Second dialect and second language imitation of geminates by Colombian Spanish speakers

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Second dialect and second language imitation of geminates by Colombian Spanish speakers

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Abstract. The present study compares second language (L2) and second dialect speech (D2) speech learning by examining geminate imitation of Standard Italian (L2) and Havana Cuban Spanish (D2) by native Colombian Spanish-speaking participants. We test the effect of both language and salience (length). We provide new data that show that participants were able to produce geminates from a phonological point of view, though they had difficulty producing them in a target-like manner in both the L2 and D2 contexts, when we compared geminate duration. Moreover, length was the main predictor of non-target-like productions, where shorter geminates were easier to imitate. It is proposed that there might be a trade-off between acoustic salience and target-like productions in L2 and D2 speech learning.

Keywords: second language/dialect imitation, phonetics, salience, production, Spanish, Italian

Introduction

Whether proximity/similarity makes a second dialect (D2) more or less acquirable or not has not been resolved yet (e.g., Siegel, 2010). Not much is known about whether it is easier to learn new sounds in a second language (L2) or in a D2 either, despite much interest in D2 speech learning (e.g., Babel, 2010; Nielsen, 2011). The only study to our knowledge that has compared L2 and D2 imitation has been Ruiz-Peña, Sevilla, and Rafat (2018). With the aim of determining whether L2 and D2 speech learning operate in the same way, the D2 production of Ecuadorian Spanish assibilated rhotics by native Sevillian Spanish speakers in a real and nonce word imitation tasks were compared with the findings on the production of Mexican assibilated rhotics by native English-speaking participants in auditory only and auditory-orthographic conditions, previously reported in Rafat (2015). Similarly to Rafat (2015), only a small percentage of assibilated rhotics were actually produced as assibilated rhotics by Andalusian Spanish-speaking participants when imitating Ecuadorian Spanish (Ruiz-Peña et al., 2018). Moreover, assibilated rhotics in the real word imitation task in the D2 context were mainly realized as rhotics in the D2 context, as in the auditory-orthographic condition in the L2 study by Rafat (2015). However, in the nonce word imitation task in the D2 context, assibilated rhotics were mainly produced as sibilants by the native L2 learners in the auditory-only group in Rafat (2015). It was concluded that at the onset of acquisition, D2 and L2 acquisition for the most part appear to operate in a similar manner, where assimilated rhotics may be categorized as a ‘similar’ sound in Flege’s (1995) terms and may be mapped on to their nearest L1 category due to equivalence classification.

A length contrast between singleton (short) and geminate (long) consonants is observed in Standard Italian (e.g., /sete/ ‘thirst’ vs. /setːe/ ‘seven’) (Payne, 2005). Gemination also exists in Cuban Spanish varieties, although it has been described as allophonic only and as a result of an assimilatory process (Carlson, 2011). This said, the assimilation process can result in minimal pairs such as /parəto/ [pat:o] ‘birth’ and /patəto/ [pato] ‘duck’ in this variety of Spanish. Moreover, gemination is not generally considered to be a phonological feature of Spanish. This is despite the fact that a length contrast exists between the tap and the trill (e.g., perro /pero/ ‘dog’ vs. pero /pero/ ‘but’) in all varieties of Spanish, even when trilling is absent (see Colantoni & Rafat, 2013). Geminate acquisition has been studied from various perspectives such as child acquisition (Khattab & Al-Tamimi, 2015), L2 speech learning (Motohashi-Saigo & Hardison, 2009; Sorianello, 2014), and in heritage and attrited speakers (Celata
With respect to L2 speech learning, previous studies provide evidence for non-native like rate of geminate production (Sorianello, 2014) and/or non-target-like geminate productions (Mah & Archibald, 2003; Sorianello, 2014).

The current study has two aims. First, it will investigate whether imitating geminates (long sounds) is easier in an L2 or a D2 context. Specifically, it will examine the imitation of Standard Italian and Havana Cuban Spanish (here on referred to as Cuban Spanish) by native Colombian Spanish-speaking participants. Second, it will examine the role of salience (length) in geminate imitation in both contexts. That salience plays a role in L2 speech learning is well known (Colantoni & Steele, 2008; Flege, 1995; Rafat, 2011; 2015). Flege’s Speech Learning Model postulates that a larger acoustic-phonetic distance between the first language (L1) and L2 sounds would result in the establishment of a new category. The absence of a large acoustic-phonetic distance between L1 and the L2 sounds would lead to equivalence classification, where the L2 sound would be mapped on to its nearest L1 category. The role of salience has also been examined in D2 studies that have focused on phonetic accommodation (Babel, 2010; MacLeod, 2012) and there is generally consensus that length is an inherently salient acoustic property of sounds and may also be salient to Spanish-speaking learners (e.g., Escudero, 2001).

