

**PALATALIZATION AND LABIALIZATION IN
TSHIVENDA: A LINEAR AND NON-LINEAR
PHONOLOGICAL ANALYSIS**

BY

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DECLARATION

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature

Date

ABSTRACT

This study focuses on two phonological processes occurring in Venda, i.e. on palatalization and labialization. Two phonological models are applied to describe these phenomena: a traditional (linear) phonological model, the Transformational Generative model of Chomsky and Halle (1968), and a non-linear Feature Geometry model of Clements (1985). This was done in order to ascertain which model would be more effective in its coverage of these sound changes. The core concepts of each model were described and the sound system of Venda was analysed in terms of distinctive features. The application of the two models led to the conclusion that a linearly structured model seem to be more effective to account for both these phenomena in Venda than its non-linear counterpart.

OPSOMMING

Hierdie studie fokus op twee fonologiese prosesse in Venda, te wete palatalisasie en labialisasie. Twee fonologie modelle word toegepas om hierdie verskynsels mee te beskryf: `n tradisionele liniêre model, die sg Transformasioneel Generatiewe model van Chomsky an Halle (1968), en `n nie-liniêre model van Clements (1985). Die doel hiermee was om te bepaal welke model hierdie verskynsels die beste kan beskryf. Die hoofkomponente van elke model is vireers bespreek waarna die klanke van Venda ontleed is in terme van distinktiewe kenmerke. Uit die toepassing van die twee modelle het dit duidelik geblyk dat die liniêre model `n veel beter beskrywing moontlik maak van die verskynsels as die meer kontemporêre nie-liniêre model.

MANWELEDZO

Mushumo hoyo wo disendeka kha u sengulusa Themba-labiala (labialization) na muphalataliso (palatalization) hu tshi khou shumiswa / tevhelwa theori (theory) ya Chomsky na Halle ine ya pfi “Generative theory”.

Heyi theori yo itwa nga modele une wa pfi SPE (Non-linear) na FG (linear). Heyi mimodele yo shumiswa kha u sengulusa idzo tshanduko dza mibrumo – Themba – labiala na muphalataliso.

Ndivho ya u shumisa theori ya Chomsky na Halle ndi u todou vhona modele une wa vha khwine kha u sengulusa musi hu tshi khou gudiwa mupalataliso na Themba-labiala kha Tshivenda.

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CHAPTER 1

ORIENTATION

1.1 INTRODUCTION

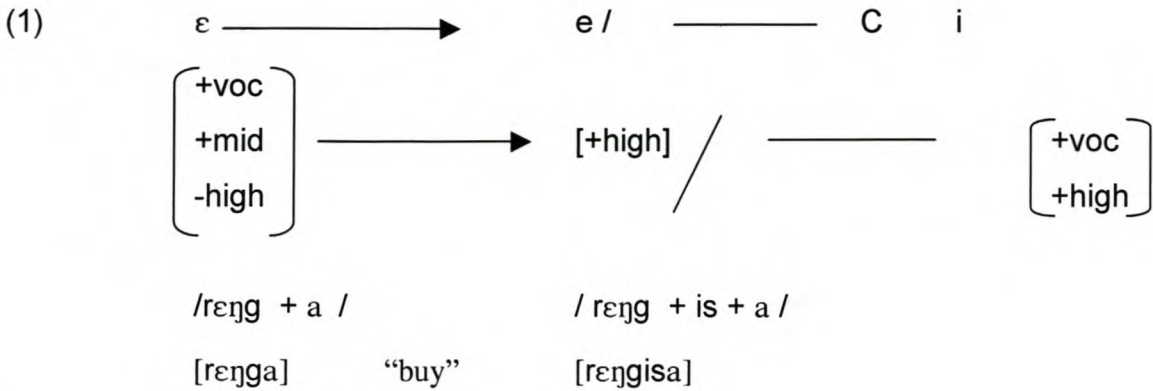
In this study the focus will be on presenting phonetic and phonological explanations for palatalization and labialization sound changes occurring in Tshivenda. These processes are also called assimilation processes. A rule making provision for assimilatory processes is normally very transparent. The features used in such a rule normally "explain" the phenomenon.

This research focuses on a linear phonological model known as the Transformational Generative Model (TG) and a non-linear phonological model known as the Feature Geometry Model (FG).

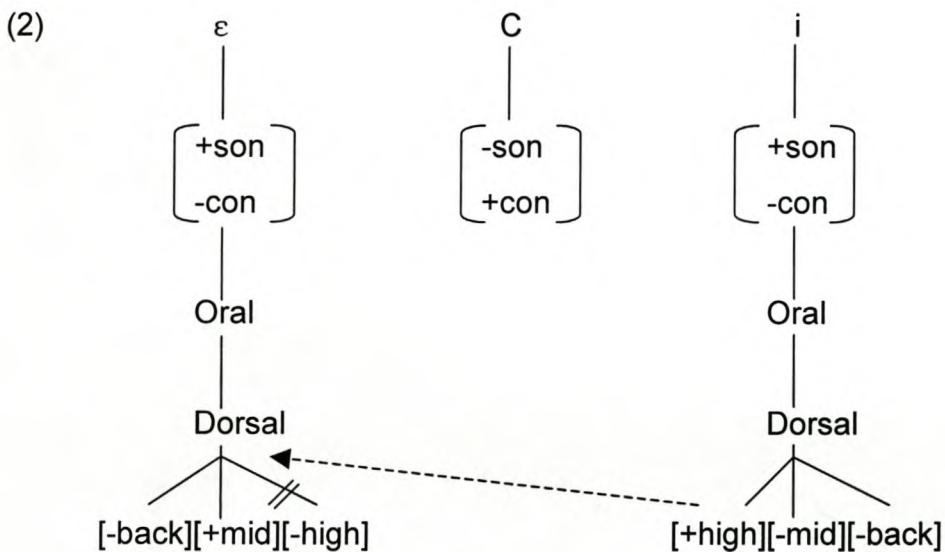
Sound changes in a particular language are motivated by various factors. It is the task of phoneticians and phonologists to determine these factors and present credible explanations for these changes. The following are factors that play a role in sound changes.

1.1.1 Phonetic factors

Sound changes may very often be ascribed to organs of speech adapting to changing environments, and hence being responsible for a new sound or sound combination to arise. The vowel raising phenomenon in African languages is a clear example of a phonetically motivated sound change, i.e. a mid low vowel is raised to a mid high vowel should it precedes a high vowel occurring in the next syllable. Compare the following representations:



To clarify the example in (1) which is presented in a TG model, one could study the following representation from a FG model which shows how one feature may spread to another.



The representation in the preceding illustration (2) demonstrates the phonological process that has taken place. When three segments as those in the preceding illustration (2) appears in this order at skeletal level, the /i/ may spread its feature [+high] towards the preceding vowel dorsal node (by passing the consonant C). The /ε/ then delinks its [-high] feature value and shares the [+high] feature value of /i/, which is phonetically realized as a [+mid] [+high] vowel [e].

In searching for explanations for sound changes, it is necessary to start off by firstly looking at the physical (phonetic) aspects of speech. This is the most natural reason why sound changes take place.

1.1.2 Morphological factors

Closely related to the phonetic factors, the above are changes that may directly be caused by morphological factors. In this process of word formation, it more than often happens that particular segments become juxtaposed and form a syllable structure that is not tolerated in the language. Compare the following example:

- (3) Passive formation
 $/\beta\text{ɔ}\phi + w + a / > [\beta\text{ɔ}xwa]$ "be tied"
 |
 passive

In (3) the combination of $/\phi/$ and $/w/$ becomes $/xw/$. This combination ought to be $[\phi w]$ instead of $[xw]$. This sound change cannot be explained by phonetic factors, however, it is clear that this final product is the result of morphological factors.

1.1.3 Historical factors

In due course the history a sound X may have changed to Z, passing through a phase Y. This phase Y may have been phonetically motivated. However, it is not attested any more. All that remains is the "fact" that $X > Z$. Unless there are reliable records (written or otherwise), it is clear that the change may be regarded as non-phonetic and not easily explained. Consider the following example occurring in the Sotho language:

- (4) selepe + ana \longrightarrow seletswana
 "an axe" "diminutive"

Sepedi: $/s\epsilon l\epsilon p'\epsilon + ana / > [selep]ana$ or $[selet]wana$ or $[selets]wana$

Setswana: $/selep'\epsilon + ana / > [selet]wana$ or $[selets]wana$

Sesotho: $/selep'\epsilon + ana / > [selets]wana$

The formalism in (4) express that when suffix "-ana" is suffixed to the word "selepe" it becomes $[selep]ana$, $[selet]wana$ or $[selets]wana$ in Sepedi. In Setswana it becomes $[selet]wana$ or $[selets]wana$. In Sesotho it becomes $[selets]wana$.

This change in Sesotho i.e. [pe] → [tsw] cannot be explained by phonetic factors, however, it is clear that this final product [seletswana] is the result of a historical process, also known as "telescoping" (see Roux, 1979).

