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Palatalisation in Brazilian Portuguese*

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Introduction

This paper aims to discuss the process of palatalisation of the alveolar stops /t/ and /d/ in Brazilian Portuguese. The analysis is based on the Government Phonology framework (Kaye, Lowenstamm and Vergnaud 1985, 1990; Kaye 1989, 1990a; Charette 1989, 1990a, 1991; Brockhaus 1995b). I first present and discuss some relevant theoretical issues and then I proceed with the analysis of Brazilian Portuguese. I propose that palatalisation is better understood as the spreading of the element *I*. The constraints which are imposed on spreading within licensing domains regulate the precise manifestation of the palatalisation process in various dialects of Brazilian Portuguese.

1 Licensing domains in Government Phonology

In (1) I present the licensing domains assumed by Government Phonology. Each licensing domain has a licensor and a licensee. In the representations in (1) the licensing domains are within brackets and the licensor is underlined. The constituents are "O" (onset), "R" (rhyme), and "N" (nucleus).

(1) a. 

b. 

c. 

d. O R e. O R

N N

× [× ×] [× ×] ×

In the onset–rhyme licensing domain in (1a) the nuclear head of the rhyme licenses the preceding onset. The nucleus–rhymal-complement licensing domain in (1b) consists of the licensor, i.e., the nuclear head, and the licensed rhymal complement. In (1c) the (rightmost) onset position licenses the preceding rhymal position in the onset–rhyme licensing domain. In the structure representing a branching nucleus as illustrated in (1d) the left-hand nuclear position licenses the following position in the intranuclear licensing domain. In (1e) the leftmost position of the branching onset licenses the following position in the onset–complement licensing domain.

2 Palatalisation preceding stressed /i/

Given the licensing domains in (1), let us proceed with the analysis of Brazilian Portuguese. The data in (2) illustrates forms in which the alveolar stops /t, d/ are followed by one of the stressed vowels occurring in Portuguese, i.e., /a, e, ɛ, o, ɔ, u/:[1]

(2) /t, d/ followed by stressed /a, e, ɛ, o, ɔ, u/

a.	/t/	*batata*	[baˈtata]	'potato'
		terra	[ˈtɛha]	'earth'
		telha	[ˈteʲa]	'tile'
		toca	[ˈtɔka]	'burrow'
		tolo	[ˈtolu]	'silly'
		túmulo	[ˈtumulu]	'grave'
b.	/d/	*dado*	[ˈdadu]	'dice'
		dela	[ˈdɛla]	'hers'
		cadeira	[kaˈdejra]	'chair'
		dose	[ˈdɔzɪ]	'dose'
		doce	[ˈdosɪ]	'sweet'
		ducha	[ˈduʃa]	'shower'

In fact, in all Brazilian Portuguese dialects the alveolar stops /t, d/ occur consistently followed by any oral or nasal vowel different from /i/. This means that there is no variation regarding the alveolar stops in the data presented in (2). Consider now the examples in (3) which illustrate two distinct dialects of Brazilian Portuguese. Dialect 1 represents speakers from the state of Minas Gerais, and Dialect 2 represents speakers from the state of São Paulo (cf. Cristófaro-Silva 1992).

(3)

			Dialect 1	Dialect 2	
a.	/t/	*prático*	[ˈpratʃiku]	[ˈpratiku]	'practical'
		típico	[ˈtʃipiku]	[ˈtipiku]	'typical'
		tinta	[ˈtʃĩta]	[ˈtĩta]	'paint'
		pote	[ˈpɔtʃi]	[ˈpɔti]	'pot'
		ártico	[ˈahtʃiku]	[ˈahtiku]	'arctic'
b.	/d/	*ódio*	[ˈɔdʒju]	[ˈɔdju]	'hate'
		dívida	[ˈdʒividа]	[ˈdividа]	'debt'
		adjetivo	[adʒiʒɛˈtʃivu]	[adiʒɛˈtivu]	'adjective'
		mandinga	[mãˈdʒĩga]	[mãˈdĩga]	'spell'
		sórdido	[ˈsɔhdʒidu]	[ˈsɔhdidu]	'sordid'

