

Palatalization of Alveolar Stops by Portuguese L2ers

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Abstract

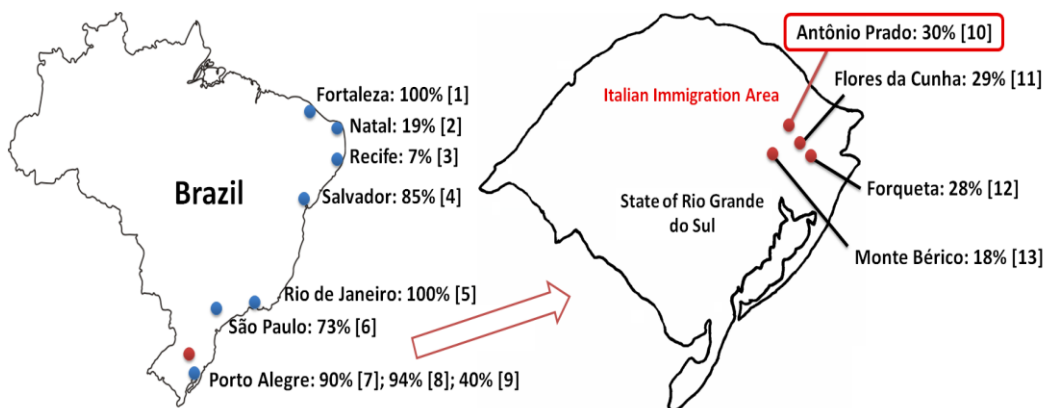
Palatalization of /t d/ before a front high vowel ([i]) is a variable phenomenon in the Portuguese dialect spoken in the Italian Immigration Area (IIA) in Brazil. This study aimed to (a) verify which variables condition palatalization in the speech of L2ers who have learned Portuguese in the IIA, (b) compare L2ers' production results to the factorial typology of palatalization for IIA natives (Battisti & Dornelles Filho, 2010), and (c) assess the learners' perception of differences between the local variety and other BP varieties. We observed that (a) some of the factors that condition the phenomenon in the IIA area also favor palatalization in L2ers' speech (underlying /i/ and preceding vowel), (b) students fit into one of the two palatalization patterns found in the IIA, and (c) they seem to be aware of differences between the IIA and other Brazilian Portuguese dialects.

Palatalization of /t d/ before a front high vowel ([i]) is a variable phenomenon in some Brazilian Portuguese (henceforth BP) dialects. The front high vowel that triggers palatalization may be an underlying /i/ or a (usually) final /e/ which has undergone vowel raising. In bilingual areas such as the Italian Immigration Area (IIA) in the state of Rio Grande do Sul, palatalization occurs less frequently than in most metropolitan areas

in Brazil (Battisti & Guzzo, 2009). In the IIA, final vowel raising is also a variable phenomenon (Roveda, 1998). The following examples show the possible variants regarding palatalization and vowel raising in the IIA. In this area, palatalization is more frequent whenever the vowel is an underlying /i/ (Battisti et al., 2007; Mauri, 2008).

[1] underlying /i/	underlying /e/
men'tira~men'tjira (<i>lie n</i>)	'zente~'zenti~'zentʃi (<i>people</i>)
'dia~'dʒia (<i>day</i>)	si'dade~si'dadi~si'dadʒi (<i>city</i>)

The following map shows the rates of palatalization in some metropolitan areas of Brazil and in the IIA.



[1] Cristóforo Silva et al., 2012; [2] Cristóforo Silva et al., 2012; [3] Abaurre & Pagotto, 2002; [4] A&P, 2002; [5] A&P, 2002; [6] A&P, 2002; [7] Bisol, 1991 (apud B&G, 2009); [8] Kamianecy, 2002 (apud B&G, 2009); [9] A&P, 2002; [10] Battisti et al., 2007; [11] Battisti, 2011; [12] Mauri, 2008; [13] Bisol, 1991 (apud B&G, 2009).