1.1.4 Dialectical factors

The example in (4) also exemplifies dialectical variation, where it has become quite clear that an original change (as in 4) has become the norm in a certain community, whilst changing in another.

1.1.5 Sociolinguistic factors

In some cases changes took place due to sociolinguistic factors. That is, persons with a specific status may start using an alternative form for status reasons. They may deliberately change a form and this may later be the norm.

1.2 AIM OF THE THESIS

This thesis aims to implement:

- (a) A linear phonological model as presented Chomsky and Halle (1968) (henceforth the SPE model) and
- (b) a non-linear phonological model, the Feature Geometry model (henceforth FG) in the analysis of palatalization and labialization in Tshivenda

The aim of this study is to determine whether any of these models can adequately account for the sound changes occurring in the above mentioned phonological processes specifically with respect to:

- (i) rule formulation and derivational processes in the case of the linear model (SPE) or
- (ii) representations and various types of processes (spreading and delinking) in the case of the non-linear model (FG).

Generative and post-generative phonological theories, *inter alia*, aim at providing explanations for sound changes. The manner in which these explanations manifest

themselves is through the formalism used. Consider (1), the reason for [ɛ] becoming [e] in front of [i] is quite apparent - an assimilation of the [+high] feature took place.

1.3 METHODOLOGY

Prior to the separate application of each model, it will be necessary to present relevant data on palatalization and labialization that goes beyond data commonly found in grammar books or taxonomic phonological descriptions. After that, a thorough distinctive feature analysis will have to be made of all sounds of Tshivenda bearing in mind that three pre-requisites have been met before an adequate set of distinctive features may be postulated for Tshivenda.

The final step will be the application of, firstly, the linear generative model to the data. This will be followed by the application of the non-linear model.

1.4 ORGANISATION OF THE STUDY

This study is composed of five (5) chapters. Apart from the introduction, which is allocated to chapter one, it is organized as follows:

Chapter 2 describes the distinctive features of Tshivenda.

Chapter 3 will focus on the phenomena of Palatalization (PAL) and Labialization (LAB) and will be analyzed within a linear phonological model.

Chapter 4 deals with the non-linear analysis of Palatalization (PAL) and Labialization (LAB).

Chapter 5 provides the conclusions of the study. This chapter will attempt to answer the following question: Which model (a linear and a non-linear) presents the most plausible explanations for a complex phonological process such as PAL and LAB?

CHAPTER 2

THE PHONETIC SEGMENTS OF TSHIVENDA: A DISTINCTIVE FEATURE ANALYSIS

2.1 INTRODUCTION

In this chapter the phonetic segments of Tshivenda will be analyzed in terms of a set of distinctive features as initially postulated by Chomsky and Halle (1968) and adapted where necessary.

Attention will first be focused on consonants thereafter a description of the vowels of Tshivenda will follow. The phonetic segments / elements of the language will be (a) assigned phonetic correlates and (b) summarized in appropriate two dimensional matrices.

The following three pre-requisites for an adequate set of distinctive features will be postulated:

- (a) every feature must have a phonetic correlate,
- (b) every feature must be phonologically relevant in its distinctive function within the particular system,
- (c) every feature must be usable in phonological rules or representations.

2.2 THE PHONETIC SEGMENTS OF TSHIVENDA (CF. POULOS 1990:590-512)

Consonants

(5) Bilabials

[p ^h]	<i>phele</i>	spotted hyena	[p ^h εrε]
[p']	- <i>penya</i>	shine, glitter	[p'εpa]
[b]	<i>bako</i>	cave	[bak'ɔ]
[ɸ]	- <i>fha</i>	give	[ɸa]
[β]	- <i>vhea</i>	put, place	[βεa]
[m]	- <i>ima</i>	stand up	[ima]

(6) Labiodentals

[ɸ ^h]	pfene	baboon	[ɸ ^h ɛnɛ]
[ɸ ^f]	kupfene	small baboon	[k'ʊɸ ^f ɛnɛ]
[ɸv]	-bvuma	thunder, roar	[ɸvuma]
[f]	-fa	die	[fa]
[v]	-vula	open	[vufa]
[m]	mvula	rain	[mɸvufa]

(7) Dentals

[t ^h]	thafu	calf of the leg	[t ^h afu]
[t']	-tamba	wash	[t'amba]
[ɖ]	-ɖa	come	[ɖa]
[ɽ]	-ɽa	eat	[ɽa]
[ŋ]	-ŋamusi	today	[ŋamusi]

(8) Alveolars

[t ^h]	thovho	mat	[t ^h ɔβɔ]
[t']	-takala	become happy	[t'ak'afa]
[d]	-devha	split open (as a peanut)	[dɛβa]
[ts ^h]	tsimu	field	[ts ^h imu]
[ts']	kutsimu	small field	[k'uts'imu]
[dz]	dzina	name	[dzina]
[f]	-lila	cry	[fifa]
[r]	-reda	collect firewood	[rɛɖa]
[s]	-sea	laugh at	[sea]
[z]	-zazamela	itch	[zazamefa]
[l] ¹	hositele	hostel	[hɔsɪtɛle]
[n]	-na	rain	[na]

(9) Pre / palatals

[tʃ']	- tyetyenea	laugh loudly	[tʃ'etj'enea]
[dj]	dyelo	craw of a fowl	[djɛfɔ]
[tʃ ^h]	tshigayo	flour-mill	[tʃ ^h igajɔ]
[tʃ']	- tshipa	strangle	[tʃ'ip'a]
[dʒ]	- dzhena	enter	[dʒena]
[ʃ]	- shuma	work	[ʃuma]
[ʒ]	- zhaka	trample down	[ʒak'a]
[ɲ]	nyala	onions	[ɲafa]

(10) Velars

[k ^h]	khuni	firewood	[k ^h uni]
[k']	tshikolo	school	[tʃ ^h ik'ɔfɔ]
[g]	gogo	crowd	[gɔgɔ]
[x]	- xa	dry up	[xa]
[ŋ]	- ñaña	argue	[ŋaŋa]

(11) Alveolabials

[ts ^h w]	- tswa	steal	[ts ^h wa]
[tsw']	- tswipudza	strike with a whip	[tsw'ip'udza]
[dzw]	- dzwala	give birth to (cattle etc)	[dzwara]
[sw]	- swaswa	joke	[swaswa]
[zw]	swino	now	[zwino]

(12) Labio (pre- / mid-) palatals

[pʃ ^h]	luphwaphwa	mealiecob	[fupʃ ^h apʃ ^h a]
[pʃ']	- pwasha	break	[pʃ'aʃa]
[bj]	- bwa	dig	[bja]
[mj]	- lim + wa	plough + passive extension	[fimja]

(Alternative pronunciations of this latter sound are [mŋ] or [ŋw])

(13) Labiovelars

(Labiovelars are rare sounds in Venda, and they occur as alternatives to the above labioplatatal sounds)

[pk ^h]	luphwaphawa	mealiecob	[fupj ^h apj ^h a]
[pk']	- pwasha	break	[pk'aʃa]
[bg]	- bwa	dig	[bga]
[mɲ]	- lim + wa	plough + passive extension	[fimja]

(14) Semivowels

[j]	- ya	go to	[ja]
[w]	- wa	fall	[wa]

(15) Vowels

[i]	- lima	plough	[lima]
[ε]	- rema	chop	[rema]
[a]	- vala	close	[vara]
[ɔ]	- vhona	see	[βɔna]
[u]	- vula	open	[vura]

(16) Raised vowels

[e]	- rengisa	sell	[rengisa]
[o]	- mulamboni	to the river	[muramboni]

On the phonetic status of labialised segments there has been a tradition in Tshivenda in which specific phonetic symbols have been assigned to fricative and affricative segments when labialised (cf. Makuya and Mudau 1989: 106-112). Compare the following

(17)	Fricative	Non-labialized	Labialized	
	s	- vusa [vusa]	- vuswa [vuʃa]	"wake up"
	z	- funza [funza]	- funzwa [funʒa]	"be taught"

(18)	Affricative	Non-labialized	Labialised	
	dz	fhodza [fɔdza]	-fhodzwa [fɔdzwa]	“healed”
	tsh	litsha [litsha]	-litshwa [litʃha]	“leave”

Compare these phonetic representation to other non-fricated segments:

(19)	Nasal	Non-labialized	Labialized	
	n	-vhona [βɔna]	-vhonwa [βɔnwa]	“be seen”
	ŋ	-ńaŋa [ŋaŋa]	ńaŋwa [ŋaŋwa]	“eat”
(20)	Plosive	Non-labialized	Labialised	
	t'	-kata [k'at'a]	-katwa [kat'wa]	“roll”
	k'	-bika [bika]	-bikwa [bikwa]	“cooked”

It is clear from the above that there are two ways currently in use to indicate secondary labialization in Tshivenda. In the case of (18) the phonetic representation [s] [z] seems to indicate that there is no labio-velar off-glide in the articulation. The examples in (19) however, clearly indicate a labio-velar off-glide in the phonetic transcription, i.e. [nwa]. This situation calls for some experimental phonetic evidence, which falls beyond the scope of this study.