In all the forms for Dialect 1 we have an affricate, /tʃ/ or /dʒ/, preceding the vowel /i/ (oral, nasal or glide) which corresponds to an alveolar stop in Dialect 2. The data in (3) show that Dialect 1 has a process of palatalisation which is triggered when an alveolar stop, i.e., /t/ or /d/, is followed by /i/ (oral, nasal or glide). The alveolar stop is then manifested as an affricate, i.e., /tʃ/ or /dʒ/, respectively.

Before I present my proposal to account for the process illustrated in (3) it is important to mention the internal structure of segments which is assumed within the Government Phonology framework (cf. Kaye, Lowenstamn and Vergnaud 1985; Harris 1990, 1994, [1992] 1997; Harris and Lindsey 1994). Segments are formed by elements. All elements are independent and pronounceable. An element may occur by itself to form a segment or elements may combine in order to form a segment. For the purpose of the present discussion it is relevant to know that the element *I* occurs in the internal representa-

tion of /i/ (oral, nasal or glide). The element *I* is also present in the representation of palatal consonants.

I propose that the process of palatalisation illustrated for Dialect 1 in (3) may be understood as the spreading of the element *I* from a nuclear licensor position into the preceding onset it licenses (1a). This first version of my analysis of the palatalisation process under discussion is given in (4).

(4) Palatalisation of alveolar stops (first version)
Dialect 1: The element *I* spreads from a nuclear licensor into its licensee (['tʃia]);
Dialect 2: No *I*-spreading (['tia]).

In dialects which present forms such as *tia* ['tʃia] 'aunt', we shall not expect to find forms which present sequences of alveolar stops followed by a high vowel such as */ti/, */di/. This is because we expect all forms which present alveolar stops to undergo the process of palatalisation given in (4). I will return to this point in section 3. Let us now examine the data in (5) which present further data from Dialect 1, which I split into Dialect 1a and 1b. Both dialects are from the state of Minas Gerais. The forms given below illustrate variation amongst speakers from this community.

(5) a. No palatalisation of rhymal /s/[2] in Dialect 1a or 1b

		Dialect 1a	Dialect 1b	
/st/	*pasta*	['pasta]	['pasta]	'suitcase'
	costureira	[kostu'rejra]	[kostu'rejra]	'sewing woman'
/zd/	*esdrúxula*	[iz'druʃula]	[iz'druʃula]	'odd'
	prosdócimo	[prɔz'dɔsimu]	[prɔz'dɔsimu]	'(trademark)'

b. Palatalisation of rhymal /s/ in Dialect 1a only

		Dialect 1a	Dialect 1b	
/t/	*haste*	['aʃtʃi]	['astʃi]	'stick'
	rústico	['huʃtʃiku]	['hustʃiku]	'rough'
/d/	*desde*	['deʒdʒi]	['dezdʒi]	'since'
	desdisse	[dʒiʒ'dʒisi]	[diz'dʒisi]	'lie'

In all forms in (5) there is a postvocalic /s/ in rhymal position which may be phonetically manifested as [s] or [ʃ]. For Dialect 1a postvocalic /s/ is palatalised when followed by an affricate (5b).[3] Palatalisation of rhymal /s/ does not apply for Dialect 1b. We have seen that for all speakers of Dialect 1, i.e., 1a or 1b, the process of palatalisation will always affect the alveolar stop so that affricates precede /i/: /tʃi, dʒi/ (3). There is however variation amongst speakers of Dialect 1. Whereas some speakers palatalise /s/ in rhymal position — as illustrated in (5b) — others do not. This means that some speakers have forms such as ['aʃtʃi] (Dialect 1a) whereas others have ['astʃi] (Dialect 1b) instead. In order to account for the behaviour of rhymal /s/ in Dialects 1a and 1b, I rewrite the condition which triggers palatalisation as in (6).