Research questions and predictions

The research questions in this study are as follows: (1) Will participants be able to imitate geminates in the L2 and D2 conditions? (2) Does language modulate the degree of target-like productions? Specifically, will it be easier to learn geminates in an L2 (Standard Italian) or a D2 (Cuban Spanish) context? And (3) Does salience (length) affect D2 and L2 geminate imitation?

It is predicted that geminate imitation will pose difficulty (e.g., Giannini, 2003; Mah & Archibald, 2003; Sorianello, 2014) for the participants in both the L2 and D2 conditions (H1). Based on Ruiz-Peña et al., (2018), it is also predicted that geminate imitation will be equally difficult in both the L2 and D2 conditions, at the onset of acquisition in native participants (H2). Because length is salient (e.g., Escudero, 2001) longer geminates will be more salient than shorter ones, and thus easier to imitate in both the L2 and D2 conditions.

Method

Participants

Participants were 3 male and 7 female Colombian Spanish-speakers, who were all educated and lived in Ontario, Canada. Their ages ranged between 21 and 43 years old (mean age = 35). None of the participants had previous contact with the Italian language, and they had very little contact with the Cuban variety of Spanish.

Procedures

Participants performed an imitation task in both the L2 and D2 and completed a language background and a language attitude questionnaire. These tasks were completed within a single experiment session, which lasted two hours and thirty minutes. Participants received a brief training session that lasted 15 minutes prior to the start of the main task. Training consisted of telling the participant to listen to the carrier sentences, pay attention to the target words carefully and imitate the target words as closely as possible while repeating the entire carrier phrases. The carrier phrase in Italian was Dico ______ un’altra volta ‘I say ______ once again’ and in Spanish Digo ______ una y otra vez ‘I say ______ once and again’. We used Praat to manipulate the duration of geminates of the 90 target stimuli (both the Italian and Cuban Spanish) and created 6 different conditions (see Table 1).

Both the training and the main task were done via PowerPoint. The instructions were also the same in both the training and the main task. In each condition, 45 words were presented individually using the
Spanish and Italian carrier phrases. Participants were auditorily presented with each phrase three times in a row, before they had to imitate them. The inter-stimuli interval was 3 seconds and participants were told to imitate them immediately after the third presentation of each phrase.

Table 1. Description of the six conditions in the experiment: Short L2, unaltered L2, long L2, short D2, unaltered D2 and long D2

<table>
<thead>
<tr>
<th>Condition</th>
<th>Geminate length manipulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short L2 (Standard Italian)</td>
<td>Minimum length of Cuban Spanish tokens</td>
</tr>
<tr>
<td>Unaltered L2 (Standard Italian)</td>
<td>Natural length in Standard Italian</td>
</tr>
<tr>
<td>Long L2 (Standard Italian) Long</td>
<td>Maximum length of Cuban Spanish tokens</td>
</tr>
<tr>
<td>Short D2 (Cuban Spanish)</td>
<td>Minimum length of Standard Italian</td>
</tr>
<tr>
<td>Unaltered Cuban Spanish</td>
<td>Natural length in Cuban Spanish</td>
</tr>
<tr>
<td>Long D2 (Cuban Spanish)</td>
<td>Maximum length of Standard Italian</td>
</tr>
</tbody>
</table>

Stimuli
The stimuli consisted of 45 Spanish real words, and 45 Italian real words that were first produced in Standard Italian and Cuban Spanish and were then manipulated for length to create short, and long geminates in addition to unaltered geminates. The stimuli contained 9 different geminate sounds including voiced and voiceless stops ([bː dː gː] and [pː tː kː], respectively), and sonorants ([mː lː nː]) in both Cuban Spanish and Standard Italian. All target words were controlled for position and stress, number of syllables, and the previous vowel. Geminates were included inter-vocally in an unstressed position preceded by the vowel [a] in disyllabic words (e.g., Cuban Spanish ['abːa'] (/alba/ in Spanish), Standard Italian ['sabːa']).