2.3 PHONETIC CORRELATES

Phonetic correlates may be defined as the relationship between the sound and its features. Chomsky and Halle (1968) indicated that when dealing with phonetic correlates, different class features should be used.

The following distinctive features will be used when explaining linear and non-linear models.

2.3.1 Major class features

The features [sonorant] and [consonantal] each partition the set of speech sounds into two broad classes. Like [continuant], these features are not bound to a particular articulator, instead, they specify phonologically critical degrees of constriction imposed by essentially any articulator (cf. Kenstowicz: 1994:36)

2.3.1.1 Syllabic / non-syllabic [+/- / syll]

Syllabic sounds are sounds which constitute peaks of syllables.

(21) [+syll]: All vowels, semivowel and nasal.

Non-syllabic are sounds which are in the margins of syllables. All other sounds are [-syll] except those mentioned above.

2.3.1.2 Consonantal / non-consonantal : [+/- -cons]

Consonantal sounds are produced with a radical obstruction in the mid-sagittal region (the middle) of the vocal tract. Such sounds are [+ cons].

(22) [+cons]: All consonants except vowels and semivowels.

[-cons] includes the vowels and semivowels.

2.3.1.3 Sonorant / non-sonorant [+/- son]

Sonorant sounds are produced with a vocal tract configuration sufficiently open for the intra-oral air pressure to be approximately equal to the ambient air pressure.

(23) [+son]: Vowels, liquids, glides and nasal.

Stops, fricatives and affricatives are [-son] because they are not produced with vocal tract configuration sufficiently open for the intra-oral air pressure to be approximately equal to the ambient air pressure.

2.3.2 Cavity features

These features refer to place of articulation. They specify modifications of the air stream taking place within the vocal tract in the production of particular sound (cf. Katamba 1991:43)

2.3.2.1 Coronal / non-coronal [+/- cor]

Coronal sounds are produced with the blade of the tongue (corona) raised from its neutral position to form a total or partial obstruction.

(24) [+cor]: All dentals, alveolars, palato-alveolars, palatals and retroflex

Labials, velars, uvulars and pharyngeals are [-cor]

2.3.2.2 Anterior / non-anterior [+/- ant]

Anterior sounds are produced with a primary constriction located at or in front of the alveolar ridge, posterior sounds, are produced with a constriction behind the alveolar ridge.

(25) [+ ant]: All labials, dentals, alveolars and labiodentals.

Palato-alveolars, palatals, velars, uvulars and pharyngeals are [-ant] because such sounds are produced without such an obstruction.

2.3.2 Tongue-body features

The neutral position of the body of the tongue is said to be the position which it assumes in the production of a mid front vowel. Other tongue configurations are regarded as departures from that norm (cf. Katamba 1997:45)

2.3.2.1 High / non-high [+/- high]

High sounds are produced by raising the body of the tongue towards the roof of the mouth or above its neutral position.

(26) [+ high]: All palatalized, palatal, velar, vowels [i, u] and glides [j, w]

All other sounds are non-high sounds because they are produced without raising of the tongue body towards the roof of the mouth or above its neutral position.

2.3.2.2 Mid / non-mid [+mid]

The mid-vowels are articulated with less tongue height and greater jaw opening than for /i/ and /u/, but with more tongue height and less jaw opening than /a/.

(27) [+ mid]: [ɛ, e, ə, o]

Non-mid vowels are articulated by raising the body of the tongue towards the roof of the mouth or above its neutral position or without the raising of the body of the tongue.

(38) [- mid]: [i, u, a]

2.3.2.3 Back /non-back [+back]

Back sounds are produced by retracting the body of the tongue from the neutral position.

(29) [+ back]: All velars, uvulars and pharyngeals are back

All labials, dentals, palatals and glottals are non back.

The three features above (tongue-body features) are used for both vowels and consonants. The main point to be observed in connection with vowels is that high, mid and back vowels together allow for a maximum of four levels of height and a simple front-back opposition from a phonological standpoint.

2.3.2.4 Dental / non-dental [+/- dental]

Dental consonants / sounds are articulated with the tip of the tongue between the front teeth or commonly against the back of the upper front teeth. There are only five dentals in Tshivenda.

(30) [+ dental]: $\underset{\sim}{t}$, $\underset{\sim}{th}$, $\underset{\sim}{d}$, $\underset{\sim}{l}$ and $\underset{\sim}{n}$

Non-dental are all consonant except those in (31) because they are articulated without the tip of the tongue between the front teeth.

2.3.3 Lip-attitude

The lips may assume different shapes when speech sounds are produced. They may be completely closed or they may be held apart in varying degrees, from being quite close to each other. Further-more, they may take on a round shape or they may even be spread (cf. Poulos 1990:470).

2.3.3.1 Rounded / unrounded [+/- round]

A round articulation involves an extension and pursing of the lips. All sounds that are [+ round] are redundantly [+ labial], but [+ labial] sounds are not necessarily [+ round], though [+ labial] is produced with no rounding.

(31) [+ round]: Labialized consonants and rounded vowel which are [ɔ, u]

All other unrounded vowel [i, ε, a] and consonant except those in (32) are [-round].

2.3.3.2 Labial / non-labial [+/- lab]

Labial sounds are formed with a constriction at the lips.

(32) [+lab]: labials and rounded vowels

All other sounds are [-lab] because they are formed without such a constriction at the lips.

2.3.4 Length of stricture

This refers to an articulation which restricts the air stream to some degree, ranging from a complete closure to a slight narrowing and a physical duration of a sound or utterance (cf. Sloat *et al* 1978:85).

2.3.4.1 Distributed / non-distributed [+/- distr]

Distributed sounds are produced with a constriction that extends for a considerable distance along the mid-sagittal axis of the oral tract.

(33) [+ distr]: All bilabial fricative, alveolar fricative and alveo-palatal fricative

Non-distributed sounds are produced with a constriction that extends only for a short distance. The following sound types are non distributed : labiodental fricative, dental fricatives and retroflex fricative.

2.3.5 Secondary apertures

When producing sounds under secondary apertures, there is a prevention air stream from flowing outward through the mouth or nose.

2.3.5.1 Lateral / non-lateral [+/- lat]

Lateral sounds are produced in such a way as to prevent the air stream from flowing outward through the center of the mouth, while allowing it to pass over one or both sides of the tongue, central sounds do not involve such a constriction.

(34) [+lat]: All lateral sonorants, fricatives and affricatives

All other sounds are [-lat] because when producing non-lateral sound air flows out through the center of the mouth.

2.3.5.2 Nasal / non-nasal [+/- nas]

Nasal sounds are produced by lowering the velum and lowering the air to pass outward through the nose.

(35) [+ nas]: Nasal stops, nasalized consonants.

All other sounds are [-nas] because they are produced with the velum raised to prevent the passage of air through the nose.

2.3.6 Manner of articulation features

These features are primarily concerned with the different forms of constriction that may take place in the vocal tract when a sound is produced. These range from a total closure of the air stream to a very partial closure where the air stream flows rather freely (cf. Poulos 1990:488).

2.3.6.1 Continuant / non-continuant [+/- cont]

Sounds which are produced with a primary constriction which allows the air to flow through the mid-sagittal region of the vocal tract.

(36) [+ cont]: Vowels, glides, fricatives and r-sounds.

But affricatives, lateral, nasal stops, oral stops are non-continuant because they are produced with sustained occlusion.

2.3.6.2 Delayed / instantaneous release [+/- delrel]

This feature is only applicable to sounds produced in the mouth cavity and distinguishes stops from affricatives.

(37) [+ delrel]: only affricatives

All other sounds are [-delrel].

2.3.7 Source feature

Sounds produced because of the influence of organs. The sound can only be produced if there is some source of energy.

2.3.7.1 Voiced / voiceless [+/-voiced]

Sounds produced with the vibration of the vocal cords.

(38) [+voiced]: Vowels, liquids, nasal, voiced obstruents.

All other sounds are [-voiced] because there is no vibration of vocal cords.

2.3.7.2 Spread / non-spread [+/- spread]

Spread sounds are produced by a displacement of the arytenoid cartilages creating a wide glottal opening.

(39) [+ spread]: Aspirated consonants, breathy voiced or murmured consonants, and glides.

All other sounds are [-spread].

2.3.7.3 Constricted / non-constricted [+/- constr]

Constricted sounds are produced with addition of the arytenoids cartilages causing the vocal cords to be pressed together and preventing normal vocal cord vibration.

(40) [+ constr]: Ejectives, implosive, glottalized or laryngealized, vowels and glides.

All other sounds are [- constr].

2.3.8 Stridency

Sounds which are produced in such a way as to permit the air stream to pass through only a narrow opening in the center of the vocal tract. This manner of articulation creates a large amount of friction, resulting in the hissing sound characteristic of strident segments (cf. Sloat *et al* 1978).

2.3.8.1 Strident / non-strident [+/- strident]

Strident sounds are produced with a constriction forcing the air stream to produce high intensity noise.

(41) [+ strident]: Fricatives and affricatives.

All other sounds are [-strident].