Figure 1. Distribution of palatalization in metropolitan areas and in the IIA.

The main objective of this pilot study is to verify whether L2ers of BP who have been learning the language in the IIA acquire the palatalization patterns which are predominant in the area (more palatalization with an underlying /i/, less palatalization with an underlying /e/). This study, thus, aims to (a) verify which variables condition palatalization in the speech of L2ers, (b) compare L2ers' production results to the factorial typology of palatalization in the IIA (Battisti & Dornelles Filho, 2010), and (c) perform a content analysis based on learners' answers to questions about their own learning process and their perception of differences between the local variety and other BP varieties, in order to assess how conscious they are of the local "way of speaking". As palatalization is not a subtle phenomenon, it is expected that L2ers are conscious of both its low frequency in the IIA

dialect and the fact that it is predominant with underlying /i/ but not with underlying /e/. Also, it is expected that learners who are aware of differences between dialects (IIA *versus* metropolitan dialects) may adjust their pronunciation to conform to one of them.

This paper is organized as follows: section 2 describes the methodology adopted in this study, and section 3 presents and discusses the results. Finally, in section 4 we present the final remarks and some guidelines for future research.

METHODOLOGY

Five BP L2ers who had been living in the area of Antonio Prado, a town in the IIA, were interviewed in a semi-controlled fashion. The interview contained three main conversation topics: a) why the learners decided to go to Brazil and learn Portuguese; b) what they think about living in Brazil, and differences between Brazil and their home countries; and c) what they think about their own learning process and the differences between the BP variety spoken in the area where they live and other areas in Brazil¹.

The participants were Thai (n=2), Italian (n=2) and German (n=1). All of them were in Brazil in a high school exchange program and learned Portuguese in the IIA —except for one (Italian), who started learning Portuguese in the city of Natal (see figure 1), where palatalization is even less frequent than in the IIA. One of the Thai students had already returned to her home country by the time the interview was performed. Two of the learners (Italian and Thai) were in Brazil for eleven months, two (Italian and German) for about eight months, and one (Thai) for about three months.

This pilot study used three different procedures, one for each of the objectives listed in the introduction. A **variable rule analysis** (Labov, 1972) was performed to verify the factors that influence palatalization among L2ers; the results of the students' production was compared to the **factorial typology** developed by Battisti & Dornelles Filho (2010) for palatalization in the IIA in order to check for similarities with the patterns found for native speakers; and a **content analysis** was performed as a way to perceive how aware the L2ers were of their own pronunciation and the

¹ Since all of the students reported having traveled to other parts of Brazil and having the habit of watching TV while they were in the country, they had no difficulties talking about this subject.

differences in palatalization due to dialectal variation. These procedures are described in the following subsections.

Variable Rule Analysis

Contexts of palatalization were taken from the interviews and submitted to GoldVarb X (Sankoff, Tagliamonte & Smith, 2005) for a variable rule analysis. These contexts were analyzed according to the linguistic and social variables presented in the chart below. The dependent variable was the palatalization of alveolar stops by BP L2ers.

Linguistic variables	
<i>Type of vowel</i> /i/ - 'tia (aunt), 'dia (day) /e/ - 'zente (people), si'dade (city)	<i>Type of syllable regarding stress</i> unstressed – 'zente, ti'rar (take) stressed – men'tira (lie n), 'tipo (type)
<i>Type of consonant</i> /t/ - 'tia, 'zente /d/ - 'dia, si'dade	<i>Preceding context</i> pause - ____ de'pois (after) vowel – si'dade nasal – 'zente sibilant – 'dezde (since) liquid – partiku'lar (particular)
<i>Position of the syllable in the word</i> initial – 'tia, 'dia medial – men'tira, a'tira (throw) final – 'zente, deci'diu (decided) clitic – de ma'ñã (in the morning)	<i>Following context</i> pause – si'dade ____ vowel – de in'gles (of English) stop – partiku'lar nasal – kontinu'ar (continue) fricative – di'fisil (difficult) liquid – di'reto (direct)
Extralinguistic variables	
<i>Situation of the student</i> in Brazil back in home country	<i>First language</i> indo-european, romance indo-european, non-romance non-indo-european

Figure 2. Independent variables.