Data analysis and results

Analysis procedure
8100 tokens were produced by the participants. Consonant duration in these tokens together with those used for the recordings (270 Standard Italian words and 270 Havana Spanish Cuban words) were analyzed both auditorily and acoustically using Praat and were compared.

Mean geminate duration of participants’ productions were calculated per token, per condition. To assess error magnitude between duration of the stimulus and the participants’ actual production for each geminate, the Euclidean distance between the 5 tokens (each consonant had 5 tokens) was calculated in SPSS. This resulted in a single, non-directional dissimilarity variable for each consonant, in each of the 6 listening conditions. Next, a 2x3x9, mixed-model ANOVA was conducted with Language (Cuban Spanish (D2) or Italian (L2)), duration condition (short, unaltered, long), and consonant ([b p d t g k l n m]) as factors. A Greenhouse-Geisser correction was applied to all comparisons to account for violations of assumptions of sphericity. Follow-up hierarchical regressions were run including all independent variables associated with significant main effects.

Analysis of variance results
Figure 1 shows that geminates were not produced in a target-like manner. For the most part, there was evidence of undershoot, but there was also some evidence of overshoot/hyper-articulation in the ‘short’ and ‘unaltered’ conditions. The three-way ANOVA with factors of language, duration condition, and consonant was conducted to measure the impact of each on how well a participant was able to replicate geminate duration (Figure 5). A main effect of language was found, such that errors were greater with L2 than with D2 (F(1,9) = 1,707.22, p < 0.001, ηp² = 0.99). Second, a main effect of duration condition was observed, such that greater errors were observed with longer geminate durations (F(2,18) = 176.94, p < 0.001, ηp² = 0.95). Third, a main effect of consonant was observed, with different consonants being associated with varying degrees of error magnitude (F(8,72) = 60.50, p < 0.001, ηp² = 0.87). All two-way interactions within the three-way ANOVA were also significant.
A language-by-duration condition interaction was observed, such that the greatest differences in error magnitude between languages was observed in the unaltered condition, and with differences in error magnitude being smallest with longer durations (Figure 2; F(2,18) = 17.44, p = 0.002, ηp² = 0.66). Likewise, significant language-by-consonant (F(8,72) = 48.13, p < 0.000, ηp² = 0.84) and duration-by-consonant (F(16,144) = 32.07, p < 0.001, ηp² = 0.78) interactions were observed. Effects of language and duration condition for each consonant individually can be seen in Figure 3.

Figure 1. Durations of geminate production. Mean token durations for each geminate produced by the native speaker of Italian and Spanish are depicted as black columns. Mean duration of participants’ productions are depicted as grey lines, with each individual’s mean duration depicted as a grey circle. L2 refers to Italian, a second language, and D2 refers to Cuban Spanish, a second dialect.

Figure 2. Mean error rate across conditions. Magnitude of duration errors increased in longer-duration conditions, across languages and averages across consonants. L2 refers to Italian, a second language, and D2 refers to Cuban Spanish, a second dialect. Error bars represent standard error of the mean.

Figure 3. Error rates of individual consonants across conditions. L2 refers to Italian, a second language, and D2 refers to Cuban Spanish, a second dialect. Error bars represent standard error of the mean.
**Hierarchical regression results**

To explore whether our three variables of interest accounted for distinct portions of the variance within the dependent measure, we conducted a 2-step hierarchical regression. The first model included individual participants as predictors to control for any between-subject differences. The second model added language, duration condition, and consonant into the model to test for experimental effects. The first model, which controlled for individual differences, was not significant, though it trended towards significance (p = 0.062). The second model was significant overall (p < 0.001), and revealed that duration condition significantly predicted magnitude of error (t = 16.49, p < 0.001, r\text{partial} = 0.58), and the consonant presented was also a significant predictor (t = -6.34, p < 0.001, r\text{partial} = -0.26). Importantly, language was not a significant predictor when also accounting for duration condition and consonant (t = -0.17, p = 0.87, r\text{partial} = -0.006) See Table 2 for detailed statistics.

| Step 1: R = 0.05, F-change(1,538) = 1.09, p-change = 0.30 |
|----------------|------------------|
| Subject        | -0.05            | 0.30             |

| Step 2: R = 0.61, F-change (3,535) = 104.10, p-change < 0.001 |
|----------------|------------------|
| Subject        | -0.06            | 0.06             |
| Language       | -0.007           | 0.92             |
| Duration Condition | 0.58          | <0.001           |
| Consonant      | -0.21            | <0.001           |

Significant results of added predictors are shown in **bold**.