2.3.9 Retroflex

This is a consonant/s that are produced by curling the tongue back to make a constriction with the tip or the underside of the tongue in the alveo-palatal region (cf. Sigh 1982:60)

in Tshivenda there is only one retroflex sound i.e. [ɽ]

(42) [+retro]: Retroflex

2.4 MATRICES

All sound segments are specified by a limited number of features. The representation of a segment by features captures the co-ordinated activity by placing features in an array called a matrix. Each feature or group of features defines a specific property of the segment. This representation is presented in binary terms: [+] means that a feature is not redundant, and [-] means that feature is absent. Consider the following feature matrix of [p']:

(43) [p']

+cons
+lab
-son
+ant
-lat
-strident

Such a list of features is known as a feature matrix.

2.5.2 Vowels

Vowels constitute a category of sounds which are produced with a relatively unobstructed air passage (cf. Poulos 1990:500). In other words, when vowels are produced, the articulators are fairly wide apart – wider apart than is the case with semivowels.

According to Chomsky and Halle vowels are represented in three level models.

(44)

	- back	+ back
+high - low	i	u
- high - low	ɛ	ɔ
- high + low		a

Three features were used – [high] [low] and [back], however this scheme could not accommodate the raised vowels [e] and [o].

The problem of raised vowels was given accommodation by Wang (Roux 1979:30) when he represented four level models of vowel description.

(45)

	- back	+ back
+ high - mid	i	u
+ high + mid	e	o
- high + mid	ɛ	ɔ
- high - low		a

In Tshivenda there are two raised vowels, [e] and [o] and two high vowels which are not raised vowels which are [i] and [u], they can be accommodated in the matrix below.

2.5.3 Feature matrix for Tshivenda vowels

	a	ɛ	e	i	ɔ	o	u
consonantal	-	-	-	-	-	-	-
sonorant	+	+	+	+	+	+	+
syllabic	+	+	+	+	+	+	+
voiced	+	+	+	+	+	+	+
round	-	-	-	-	+	+	+
high	-	-	+	+	-	+	+
mid	-	+	+	-	+	+	-
back	+	-	-	-	+	+	+

2.5.4 Semivowels

When semivowels are produced, there is a relatively wide opening in the mouth through which the air passes (cf. Poulos 1990:499). As the opening of the air passage in the mouth widens, it tends to move away from consonant production to vowel production.

There are two semivowels in Tshivenda which are represented in the orthography by / y / and / w /. When these two are produced, the tongue move lightly upwards but not far enough to cause any real turbulence of the air stream.

With / y /, the center of the tongue rises slightly in the area of the palate – for this reason it is usually referred to as the palatal semivowel.

The semivowel / w /, on the other hand, is produced with the back of the tongue rising slightly towards the velum, while at the same time there is a considerable amount of lip-rounding.

Because of the involvement of both the lips and velum area in the production of / w /, this semivowel is sometimes referred to as the labiovelar semivowel; it can therefore be seen as a double articulation sound (cf. Poulos 1990:499).

The phonetic symbol for the semivowel / y/ is [j]. For / w /, the phonetic and orthographic symbols are identical, hence [w].

2.5.5 Feature matrix for Tshivenda semivowel

	w	j
consonantal	-	-
sonorant	+	+
syllabic	-	-
voiced	+	+
round	+	-
high	+	+
back	+	-
labial	+	-

Thus a full description of the semivowels can be summarized as follows (cf. Poulos 1990:499).

(46)

Nature of closure / opening	Place of articulation	
Relatively wide opening	Palatal j	labiovelar w

It must be noted that even though semivowels are very closely related to vowels in their production, they nevertheless behave more like consonants when they occur in word. [w] and [j] do not represent syllable peaks, a feature which is normally associated with vowels.

CHAPTER 3

PALATALIZATION AND LABIALIZATION: A LINEAR PHONOLOGICAL ANALYSIS

3.1 INTRODUCTION

In this chapter the focus will be on the nature of Palatalization and Labialization in Tshivenda. In more specific terms this section will present:

- (a) an exposition of the nature of the phoneme in general, and
- (b) sets of language specific data on palatalization and labialization in Tshivenda.

This will be followed by a linear phonological analysis of the two processes. Prior to this, however, some attention will be paid to core concepts related to the typical linear model.

3.2 PALATALIZATION AND LABIALIZATION AS ASSIMILATORY PROCESSES

Assimilation is a type of phonological process that refers to the influence exercised by one sound segment upon the articulation of another sound, so that the two sounds become more alike, or identical (cf. Crystal 1991:89).

Assimilation processes are to be found in many languages of the world. In this chapter attention will be focused on palatalization (PAL) and labialization (LAB) as assimilation processes in Tshivenda.

3.2.1 Palatalization

Palatalization is a phonological process which occurs when non-palatal sounds are palatalized. Sounds which were not articulated at the palate are changed and articulated at the palate, that is, non-palatal sounds become palatal sounds.

Palatalization involves raising the tip and blade of the tongue to a high front position close to the anterior part of the hard palate region, as for an [i] vowel .

Katamba (1989:86-87) notes that “ ... palatalization is one of the most common co-articulatory processes in language. The tongue blade feature [+ high] of vowels and glides is carried over to non-palatal consonants as secondary articulatory as feature”.

3.2.2 Labialization

This is a phonological process which occurs when a non-labial sound is assimilated to a labial sound. Clark and Yallop (1995:64) state “ ... labialization is the addition of lip rounding or lip protrusion to any sound which is normally articulated with the lips in a neutral or spread position. Labialization modifies the basic articulation by extending the length of the vocal tract and altering its cross-section”. This process involves lip rounding.

3.3 TSHIVENDA DATA

In this section data will be grouped in different sets explicating to palatalization and labialization together with their sets.

3.3.1 Palatalization in Tshivenda

Edwards and Shriberg (1983:101) state that “ ... in the process of palatal assimilation, non-palatal consonant anywhere in a word become a palatal due to the influence of another palatal sound”.

In Tshivenda palatalization takes place in the formation of the Passive when / w / is affixed to the verb root ending with bilabial plosive. Palatalization (PAL) is also caused by the causative morpheme / i / (the short form) of / -is / when affixed to the verb root ending with alveolar nasal / n /. Consider the Tshivenda example below:

(47)	tangana	→	tanganya	[tʰaŋgʌnʌ]
	“to meet”		“united”	

What happens in (47) is the following:

(48)	[tʰaŋgan + i + a]	→	[tʰaŋgʌnʌ]
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The non-palatal nasal /n/ changed to a palatal /ɲ/ in the environment of a high vowel (which eventually changes to a glide /j/).

This indicates that palatalization is the phenomenon in which a segment whose primary articulation is at some other location is articulated with a secondary articulation involving the raising of the front part of the tongue towards the palate or the moving of the constriction forward towards the palate.

Following are different sets of data exemplifying the environments in which PAL takes place in Tshivenda. The phonological analysis in 3.5 will attempt to explain the variation in each set below.

SET A : PASSIVE

“Passive” is a term used in the grammatical analysis of voice referring to a sentence, clause or verb from where the grammatical subject is typically the “recipient” or “goal” of the action devoted by the verb (cf. Crystal 1997:280).

When the passive extension /w/ is suffixed to the verb root which end in certain consonants, sound changes take place. Note that although /w/ occurs in the orthographic representation it is absent in the phonetic representation. Consider the following data:

(49)	(a)	tapa “flick”	→	tapwa “be flicked away	[tʰapja]
	(b)	topa “nominated	→	topwa “be nominated”	[tʰɔpja]
	(c)	tshipa “strangle”	→	tshipwa “be strangled”	[tʃipja]
	(d)	phapha “stick to”	→	phaphwa “be stuck to”	[phapjha]
	(e)	phupha “weak”	→	phuphwa “be weakened”	[phupjha]
	(f)	phepha “turn”	→	phephwa “be turned”	[phɛpja]
	(g)	khopha “break”	→	khophwa “be turned”	[khɔpja]

(h)	goba “to plant”	→	gobwa “be planted”	[gɔbja]
(i)	buba “be early”	→	bubwa “being early”	[bubja]
(j)	vhumba “crown”	→	vhumbwa “be crowned”	[βumbja]
(k)	vhomba “roar”	→	vhombwa “be roared”	[βɔmbja]

SET B: CAUSATIVE

“Causative” is a term used in grammatical description to refer to the causal relationship between alternative versions of a sentence (cf. Crystal 1997:56). Causatives are usually expressed by verbs.

In Tshivenda the causative is signaled by the affixation of /-is-/ or its short form /-i-/ to a verb root. The analysis is presented in 3.5. Consider the following data.