The question that we sought to answer through this procedure was: *Is palatalization among BP L2ers conditioned by /i/, /t/ and unstressed syllables, as it is for native speakers in the IIA (Battisti et al., 2007; Mauri, 2008)?* Although the most relevant variables in conditioning palatalization among IIA speakers seem to be *type of vowel*, *type of consonant* and *type of syllable regarding stress*, other variables may play a role in the production of palatalization by non-native speakers. It may be the case that learners

perceive a certain syllable as more prominent, or that the articulation of palatalization is easier due to the presence of certain sounds in the surroundings of the alveolar stop and the trigger vowel. It may also be the case that, due to their current location or to the similarities/differences between their first language and BP, some speakers exhibit a certain pronunciation pattern. The independent variables were set up considering these possibilities.

Factorial Typology

Through implicational generalizations, Battisti & Dornelles Filho (2010) developed a *t-ordered* factorial typology for palatalization in the IIA. In the IIA area, more specifically in the town of Antonio Prado, palatalization follows two out of five possible patterns: (a) palatalization is absent ([ti]a, [di]a, ʒen[te], sida[de]), or (b) it only occurs with /i/ ([tʃi]a, [dʒi]a, ʒen[te], sida[de]). There are two generalizations that are applicable to these patterns: (i) if palatalization occurs with /e/, then it also occurs with /i/, and (b) if palatalization occurs with /d/, then it also occurs with /t/. Battisti & Dornelles Filho (2010) also observed that the phenomenon is variable between speakers, but not within speakers.

In order to verify if the BP L2ers could access these generalizations and thus follow one of these patterns, we measured (a) the production of palatalization individually, and (b) the frequency of palatalization with /i/, /e/, /t/, and /d/ individually and among all participants. By doing so, we could notice whether the learners fall into one of the palatalization patterns assigned for the IIA and whether variation is present only between speakers.

This step in the procedure, then, aimed to answer the question *Does palatalization among BP L2ers follow the patterns verified by Battisti & Dornelles Filho (2010) for native speakers of the IIA?* We expected that students could either follow one of the patterns attested for the IIA or adopt the most common pattern in metropolitan areas of the country, which is palatalization with both /i/ and /e/.

Content Analysis

The questions that were part of the interview were elaborated so as to yield answers that demonstrated how conscious the learners were of their own pronunciation and of dialectal differences in BP. The interview also

approached the students' perception regarding their own difficulties in learning the language and how they felt about dialectal differences.

This part of the procedure attempted to answer the following questions: *Do BP L2ers perceive dialectal differences between the IIA and other areas in Brazil? Do they notice what their own pronunciation is like (especially concerning palatalization)?* We expected that their answers to these questions would be related to their palatalization patterns, in the sense that their consciousness about the phenomenon could influence their adoption of a particular pattern.

RESULTS

730 contexts of palatalization were obtained, and the rule applied in 269 (36.8%) of them. This percentage is slightly higher than those found among IIA native speakers (see figure 1). The following subsections describe the results for each of the procedures adopted in this study.

Results of the Variable Rule Analysis

Three runs were performed using the software GoldVarb X. On the third run, the distribution of factors in some variables was slightly modified. As some factors did not have a significant number of contexts, some amalgamations were necessary (initial and medial position in the variable *position of the syllable in the word*, nasal and liquid in *preceding context*, and nasal and liquid in *following context*). Because the number of data was insufficient to differentiate groups of learners, the extralinguistic variables were excluded from the analysis.

The following variables were considered significant by the software: *type of vowel*, *type of syllable regarding stress*, *position of the syllable in the word*, and *preceding context*. Two variables were eliminated by GoldVarb: *following context*, and *type of consonant*, since the factors that composed them were considered neutral.