(6) Palatalisation of alveolar stops (second version)
Dialect 1a: The element *I* spreads from a licensor into its adjacent licensee within a domain (['tʃia], ['aʃtʃi]);
Dialect 1b: The element *I* spreads from a nuclear licensor into its adjacent licensee within a domain (['tʃia], ['astʃi]);
Dialect 2: No *I*-spreading (['tia], ['astʃi]).

In Dialect 1a palatalisation is triggered from any licensor position into its licensee within a domain. Thus the element *I* spreads from a nuclear head into its preceding position which is the onset licensed by it (Onset ← Nucleus). The licensed onset is the licensor of the preceding rhymal position (Rhyme ← Onset). Palatalisation applies to the left from the nucleus into the onset and then into the rhyme (Rhyme ← Onset ← Nucleus): ['tʃia], ['aʃtʃi]. In Dialect 1b palatalisation is triggered only from a nuclear head. That is, the element *I* only spreads from a nuclear head into an adjacent licensee within a domain (Onset ← Nucleus), but not from an onset into the preceding postnuclear rhymal position licensed by that onset (Rhyme ↞Onset): ['tʃia], ['astʃi]; *['aʃtʃi]. Thus, in Dialect 1b palatalisation does not

affect the postvocalic /s/ because spreading would not come from a nuclear position.

3 Branching onset reduction

I mentioned above that, based on the analysis presented so far, we should not expect to find forms which present sequences of alveolar stops followed by a high vowel such as */ti/ or */di/ in Dialect 1a (or Dialect 1b, for that matter). This is because we expect all forms which present alveolar stops to undergo the process of palatalisation given in (4) and thus be manifested as [tʃi] and [dʒi]. Consider the examples in (7) which are from Dialect 1a.

(7)

	Dialect 1a	
electricista	[eleti'sista]	'electrician'
tristeza	[tis'teza]	'sadness'
pátria	['patja]	'homeland'
compadre	[kũ'padi]	'compadre'
Adriana	[adi'ãna]	'Adriana'
Alexandre	[ali'ʃãdi]	'Alexandre'

All examples in (7) have an alveolar stop followed by /i/. We did not expect to find such forms in Dialect 1a (or 1b) since we predicted that all /ti/- and /di/-sequences should undergo palatalisation and thus be manifested with an affricate: /tʃi, dʒi/. However, this is not the case, and we do have /ti, di/ in Dialect 1a as shown in (7). In order to understand the forms in (7) we have to consider a process in Dialect 1a called "branching onset reduction". The analysis proposed in Cristófaro-Silva (1992) is presented below.[4] Consider the forms in (8).

(8)

		Dialect 1a	
a.	*prato*	['pratu]	'plate'
	frevo	['frevu]	'frevo (dance)'
	breve	['brɛvi]	'brief'
	crime	['krimi]	'crime'
	grosso	['grosu]	'thick'
	troca	['trɔka]	'change'
	blusa	['bluza]	'blouse'
b.	*exemplo*	[e'zẽplu]	'example'
	outro	['outru]	'other'
	sempre	['sẽpri]	'always'
	livro	['livru]	'book'
c.	*flamengo*	[fla'mẽgu]	'flamingo'
	brasileiro	[brazi'lejru]	'Brazilian'
	comprimido	[kõpri'midu]	'tablet'
	complicado	[kõpli'kadu]	'complicated'

All forms in (8) have a branching onset which consists of an obstruent–liquid sequence. In (8a) the branching onset is followed by a stressed vowel. In (8b–c) the vowel which follows the branching onset is unstressed. In (8b) the branching onset is followed by a posttonic vowel, and in (8c) the branching onset is followed by a pretonic vowel. In all forms illustrated in (8b–c) the obstruent–liquid sequence may be reduced to a single consonant, i.e., only the obstruent is realised. This is illustrated in (9) with forms from (8b–c).