(50)	(a)	tangana “meet”	→	tanganya	[tʰaŋgana]
	(b)	lingana “equal”	→	linganya	[liŋgana]
	(c)	luṭana “be at strife with one another”	→	luṭanya	[luṭana]
	(d)	vhandana “clap”	→	vhandanya	[βandana]
	(e)	kaidzana “reprimand”	→	kaidzanya	[kʰaidzana]
	(f)	piringana “become entangled”	→	piringanya	[pʰiriŋgana]
	(g)	kuvhangana “assemble”	→	kuvhanganya	[kʰuβaŋgana]
	(h)	fhiritana “become entangled”	→	fhiritanya	[fʰiritʰana]

(i)	vangana “assort”	→	vanganya	[vaŋgana]
(j)	vhumbana “mould”	→	vhumbanya	[βumbana]
(k)	balangana “scatter”	→	balanganya	[bafaŋgana]
(l)	kudana “collide”	→	kudanya	[k’udana]
(m)	sukana “tan”	→	sukanya	[suk’ana]
(n)	lamba	→	lambanya	[fambana]
(o)	omba “knock”	→	ombanya	[ɔmbana]
(p)	luma “bite”	→	lumanya	[ɾumana]

SET C : DIMINUTIVE

The diminutive in Tshivenda is expressed by an affix, with the general meaning of “little” (cf. Crystal 1992:104). Diminutives in Tshivenda are formed by adding the suffix / -ana /to a noun. Consider the following data:

(51)	(a)	mulambo + ana “river”	→	mulambwana	[mulambjana]
	(b)	thambo “rope”	→	thambwana	[t ^h ambjana]
	(c)	rambo “bone”	→	rambwana	[rambjana]
	(d)	nwana “child”	→	ńwananyana	[ŋwananana]
	(e)	musidzana “girl”	→	musidzanyana	[musidzanana]

3.3.2 Labialization in Tshivenda

During the production of labial sounds the back part and front part of the tongue are raised while lips are rounded. Sloat *et al* (1979: 45) say: "Another secondary articulation is labialization, which involves lip-rounding and a high back tongue position".

In Tshivenda, labialization is caused by suffixing / w / to the verb root in the case of passives. Labialization is also caused by suffixing /-ana/ to nouns ending in with vowel /u/. This means that sounds which were not labial are now labial after the process of assimilation. Consider the following labialization (LAB) data in Tshivenda:

SET D: PASSIVE

(52)	(a)	lila "cry"	→	lilwa	[fi fwa]
	(b)	tshimbila "walk"	→	tshimbilwa	[tʃhimbi fwa]
	(c)	lela "to nurse"	→	lelwa	[fɛ fwa]
	(d)	lula "roofing"	→	lulwa	[rurwa]
	(e)	bula "to name"	→	bulwa	[bufwa]
	(f)	shela "pour"	→	shelwa	[ʃɛfwa]
	(g)	lilela "crying for"	→	lilelwa	[lifɛfwa]
	(h)	lindela "wait"	→	lindelwa	[fiɛɛfwa]
	(i)	mala "marry"	→	malwa	[mafwa]
	(j)	ḁisa "bring"	→	ḁiswa	[ḁiswa]
	(k)	vusa "wake up"	→	vuswa	[vuswa]

(l)	lisa “look after”	→	liswa	[fiswa]
(m)	tusa “subtract”	→	tuswa	[tuswa]
(n)	bvisa “to take out”	→	bviswa	[bviswa]
(o)	vhidza “call”	→	vhidzwa	[βidzwa]
(p)	fhodza “heal”	→	fhodzwa	[fɔdzwa]
(q)	tshidza “save”	→	tshidzwa	[tʃhidzwa]
(r)	bika “cook”	→	bikwa	[bik'wa]
(s)	luka “to knit”	→	lukwa	[fuk'wa]
(t)	tika “to support”	→	tikwa	[tik'wa]
(v)	nwata “break”	→	nwatwa	[ɲwat'wa]
(w)	kata “roll”	→	katwa	[k'at'wa]
(x)	ita “make”	→	itwa	[it'wa]

SET E: Diminutive (see also SET C)

(53)	(a)	phulu “ox”	→	phulwana	[phufwana]
	(b)	ndau “lion”	→	ndawana	[ndawana]
	(c)	ndou “elephant”	→	ndowana	[ndɔwana]
	(d)	muthu “person”	→	muthwana	[muthwana]
	(e)	dilu	→	dilwana	[difwana]

3.5 LINEAR MODEL

The classical SPE model of Chomsky and Halle (1968) is an example of a linear phonological model. In this section the core elements of this model (also referred to as the TG model) are discussed. These core elements comprise the concepts “distinctive feature”, “phonetic representation”, “underlying representation” and “phonological rule”. The linear nature of this model is exemplified in a “phonological derivation” which is regarded as an input-output device applying phonological rules in a linear order.

3.5.1 Distinctive feature

Distinctive features are features used to analyze phonemes according to their inherent features. Phonemes are differentiated on the basis of their articulatory features. These features have been borrowed from the phonetic description of speech sounds and are therefore also known as phonetic features. According to Chomsky and Halle (1968) a language selects its features from a universal set of features on linguistic grounds. The concept “phoneme” has effectively been replaced as a phoneme is considered to be nothing else than a set (bundle) of unordered distinctive features. Consider the representation of two “phonemes” /a/ and /t'/ respectively:

(54) /a/

/t'/

$\left(\begin{array}{l} - \text{ high} \\ + \text{ son} \\ + \text{ vowel} \\ - \text{ mid} \\ + \text{ voice} \end{array} \right)$	$\left(\begin{array}{l} + \text{ cons} \\ - \text{ son} \\ + \text{ cor} \\ + \text{ ant} \\ - \text{ voice} \end{array} \right)$
--	--

Distinctive features should at least have phonetic correlates, distinguish phonetic segments uniquely, and be useful in phonological rules..

3.5.2 Phonetic representation

The phonetic representation of an utterance is presented in IPA symbol format and represents the pronunciation of the utterance. Consider the following example:

(55) vhona [βɔna]
 “see”

3.5.3 Underlying representation

An underlying representation shows the components of a word or how a word is formed.

Trask (1997: 366) defines the notion of underlying representation as “A more – or – less abstract phonological representation of a segment , morpheme, a word or a phrase from which corresponding surface forms including any variant realization, are derived by the application of rules.” Consider the following example:

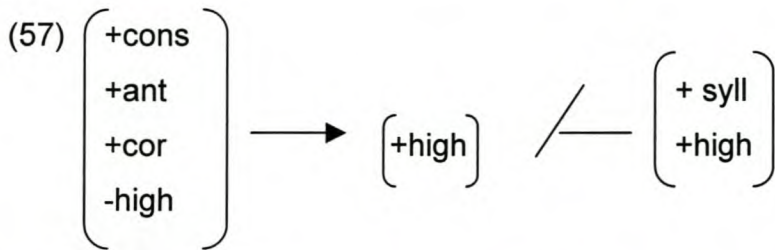
(56) goba “plant” / gɔb + a /
 gobwa “be planted” / gɔb + w + a /

From the preceding example, one can observe the components of the word “goba”, that it is composed of root / gɔb / and suffix / a / and the word “gobwa” is composed of the root / gɔb /; suffix / -w- / and terminating vowel / a /.

3.5.4 Phonological rule

In phonology the term phonological rule refers to a process that takes place “as a rule”. In phonology the term rule, therefore, does not refer to an instruction, prescription or stipulation, but to a regularity. It can be also said that the term refers to a process that is predictable: if all the conditions for the application of the rule are met, then the rule will be applicable.

Consider the typical structure of a phonological rule below



This rule states that alveolar stops are palatalized before front vowels. Different rules will be formulated below to account for the different phonological processes.

3.5.5 PHONOLOGICAL DERIVATION

Derivation shows how sound changes take place. This is where input and output of the utterance is observed. Different phonological rules are applied in a phonological derivation.

Trask (1996: 67) describes a phonological derivation as follows: "...the entire series of steps by which an underlying structure is converted rules into a surface structure". Consider the following example:

(59) gobwa [gɔbja] : Passive form of goba "to plant"

Input	/-gɔb + w + a/
PAL rule	bj
SVdel rule	∅
Output	[gɔ bj a]

This derivation in (59) implies the following: In order to generate the Passive voice (phonetic) output of goba, i.e. [gɔbja], it is hypothesized that the mother tongue speaker of Tshivenda takes as input the sequence /root (gob) + passive (w) + terminal vowel (a)/. He/she then applies a palatalization rule (still to be formulated) which will change b > bj. Due to the fact that there is no labial /w/ in the final phonetic output ([gɔbja]) he/she then employs a Semivowel Deletion rule to delete the /w/. By applying these phonological rules in this particular linear order, he/she generates the appropriate output.

3.6 LINEAR ANALYSIS OF PALATALIZATION (PAL) AND LABIALIZATION (LAB)

In this section examples of different sets of data (A-E) will be analyzed in this manner.

3.6.1 PALATALIZATION

SET A: PASSIVE

Compare the following example from SET A (50)

(60) goba “to plant” > gobwa (Passive)

(a) **Phonetic representation** : [gɔbja]

(b) **Underlying representation** : / gɔb + w + a /

(c) **Phonological rule**

In order to generate the phonetic representation (a) from the underlying representation (b) it seems as if the following phonological rules are involved.