Table 1 shows the results for the variable *type of vowel*:

Table 1. Type of vowel

Factor	Contexts	Percentage	Relative Weight
/i/	235/318	73.9	0.845
/e/	34/412	8.3	0.213
<i>TOTAL</i>	269/730	36.8	-

Input 0.286

Significance 0.012

In *type of vowel*, the factor /i/ (in words like *tipo* ‘type’ and *dia* ‘day’) is considered significant, whereas /e/ (in words like *zente* ‘people’ and *cidade* ‘city’) is not. This result is similar to what was observed among native IIA speakers: palatalization is conditioned by an underlying /i/, but not by an underlying /e/ (Battisti et al., 2007; Mauri, 2008). This may be due to the fact that /e/ in word-final, post-alveolar stop position tends not to undergo vowel raising in the IIA dialect (Roveda, 1998). Thus, regarding the underlying quality of the vowel that triggers palatalization, the same conditioning factor can be observed for both natives and non-natives.

In *type of syllable regarding stress*, the factor *stressed* was considered significant, as shown in table 2:

Table 2. Type of syllable regarding stress

Factor	Contexts	Percentage	Relative Weight
Stressed	152/177	85.9	0.738
Unstressed	117/553	21.2	0.418
<i>TOTAL</i>	269/730	36.8	-

Input 0.286

Significance 0.012

Palatalization, thus, would be more likely in stressed syllables (in words like *dia* ‘day’ and *tipo* ‘type’) than in unstressed syllables (in words like *partiku’lar* ‘particular’ and *di’fisil* ‘difficult’). Among native speakers of the IIA, the factor *unstressed* was considered relevant (Mauri, 2008).

The result for this variable can be associated with the results for *type of vowel* and *position of the syllable in the word*. As vowel raising occurs only in unstressed position, palatalization in stressed syllables can only apply if the syllable has an underlying /i/. Therefore, we would expect that the conditioning factor in the variable *position of the syllable in the word* would be initial/medial, since in final or clitic position the vast majority of contexts present an underlying /e/. However, the factor that was assigned a significant relative weight in this variable was *final*, as can be seen in table 3.

Table 3. Position of the syllable in the word

Factor	Contexts	Percentage	Relative Weight
Final	66/289	22.8	0.677
Initial/medial	198/304	65.1	0.418
Clitic	5/137	3.6	0.303
<i>TOTAL</i>	<i>269/730</i>	<i>36.8</i>	<i>-</i>

Input 0.276

Significance 0.000

In this variable, however, the percentage of rule application does not correspond linearly to the relative weight of the factors. This discrepancy between percentage and relative weight is due to the interaction between *position of the syllable in the word* and other variables. Considering this variable in isolation, the relative weight that the software assigned to the factor *initial/medial* was 0.812. In the IIA, however, this variable was not relevant (Battisti et al., 2007; Mauri, 2008).

The other variable that was selected by GoldVarb was *preceding context*. In this case, *pause* and *vowel* were the significant conditioning factors. Table 4 shows these results:

Table 4. Preceding context

Factor	Contexts	Percentage	Relative Weight
Pause	46/83	55.4	0.670
Vowel	124/322	38.5	0.563
Sonorant (nasal/liquid)	72/254	28.3	0.396
Sibilant	27/71	38	0.385
<i>TOTAL</i>	<i>269/730</i>	<i>36.8</i>	<i>-</i>

Input 0.286

Significance 0.012

Thus, contexts with a preceding pause (like in *tipo* 'type' and *dia* 'day') or vowel (like in *kada tipo* 'each type' or *cidade* 'city') are more likely to favor palatalization, whereas sonorants (like in *gente* 'people' and *partikular* 'particular') and sibilants (like in *desde* 'since') do not condition it. In the IIA, *preceding central vowel* was regarded as a significant factor (Mauri, 2008).

The following figure shows the factors with higher relative weight and those with higher percentage of rule application.