(9)

a.	From (8b)	[e'zẽplu]	~	[e'zẽpu]
		['livru]	~	['livu]
b.	From (8c)	[brazi'lejru]	~	[bazi'lejru]
		[kõpli'kadu]	~	[kõpi'kadu]

Let us now reconsider the forms in (7) which present an alveolar stop followed by /i/: [eleti'sista] or [kũ'padi]. A closer look at the forms in (7) shows that in all the cases the alveolar stop followed by /i/ occurs in an unstressed syllable (either posttonic or pretonic). Considering the process of branching onset reduction illustrated in (9) one

may wonder if there is an alternative pronunciation for forms which present alveolar stops followed by /i/ where a liquid occurs between the alveolar stop and the vowel /i/. A few examples of this situation can be found in (10).

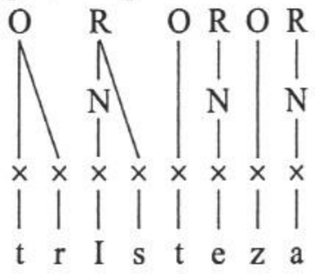
(10)

	Dialect 1a			
electricista	[eletriˈsista]	~	[eletiˈsista]	'electrician'
tristeza	[trisˈteza]	~	[tisˈteza]	'sadness'
pátria	[ˈpatrja]	~	[ˈpatja]	'homeland'
compadre	[kũˈpadri]	~	[kũˈpadi]	'compadre'
Adriana	[adriˈãna]	~	[adiˈãna]	'Adriana'
Alexandre	[aliˈʃãdri]	~	[aliˈʃãdi]	'Alexandre'

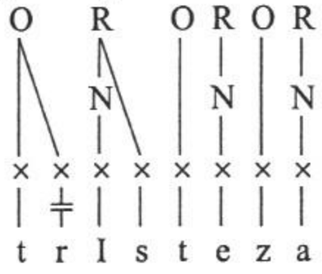
The analysis I propose predicts that all forms which present an alveolar stop followed by /i/ also present an alternative pronunciation where a liquid intervenes between the stop and the /i/. This is exactly the case.

Let us then consider the representation of the forms which present alveolar stops followed by /i/ such as [trisˈteza] ~ [tisˈteza]. In the lexical and phonological (i.e., derived) representations[5] of such forms the nuclear licensor position filled with an *I*-element is not adjacent to the licensed head of the branching onset (11). This is because there is a skeletal position, filled by the liquid, which intervenes between them. When the liquid is interpreted the form [trisˈteza] surfaces (11a). The case when the liquid is not interpreted — although present in the lexical representation — results in the form [tisˈteza] (11b).

(11) a. [trisˈteza]



b. [tisˈteza]



4 Palatalisation following [Vj]-diphthongs

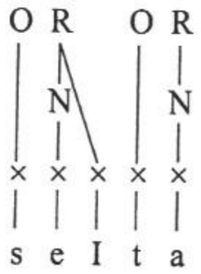
Let us now consider cases in which a palatal glide which is part of a falling diphthong is followed by /t, d/. We shall consider data from Dialects 1 and 2 in contrast with Dialect 3. Dialect 3 represents speakers from the Northeast (rural area in Aracajú-Sergipe state). Consider (12).

(12)

		Dialects 1 and 2	Dialect 3	
a.	/t/			
	seita	[ˈsejta]	[ˈsejtʃa]	'sect'
	gaita	[ˈgajta]	[ˈgajtʃa]	'harmonica'
b.	/d/			
	doido	[ˈdojdu]	[ˈdojdʒu]	'crazy'
	cuidado	[kujˈdadu]	[kujˈdʒadu]	'be careful'