(61) Palatalization rule (PAL)

$$\begin{pmatrix} + \text{ cons} \\ - \text{ high} \\ + \text{ ant} \\ - \text{ cor} \end{pmatrix} \longrightarrow \begin{pmatrix} + \text{ high} \end{pmatrix} / - \begin{pmatrix} - \text{ cons} \\ - \text{ vowel} \\ + \text{ high} \end{pmatrix}$$

This rule changes bilabial stops (cf. [+ant, -cor]) in Tshivenda into palatalized forms should the labial be juxtaposed to labio-velar glide (/w/) which contains a [+high] feature. In other words the glide (semi-vowel) transfers its high tongue position to the preceding consonant which causes the latter to be palatalized.

A second rule also seems to play a role in this process. It is clear that as the semi-vowel does not appear in the final output it is deleted by the speaker after it has created the environment for palatalization to have occurred. In other cases, in Tshivenda it also applies to the palatal glide /j/ as in example (66) below. Thus a /Cj/ or /Cw/ combination respectively become /C/ and /C/. This process can be formalized as follows:

(62)

(a) C + j \longrightarrow C
 [+ high] [+ high]

(b) C + w \longrightarrow C
 [+ round] [+ round]
 [+ high]

In order to generate the passive form of the verb, the following derivation seem to be made (this applies for all data in Set A).

(d) **Phonological Derivation**

(63) Input /gɔb + w + a /
 PAL bj
 SVDel \emptyset
 Output [gɔbjɑ]

The semivowel /w/ causes the consonant /b/ to become /bj/ after which /w/ is deleted. The TG model covers all data in SET A in this manner.

SET B: CAUSATIVE

The following example covers all data in SET B (51)

(64) tangana "meet" > tanganya (passive)

(a) **Phonetic representation** : [tɑŋgɑɲɑ]

(b) **Underlying representation**: /tɑŋgɑn + i + a)

(c) **Phonological rule**

In describing the data in this set, the following rules seem to play the role:

- (i) Semi vocalization rule (SV)
- (ii) Palatalization rule (PAL) and
- (iii) Semivowel deletion (SVDel)

These rules will be discussed below:

$$(65) \begin{pmatrix} + \text{ vowel} \\ - \text{ cons} \\ < - \text{ low} > \\ \alpha \text{ back} \end{pmatrix} \longrightarrow \begin{pmatrix} - \text{ vowel} \\ \alpha \text{ back} \end{pmatrix} \quad / \text{ — } \begin{pmatrix} + \text{ vowel} \\ - \text{ high} \end{pmatrix}$$

This rule will change an underlying /i/ into the glide /j/ (if the initial vowel is [-back]), and underlying /u/ into the glide /w/ (if the initial vowel is [+back]).

In order to generate the causative form of the verb. The semi-vowel will be deleted after the verb has been palatalized.

(ii) Palatalization rule (PAL)

This rule has already been described in (61).

(iii) Semivowel deletion (SVDEL)

This rule was described in (62).

The following derivation can be applied to the data in SET B.

(e) Phonological Derivation

(66) Input	/ ʔaŋgan+ i + a /
SV	j
PAL	n
SVDEL	∅
Output	[ʔaŋgana]

SET C: DIMINUTIVE

Compare the following example from the SET C in (52)

(67) mulambo “river” > mulambwana

(a) Phonetic representation [mulambjana]

(b) Phonological rule

In describing the date in this set (SET C), the following rules play a role:

- (i) Semivocalization rule
- (ii) Palatalization rule
- (iii) Semivowel deletion rule

These rules have all been described respectively in (65), (61) and (62).

(d) Phonological Derivation

In order to form diminutive of the noun, the following derivation can be made and this applies for all examples in SET C. Consider the following example:

(68) Input	/ mulambo + ana /
SV	w
PAL	bj
SVDEL	∅
Output	[mulambjana]

SET D: PASSIVE

Compare the following example with the data in SET D (53)

(69) lila “cry” > lilwa

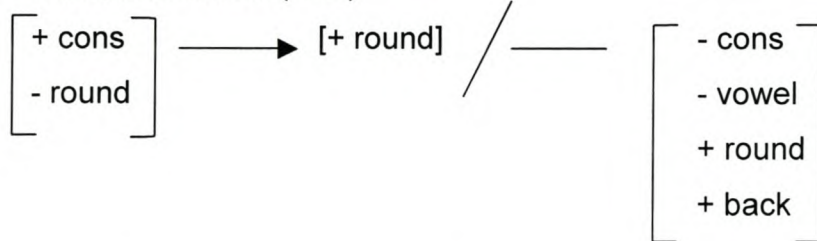
(a) **Phonetic representation** [lil^wwa]

(b) **Underlying representation** / lil + w + a /

(c) **Phonological rule**

To generate the phonetic representation (a) from the underlying representation (b) it seems as if the following phonological rule is involved.

(70) Labialization rule (LAB)



This rule changes all unround sounds in Tshivenda into labialized counterparts. This change takes place when an unrounded consonant is juxtaposed to a labia-velar glide which contains, *inter alia*, a [+round] specification.

(d) **Phonological Derivation**

(71) Input	/ li l + w + a /
LAB	^w
Output	[li l ^w wa]

From the above representation, only labialization rule is operating. SVDel rule cannot apply here because the [+round] consonant is not simultaneously [+high]. The semivowel /w/ is retained.

SET E: DIMINUTIVE

Compare the following example from SET E (54)

(72) ndau "lion" < ndawana

(a) **Phonetic representation** [ndawana]

(b) **Underlying representation** / ndau + ana /

(c) **Phonological rule**

Only one rule, i.e. Semivocalization (65) operates in this process.

(d) Phonological derivation

(73) Input	/ ndau + ana /
SV	w
Output	[ndawana]

With this rule the underlying / u / is changed to / w / and suffix / -ana / is retained, giving the correct output.

3.5 EVALUATION

From the examples of the different data sets (A-E) in the preceding presentations, it has become clear that all changes with regard to palatalization and labialization are adequately covered by the FG model. The different assimilation processes are demonstrated in the respective phonological derivations.

It is clear that the linear (FG) model presents a plausible explanation for phonological processes such as labialization and palatalization.

CHAPTER 4

PALATALIZATION AND LABIALIZATION : A NON-LINEAR PHONOLOGICAL ANALYSIS

4.1 INTRODUCTION

In this chapter the focus will be on the nature of palatalization and labialization in Tshivenda. In more specific terms, this chapter presents:

- (a) A short introduction to the non-linear Feature Geometry (FG) model.
- (b) A view on core concepts of Feature Geometry model, with a focus on:
 - (i) distinctive features as ordered in hierarchical trees,
 - (ii) representations as processes.

This will be followed by a non-linear phonological analysis of each particular process.

4.2 NON-LINEAR (FG)

In applying distinctive features in phonological analysis, it was found that certain processes only involve certain groups of distinctive features and that there seems to be a relationship between features. This led to the postulation of a theory of Feature Geometry (cf. Clements 1985) which states that features are organized in one of the other hierarchical tree. This means that some features may be dependent on others whilst others may be totally independent. The nature of the tree is very much determined by the way in which the constituents behave in phonological analysis.

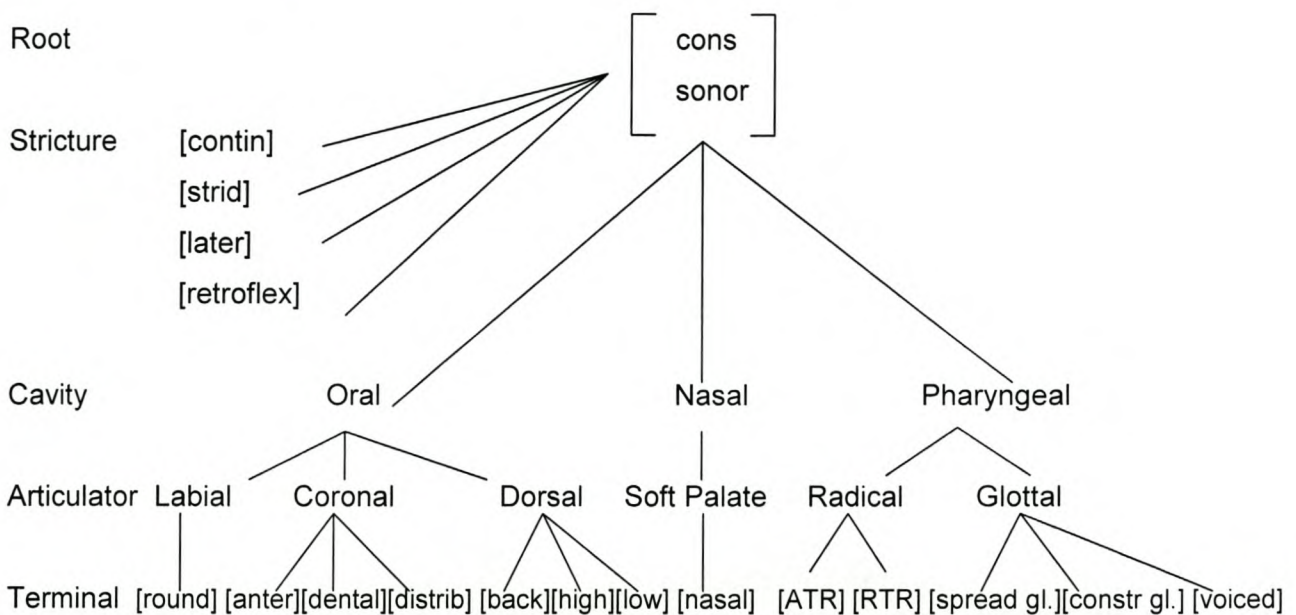
The aim of the non-linear model is to describe and explain phonological phenomena.