Factor	Relative Weight	Factor	Frequency
/i/	0.845	stressed syllable	85.9%
stressed syllable	0.738	/i/	73.9%
final syllable	0.677	initial/medial syllable	65.1%
pause in preceding context	0.670	pause in preceding context	55.4%
vowel in preceding context	0.563		

Figure 3. Factors with higher relative weight and frequency.P

The results indicate that palatalization in L2ers' speech is conditioned by some of the same factors shown to condition the native speakers' production (*underlying /i/, preceding vowel*). In the following subsection, the patterns of palatalization among L2ers will be compared to the results of Battisti & Dornelles Filho's (2010) factorial typology for palatalization in the IIA, in order to verify if the phenomenon follows the same patterns with both groups of speakers.

Results of the Factorial Typology

Based on the results for frequency of palatalization obtained through the variable rule analysis, it is possible to compare the palatalization patterns found in the IIA by Battisti & Dornelles Filho (2010) with those of the non-native speakers. As shown in the previous subsection, palatalization among BP L2ers is more frequent with /i/ (73.9%) than with /e/ (8.3%). This is consistent with what the authors verified for native speakers in the IIA. Likewise, palatalization in L2ers' production is more frequent with /t/ (41.9%) than with /d/ (33.3%)². Thus, the generalizations applied to the phenomenon in the IIA also seem to apply to the speech of L2ers.

Figure 4 summarizes the individual rates of palatalization. Figures 5 and 6 show the variables taken into account by Battisti & Dornelles Filho (2010) for the generalizations of the phenomenon in the IIA, namely, *type of vowel* and *type of consonant*.

² However, *type of consonant* was not considered by the software as a significant variable.

Speaker	Total percentage of palatalization
1 (Italian)	42.76% (62/145)
2 (Italian)	1.16% (2/172)
3 (Thai)	29.63% (16/54)
4 (Thai)	40.87% (47/115)
5 (German)	58.2% (142/244)

Figure 4. Individual rates of palatalization.

Speaker	Palat. with /i/ (%)	% in speaker's total frequency	Palat. with /e/ (%)	% in speaker's total frequency
1	98.3	40	4.65	2.76
2	1.67	0.58	0.90	0.58
3	66.67	22.22	11.11	7.41
4	66.67	26.09	24.29	14.78
5	98.53	54.91	7.41	3.28

Figure 5. Individual rates of palatalization considering *type of vowel*.

Speaker	Palat. with /t/ (%)	% in speaker's total frequency	Palat. with /d/ (%)	% in speaker's total frequency
1	46.81	15.17	40.81	27.59
2	2.9	1.16	0	0
3	36.36	7.41	27.91	22.22
4	37.5	18.26	44.07	22.61
5	66.09	31.15	51.16	27.05

Figure 6. Individual rates of palatalization considering *type of consonant*.

Figures 4-6 show that BP L2ers fall into one of the two patterns found by Battisti & Dornelles (2010) for palatalization in the IIA. Speaker 2, with only two contexts of rule application, belongs to the first pattern (palatalization is absent), whereas speakers 1, 3, 4, and 5 belong to the second pattern (palatalization occurs with /i/, but not with /e/). Although speakers 1 and 3-5 show some rate of palatalization with /e/, it is always considerably lower than the rate for palatalization with /i/ (figure 5).

Regarding the type of consonant involved in the process (figure 6), speakers 1, 3, and 5 show a higher rate of palatalization with /t/ than with /d/. This corresponds to one of the generalizations proposed by Battisti & Dornelles Filho (2010) for the IIA: if palatalization occurs with /d/, then it

also occurs with /t/. Considering palatalization with /t/ and /d/ for each speaker's total frequency, palatalization with /d/ seems to be more frequent than palatalization with /t/ (speakers 1, 3 and 4). However, this should be due to the fact that there were more contexts with /d/ in the data than with /t/.