The forms in (12) show that in Dialect 3 an alveolar stop is palatalised when preceded by a palatal glide which is part of a falling diphthong. Thus, an affricate follows the palatal glide. This process does not apply to Dialects 1 and 2. In Dialects 1 and 2 an alveolar stop always follows the palatal glide. I propose that the glide represents the element *I* syllabified in a rhymal position. This is illustrated in (13), which provides the representation of *seita* (12a) for Dialects 1 and 2.[6]

(13) *seita* [ˈsejta] (Dialects 1 and 2)



In order to account for palatalisation in Dialect 3, I propose that the element *I* which occupies a licensed postnuclear rhymal position spreads into its licensor (the onset position which follows it) and

palatalisation is triggered: [ˈsejtʃa]. This means that in Dialect 3 spreading takes place from the licensed rhymal position into its onsetal licensor position within the rhymal–onset licensing domain (1c).

Let us sum up the process of palatalisation in Brazilian Portuguese: In Dialects 1a and 1b spreading takes place within a licensing domain where the element *I* spreads from a licensor position. In Dialect 1b spreading must be from a nuclear licensor, while in Dialect 1a spreading applies from any licensor position. Spreading, and therefore palatalisation does not apply to Dialect 2. In Dialect 3, spreading occurs within a licensing domain (from a licensor or licensee position). I summarise these conditions in (14).

(14) Palatalisation of alveolar stops (third version)

Dialect 1a: The element *I* spreads from a licensor into its adjacent licensee within a domain ([ˈtʃia], [ˈaʃtʃi], [ˈsejta]);

Dialect 1b: The element *I* spreads from a nuclear licensor into its adjacent licensee within a domain ([ˈtʃia], [ˈastʃi], [ˈsejta]);

Dialect 2: No *I*-spreading ([ˈtia], [ˈasti], [ˈsejta]).

Dialect 3: The element *I* spreads within a licensing domain ([ˈtʃia], [ˈaʃtʃi], [ˈsejtʃa]).

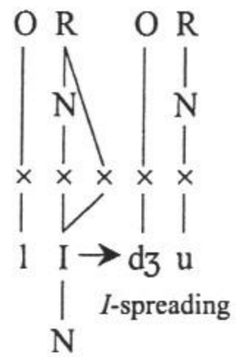
5 Palatalisation following [ĩ]

If my proposal is correct we shall expect palatalisation to take place in Dialect 3 when a rhyme dominating [ĩ] is followed by an alveolar stop. This is because in the representation of [ĩ] in Brazilian Portuguese the element *I* and the nasal element *N*, that is (I·N), are both linked to the nuclear and postnuclear rhymal position. Then, if the element *I* occupies a rhymal position, it should spread into the following onset position filled with /t/ or /d/ (in a similar manner to falling diphthongs where the element *I* spreads from a rhymal position into the following onset). Thus, in Dialect 3 we expect to have a form like [ˈlĩdʒu], where the element *I* spreads from the rhyme (in the representation of a nasal vowel) into the following onset filled with /d/. In fact forms such as [ˈlĩdʒu] are found in Dialect 3. The forms in (15) show examples where the nasal vowel [ĩ] is followed by an alveolar stop in Dialects 1 and 2 but by an affricate in Dialect 3.

(15)		Dialects 1 and 2	Dialect 3	
a.	/t/			
	cinto	[ˈsĩtu]	[ˈsĩtʃu]	‘belt’
	tinta	[ˈtʃĩta] (Dialect 1) [ˈtĩta] (Dialect 2)	[ˈtʃĩtʃa]	‘paint’
b.	/d/			
	lindo	[ˈlĩdu]	[ˈlĩdʒu]	‘beautiful’
	ainda	[aˈĩda]	[aˈĩdʒa]	‘yet’

Palatalisation applies in Dialect 3 because the element *I* spreads from the rhymal position into the following onset position within the rhymal–onset licensing domain (1c). This is illustrated in (16) for [ˈlĩdʒu] (15b).[7]

(16) *lindo* [ˈlĩdʒu] (Dialect 3)



A form which is pronounced [ˈlĩdʒu] in Dialect 3 is pronounced as [ˈlĩdu] in Dialects 1 and 2. This is because in these dialects when palatalisation applies the element *I* must spread from a licensor position. In Dialect 3 the element *I* spreads into an adjacent position in a

licensing domain independently of whether the element *I* occupies a licensor or licensed position.

