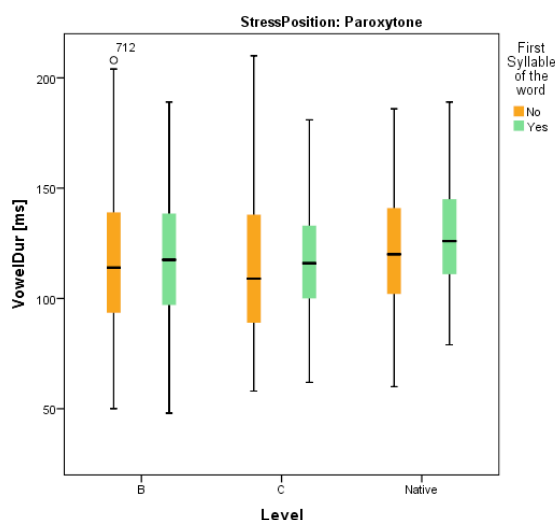
<sup>5</sup> We prefer to report median values in this case because they are clearer: average is too sensitive to extreme values.



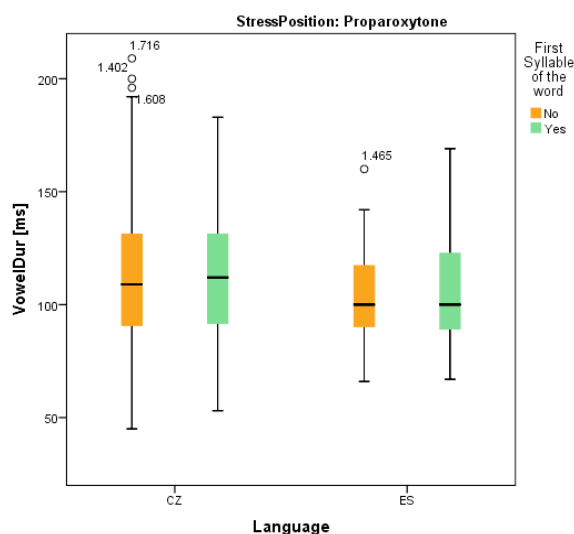
**Figure 6a-b:** *Durational differences between the levels and languages: Variable 'First syllable of the word' for proparoxytone words.*

## 5. CONCLUSIONS

According to our findings, Czech learners tend to produce stressed vowels longer than native Spanish speakers. Since longer vowels were found in words with an orthographic acute accent, our first hypothesis was confirmed: The native orthography has a negative influence on L2 speech production and affects phonetic-acoustic properties. This reveals that orthography is a conceivable variable that should be incorporated into the L2 speech learning models (Nimz 2015: 39). The observed inter-learner variation attested in the data can be traced back – at least partly – to the different proficiency levels of the learners. As for the comparison of stressed word-initial and stressed word-non-initial vowels, we found that Czech learners produce longer vowels when they are in the initial position of the paroxytones and in the non-initial position of the proparoxytones. Since our second hypothesis was only partly confirmed, further experiments should be performed, in which we can test, for instance, how Czech learners perceive stressed syllables of nonsense words in Spanish, and, how Czech naïve hearers/speakers of Spanish perceive and produce stressed syllables in initial and non-initial positions. There also remains the question as to what degree the observed lengthening of stressed vowels influences the perception of a foreign accent.



**Figure 5a-b:** *Durational differences between the levels and languages: Variable 'First syllable of the word' for paroxytone words.*



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