There seems to be variation within-speaker variation in the production of palatalization by the Thai participants (3 and 4). Although they present a high percentage of palatalization with /i/, it is not as high as the frequency verified for speakers 1 and 5. The Thai speakers also show a higher rate of palatalization with /e/. Contrary to what happens with native IIA speakers, there may be variation within speakers in BP L2ers' speech.

In general, the production of palatalization by BP L2ers seems to follow the patterns attributed to the phenomenon in the IIA and fit into the generalizations regarding *type of vowel* and *type of consonant*.

Results of the Content Analysis

The learners' answers to the interview questions showed that, except for speaker 3, who had been in the country for only three months, they are all aware of dialectal differences between the IIA and other areas of Brazil. When asked what these differences are, speakers 1, 2, and 4 pointed out palatalization, among other things. These learners are aware of the fact that palatalization is more frequent in other parts of the country³, but the only difference that these participants reported regarding this phenomenon is related to the application of the process with /e/. In their opinion, speakers from the IIA do not palatalize when there is an /e/ in word-final position, whereas speakers from other areas of the country do. None of the examples of differences in palatalization that the BP L2ers mentioned had an underlying /i/.

Two learners also commented on their own pronunciation. Speaker 1 claimed that he noticed palatalization is more frequent in other areas of the country, but that he had chosen to produce it according to the pattern that he found more common in the IIA. Speaker 1 fits in the pattern where palatalization occurs with /i/, but not with /e/.

Speaker 2, who started learning Portuguese in Natal, a metropolitan area where palatalization is less frequent than in the IIA (see figure 1),

³ The learners did not identify palatalization by its name. Instead, they referred to this dialectal difference using several versions of the following sentence: *Here people say 'zente, but in some places people say 'zentfi.*

said that she could also perceive differences between the IIA and Natal dialects. She also claimed that she had chosen to maintain some characteristics that related either to one dialect or the other. Although she adopted the pattern that is related to the rural areas in the IIA (i.e. absent palatalization), she did not perceive her speech as very different from the IIA speakers'.

The fact that the learners realize differences in palatalization suggests that this is not a subtle phenomenon in BP. The participants that seemed to be conscious of palatalization in distinct areas of the country are also those that reported having chosen a particular type of pronunciation. Although two of the students did not mention palatalization as a factor of dialectal differentiation between the IIA and other areas, the fact that they follow one of the palatalization patterns assigned to the IIA indicates that they, too, may be aware of the conditioning factors of the phenomenon.

FINAL REMARKS

BP L2ers who learned Portuguese in the IIA seem to acquire palatalization with patterns that are similar to native ones. The variable rule analysis showed that palatalization among L2ers is conditioned by the factors *underlying /i/, stressed syllable, final syllable* and *pause or vowel in the preceding context*. However, the factor that had the highest percentage in the variable *position of the syllable in the word* was not *final syllable*, but *initial/medial syllable*. The mismatch between frequency and relative weight, in this case, can be attributed to the interaction among variables. The factors *underlying /i/* and *preceding vowel* were also shown to condition palatalization in native IIA speech (Battisti et al., 2007; Mauri, 2008).

Regarding the comparison between L2ers' and native IIA speakers' production, the same generalizations can be drawn for both groups. Among L2ers, as it happens with native IIA speakers, palatalization is either absent or applied predominantly with underlying /i/. Moreover, palatalization by L2ers is also more frequent with /t/ than it is with /d/, as observed in native IIA speech.

The participants' answers to specific questions about their own learning process demonstrated that palatalization is perceived by them as a phenomenon that differentiates dialects in Brazil. The learners seem to have different degrees of consciousness regarding palatalization. However, the fact that all of them fit into one of the IIA's palatalization patterns suggests that they may be able to adjust their own speech (at least as far as palatalization is concerned) so that it sounds similar to the IIA's.

As this is a preliminary study, this work has several limitations. An analysis with data from more participants will be able to determine whether the conditioning factors and the generalizations derived through factorial typology are indeed similar for both native IIA speakers and BP L2ers who have learned Portuguese in this area. This is precisely the future step of this research.

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