In cases where the nasal vowel occurs followed by a branching onset, the process of palatalisation does not apply. In all Brazilian Portuguese dialects we have the forms *entrar* [ĩˈtrah] (*[ĩˈtʃrah]) 'to come', or *melindrosa* [melĩˈdrɔza] (*[melĩˈdʒrɔza]) 'touchy'. The lack of palatalisation in these forms is accounted for by the fact that the element *I* cannot spread into a licensor position (which is the position occupied by the obstruent in the branching onset).

6 Unresolved issues

Palatalisation is not reported either when the rhymal position is filled with a lateral. An alveolar stop, i.e., /t, d/, occurs in the following examples: *Ilda* [ˈiwda] ~ [ˈilda] 'Ilda', *Milton* [ˈmiwtõ] ~ [ˈmiltõ].[8] These two examples are proper names and there seem to be no other cases of a nuclear position filled with /i/ followed by a rhymal position filled with a lateral and then followed by /t/ or /d/. There are very few forms where a rhymal position filled with /ɾ/ is preceded by /i/ and followed by /t/ or /d/. Forms such as *vi*[rt]*ual* 'virtual' and *vi*[rt]*ude* 'virtue' do not undergo palatalisation. That is: **vi*[rtʃ]*ual* and **vi*[rtʃ]*ude* do not occur.

The analysis presented in this paper predicts that we shall find forms where the element *I* spreads from a nuclear position into the following rhymal position dominating /s/ which form a nucleus–rhyme licensing domain (1b). This would represent local spreading from left-to-right within a domain. Whereas some dialects would have *vista* [ˈvista] 'view' and *pasta* [ˈpasta] 'folder', we should find dialects with forms such as [ˈviʃta] and [ˈpasta]. I have not found any evidence for such a dialect.

It is worth mentioning that palatalisation is not triggered in a form like *mito* [ˈmitu] 'myth' although the vowel /i/ is adjacent to the alveolar stop. That is, *[ˈmitʃu] does not occur. This is accounted for by the fact that the nuclear position filled with /i/ is not in a licensing relation with the onset position filled with the alveolar stop. Since no licensing relation is involved between the adjacent positions palatalisation does not takes place.

Conclusion

In (17) I summarise the conditions which trigger palatalisation in Brazilian Portuguese.

(17) Palatalisation of alveolar stops (final version)

Dialect 1a:	The element *I* spreads from a licensor position into its adjacent licensee within a domain. Direction: leftwards ([ˈtʃia], [ˈaʃtʃi], [ˈsejta], [ˈlĩdu]);
Dialect 1b:	The element *I* spreads from a nuclear licensor position into its adjacent licensee within a domain. Direction: leftwards ([ˈtʃia], [ˈastʃi], [ˈsejta], [ˈlĩdu]);
Dialect 2:	No *I*-spreading ([ˈtia], [ˈasti], [ˈsejta], [ˈlĩdu]);
Dialect 3:	The element *I* spreads from any position within a licensing domain. Direction: leftwards and rightwards ([ˈtʃia], [ˈaʃtʃi], [ˈsejtʃa], [ˈlĩdʒu]).

The chart below lists dialectal variation regarding palatalisation of alveolar stops in Brazilian Portuguese.