4.3 CORE CONCEPTS OF FEATURE GEOMETRY

4.3.1 DISTINCTIVE FEATURES

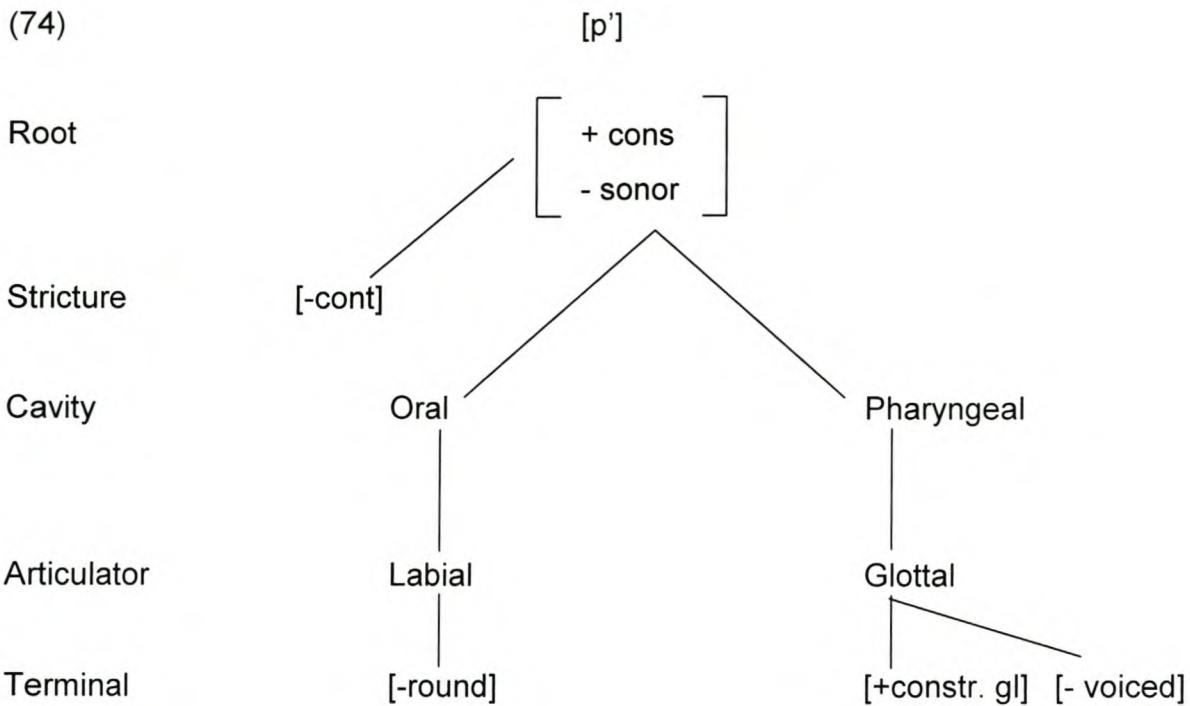
In non-linear phonology distinctive features are ordered in a hierarchical tree. In linear (TG) phonology these features have been represented as unorganized bundles of features. In order to capture formally natural feature groupings and restrictions on feature combinations, phonologists working within FG theory have pursued the hypothesis that features are organized in a hierarchical tree structure. Compare the figure in (73) below.

(73) Adapted FG model for Tshivenda



From the above representation in (73) it is clearly observed that features are organized in a hierarchical tree.

In order to make (73) more clearly understood compare it with the following representation of the phonetic segment [p']



This type of phonology does away many traditional concepts including the concept of rules and rule ordering. Thinking of an FG-tree as a representation it is argued that, should two or more of these representations co-occur; features at various node levels may interact with one another. Nodes may be spread from one to the other, nodes may be deleted or duplicated (cf. Clements 1985).

The Feature Tree has the following core components:

- Root: This is the highest level of the tree. It is composed of consonant and sonorant features.
- Cavity: This is the second level and it is called sister node because it depends on the root. Three cavity features are to be distinguished [oral], [nasal] and [pharyngeal].
- Articulator: This is the third level and also called sister node because it depends on cavity. There are six articulators which are: [labial], [coronal], [dorsal], [soft palate], [glottal] and [radical].
- Terminal Feature: This is the lowest level of the feature tree. It depends on the articulator node and comprises of thirteen features as indicated in (73).

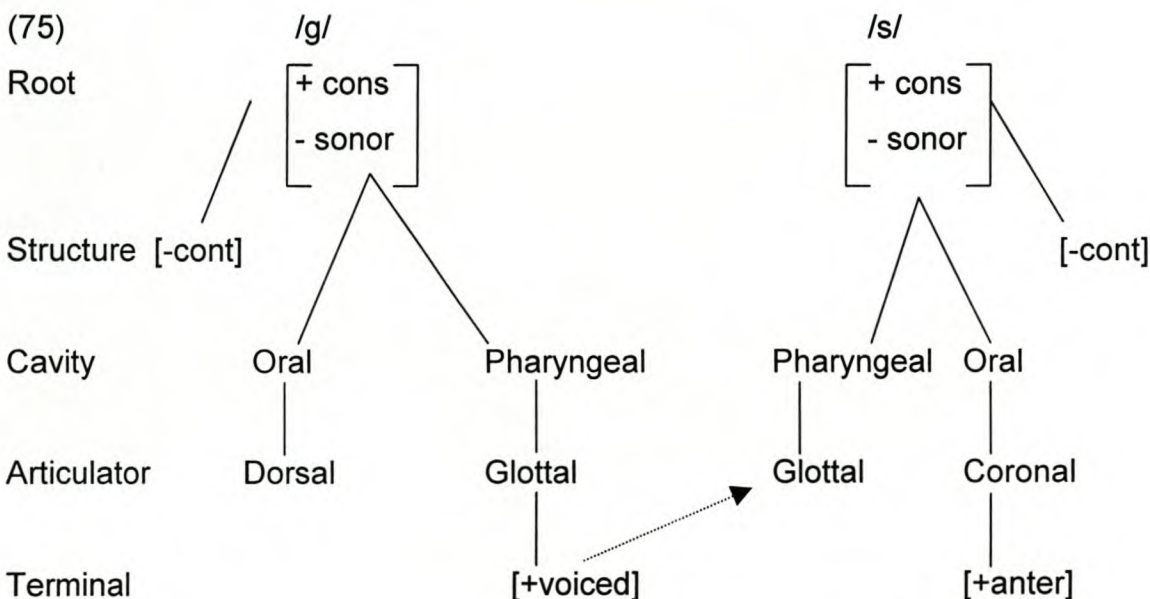
4.3.2 NO LINEAR INPUT / OUTPUT PROCESS BUT REPRESENTATION

Contrary to a linear (TG) phonological model which operates in an input-output mode, and which requires phonological rules to be applied in a linear order, this FG model does not require the formulation of rules. This model relies on the **representation** of juxtaposed segments and the existence of, *inter alia*, spreading and linking or delinking mechanisms to explain a particular sound change. Assimilation processes are treated as the spreading and delinking of features.

Taylor (1991:228) maintains that, "Spreading is a language particular operation that may include trigger and target conditions and also a directionality parameter". The spreading can be summarized as follows:

- Spreading can occur only if the spreader is spreading to the same node that dominates it, that is, a structural target must be present.
- A feature or node can spread only to an empty position (cf. Taylor, 1991).

This means that spreading is the moving of feature from one node to the other node. Spreading is well understood in English when plural morphemes are introduced. Compare the following representation of the plural formation in English where the plural suffix /-s/ assimilates to the voicing of the final consonant of the noun. Thus /cat + s/ > [kæts], but /dog + s/ > [dɒgz]. This voicing assimilation may be demonstrated in the following example (75):



In this particular example the voicing of the terminal node spreads to the articular node of the /s/ changing it to become phonetically realized as [z].

Delinking usually also play a role in assimilation processes. Trask (1997:105) states that delinking is "...the procedure by which a feature is disconnected from its superordinate node and hence removed from the phonetic realization of a segment." Delinking can be understood in the process of vowel raising that occurs in many African languages, see (2) in this regard.