While both consonant and duration condition were significantly predictive of error magnitude in the above hierarchical regression, it should also be noted that different consonants naturally have different absolute durations. To parse these effects, a second hierarchical regression was conducted using the absolute duration (as opposed to duration condition). This regression included three models. The first model consisted of the individual participant to account for individual differences, the second added the consonant independent variable, and the third model added the absolute duration of the presented token, to explore whether absolute duration accounted for additional variance above and beyond that accounted for by the specific consonant. This analysis (see Table 3) suggests that the absolute duration of tokens is the primary predictor of error magnitude, uniquely accounting for 21% of the variance in error magnitude, with consonant only uniquely accounting for 0.6% of variance.

| Step 1: R = 0.045, F-change(1,538) = 1.09, p-change = 0.30 |
|----------------|------------------|
| Subject        | -0.05            | 0.30             |

| Step 2: R = 0.22, F-change (1,537) = 26.78, p-change < 0.001 |
|----------------|------------------|
| Subject        | -0.05            | 0.29             |
| Consonant      | -0.22            | <0.001           |

| Step 3: R = 0.50, F-change (1,536) = 140.73, p-change < 0.001 |
|----------------|------------------|
| Subject        | -0.03            | 0.51             |
| Consonant      | 0.24             | <0.001           |
| Absolute Duration | 0.46          | <0.001           |

Significant results of added predictors are shown in **bold**.

This relationship is visually depicted Figure 4A for all trials, and separated by individual consonants in Figure 4B.
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Discussion

We had predicted that geminates would be difficult to imitate. This hypothesis was not born out with respect to the rate of geminate production, but it was born out with respect to the degree of target-like productions (accurate length imitation) from an acoustic point of view. The fact that the participants were able to produce geminates, albeit not in a target-like manner, might be due to two factors. First, there is a short-long rhotic contrast in all varieties of Spanish, which may be aiding the participants with the imitation of the geminates sounds in general. The rhotic contrast has traditionally been described as the tap-trill contrast (e.g., Hualde, 2005), but it also exists as a length contrast in some (Andean) varieties of Spanish (Colantoni & Rafat, 2013). It might be that learners are able to apply an existing L1 phonological/phonetic feature to new sounds in an L2 or D2 context. Previous studies have also shown that Spanish-speaking participants are sensitive to length (e.g., Bion, Miyazawa, Kikuchi, & Mazuka, 2013; Escudero, 2001). It is also worth noting that the participants in this study are from mainland Colombia, who reported they had never been in contact with Cuban Spanish before.

However, coastal varieties of Colombian Spanish, such as some varieties from the provinces of Bolivar, Cordoba, and Sucre are very similar to Cuban Spanish, and exhibit gemination. Costal varieties are stigmatized in Colombia and it is possible that our participants were familiar with these varieties or their imitation in media, at least at the perceptual level. We had also predicted that geminates would be equally difficult to imitate in both the L2 and D2 conditions. This hypothesis was born out because the rate of geminate production was the same in both contexts. Moreover, when we looked at the dissimilarity matrices between the L1 and the D2 and L2 productions, although there was a language effect, the results of the regression analysis suggested that length was the main predictor of non-targetlikeness. However, the direction of the effect of length/salience was opposite to what we had initially predicted. This suggests that there might be a trade-off between acoustic salience and ease of imitation in naive learners. This might be because what may make a sound inherently more salient, may also require more articulatory efforts and/or planning, leading to a difficulty in imitation/production. In the case of acoustic cues, the feature/acoustic attribute ‘long’ is more difficult to maintain/produce. The hypo- and hyper-articulation patterns of imitation attested here also support this proposal. Whereas there was evidence of both hypo- and hyper-articulation with the short and unaltered conditions (more so with the former than the latter), there was no evidence of hyper-articulation in the long (very salient) condition.

The analysis put forth in this paper sheds light on our understanding of the D2 and L2 speech learning at the onset of acquisition, as we have shown that the participants are able to produce geminates in both contexts, albeit their productions are not acoustically target-like. We have also provided evidence...
that challenges one of the most important predictions of the Speech Learning Model and highlighted the complexity of the role of salience (length) in L2 and D2 production.

References