(18)

		Dialect 1a	Dialect 1b	Dialect 2	Dialect 3
a.	*tia*	[ˈtʃia]	[ˈtʃia]	[ˈtia]	[ˈtʃia]
	haste	[ˈaʃtʃi]	[ˈastʃi]	[ˈasti]	[ˈaʃtʃi]
	seita	[ˈsejta]	[ˈsejta]	[ˈsejta]	[ˈsejtʃa]
	lindo	[ˈlĩdu]	[ˈlĩdu]	[ˈlĩdu]	[ˈlĩdʒu]
	tristeza[9]	[trisˈteza]	[trisˈteza]	[trisˈteza]	[triʃˈtʃeza]
b.	*entrar*	[ĩˈtrah]	[ĩˈtrah]	[ĩˈtrah]	[ĩˈtrah]
	mito	[ˈmitu]	[ˈmitu]	[ˈmitu]	[ˈmitu]

This paper has accounted for dialectal variation involving the process of palatalisation of alveolar stops in Brazilian Portuguese. I have

proposed that palatalisation is better understood as the spreading of the element *I*. What regulates palatalisation are the constraints imposed on spreading within licensing domains. Some dialects require spreading to take place only when *I* occupies a licensor position (Dialect 1a). The licensor position may be required to be a nuclear head (Dialect 1b). Spreading may also be from either a licensor or a licensee within a licensing domain (Dialect 3). The analysis I have proposed also accounts for cases in which palatalisation is not reported in Brazilian Portuguese: *mito* ['mitu] 'myth' but not *['mitʃu], and *entrar* [ĩ'trah] 'to come' but not *[ĩ'tʃrah]. In conclusion, I claim that I have provided a comprehensive analysis of the process of palatalisation in various dialects of Brazilian Portuguese.

Notes

* The subject discussed in this paper was presented at the Departmental Seminar of the Department of Linguistics of the School of Oriental and African Studies (1994), the 5th Manchester Phonology Meeting (1997) and the Associação Brasileira de Lingüística Conference (1999). I would like to thank people for their useful comments at these meetings. Any remaining errors are, of course, my responsibility alone.

1. For an element-theoretical analysis of the vowel system of Brazilian Portuguese, see Ploch (1999b: section 6.2).
2. In Dialects 1a and 1b a rhymal [s] agrees in voicing with the following consonant. In some other dialects — as Cariocan spoken in Rio de Janeiro — we have rhymal [ʃ] which occurs systematically in all forms. In this dialect voice agreement also takes place yielding rhymal [ʒ] followed by voiced consonants.
3. Note that in the Rio de Janeiro dialect [ʃ] will occur systematically in rhymal position. In Dialect 1a shown below palatalisation in rhymal position only occurs when the onset which follows the rhyme is filled with an affricate.
4. Further research has shown that branching onsets followed by a stressed vowel may also be reduced (Cristófaro-Silva 2000). That is, *trinta* ['trĩta] 'thirty' may also be realised as ['tĩta]. This fact does not alter the discussion presented here.
5. For arguments in favour of the assumption of two relevant levels of phonological representation, i.e., one lexical level and one level derived from it via the application of the phonology-function ϕ to a lexical input string, or, if optional processes are to be included, via the application of one of a family of phonology-functions ϕ', ϕ'', ϕ''', etc., see Kaye [1993] (1995).

6. Whether glides in Brazilian Portuguese are syllabified as part of the nucleus or as a postvocalic consonantal position is controversial. See for example Câmara (1970); Cristófaro-Silva (1992).
7. Ploch (1999b: section 6.2) analyses nasal vowels in Brazilian Portuguese as phonological expressions containing a *L*(ow-tone)-head, attached to a non-branching *nucleus*. Note that in Ploch's version of Element Theory, the *L*- and the *N*(asal)-element have been merged into one new element *L* (see Ploch 1999b: chapter 5, and Ploch 2000).
8. Laterals in a rhymal position are vocalised in most Brazilian Portuguese dialects: *mil* /mil/ → [miw] 'thousand'.
9. As mentioned before, a consonantal cluster may be reduced to a single consonant, i.e., the liquid may be deleted. Thus *tristeza* [tris'teza] may also occur as [tis'teza]. In this chart alternation regarding branching onset reduction is not shown. In the Rio de Janeiro dialect *tristeza* occurs as [triʃ'teza].