4.4 KINDS OF ASSIMILATION

Mackay (1978: 102) points out that "... the processes of assimilation underlie sound changes in which the features of one sound segment adapt to those of adjacent sound segments. An assimilatory process can change features which relate to place of articulation; manner of articulation voicing or a combination of these three. Such a process can change the sound segments completely (they become identical) or partly (the two sound segments becomes more similar to each other)". Following are different types of assimilations:

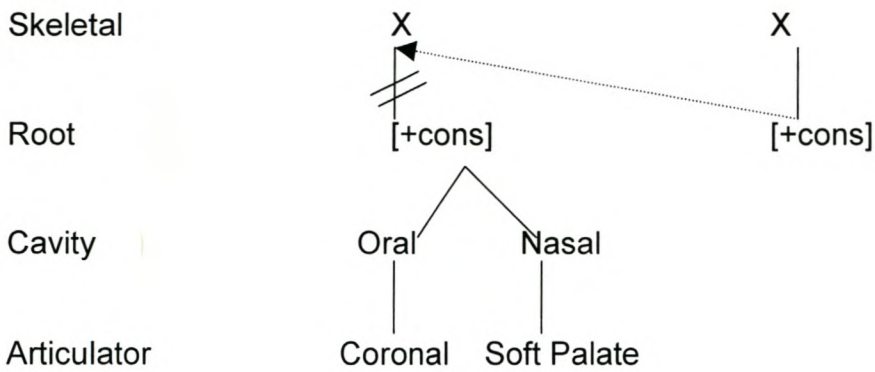
4.4.1 SINGLE – FEATURE ASSIMILATION

Single-feature assimilation corresponds to the extension of a terminal feature or leaf. This assimilation takes place on the terminal node. The change may be related to [high], [back], [round] etc. as found, *inter alia*, in palatalization and labialization.

4.4.2 COMPLETE ASSIMILATION

This type of assimilation takes place or occurs on the root node. This is where we find that one segment completely assimilates the other, e.g. /mn /> [mm].

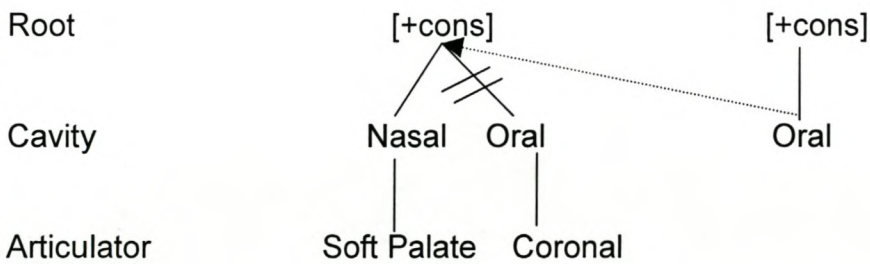
(76)



4.4.3 PARTIAL ASSIMILATION

The information at some intermediate node in the tree spreads to an adjacent position. This means that one segment only assimilates partially, e.g. /nb/ > [mb].

(77)



4.5 FEATURE GEOMETRY ANALYSIS

In this section the different data sets (A-E) will be analysed in terms of an FG model in order to determine its applicability.

SET A

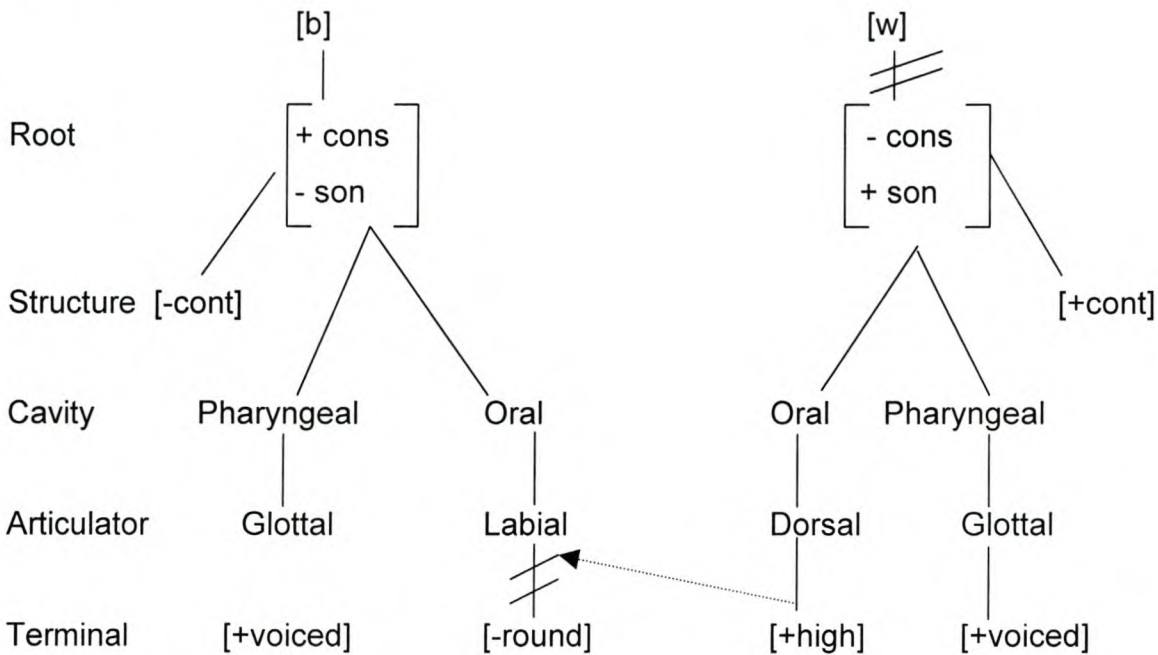
Compare the following example from Set A (50)

(78) = (63) gobwa < goba "to plant"

- (a) Phonetic representation [gɔbja]
- (b) Underlying representation / gɔb + w + a /

In order to represent the process of Palatalization that has taken place here, the following feature tree may be constructed.

(79)



The representation in (79) demonstrates the phonological process that has taken place. That is, when two segments in (79) appear in this order at skeletal level, then the /w/ spreads its feature [+high] towards the preceding consonant labial node, in this event the [b] delinks its [-round] feature value and now shares the [+high] feature value of /w/. Now /b/ is interpreted as [bj] because [b] contains [+high] feature.

Due to the fact that there is no rounded semivowel /w/ in the output, it is clear that this segment is deleted when following a palatal consonant. Therefore the /w/ is delinked at the root node.

The problem however is that the [high] feature which has spread will also be deleted. This implies that there is a temporal order present which first allows the spreading of [+high] and then deletes the trigger [w]. Although this is contrary to the general applicational principles of the model, it nevertheless presents some explanation for the change.

SET B

Compare the following example with SET B (64)

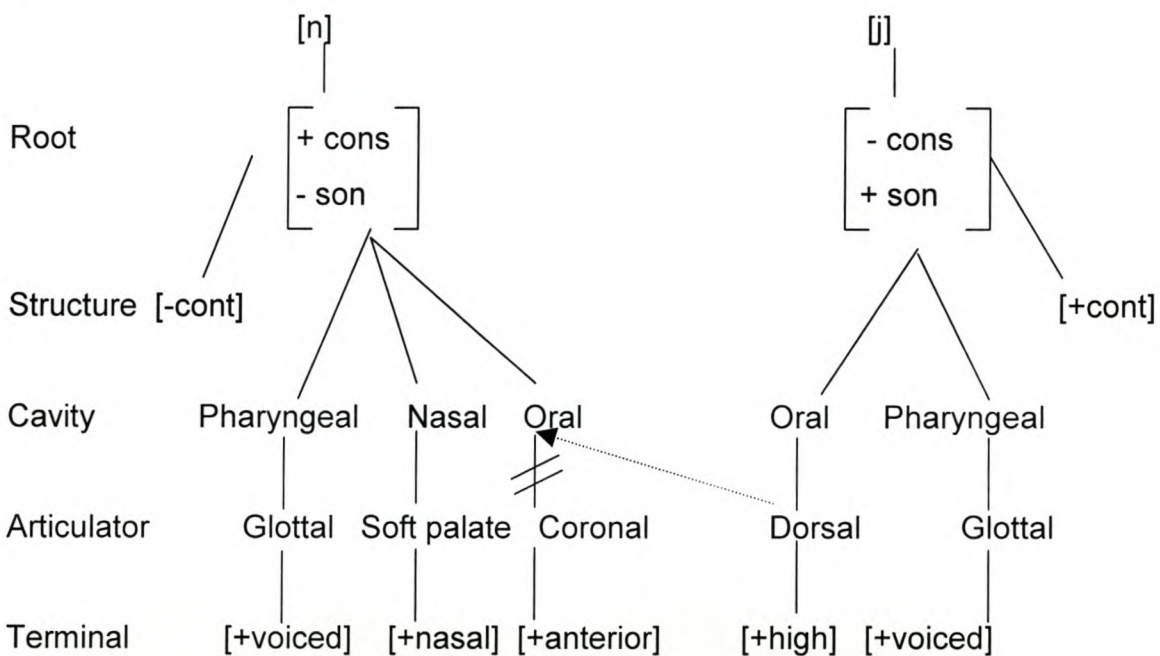
(80) = (66) tanganya < tangana “meet”

(a) Phonetic representation [tʌŋgʌnʌ]

(b) Underlying representation /tʌŋgan + i + a /

The preceding representation in SET B may be presented as follows:

(81)



From the preceding representation, [j] spreads its [+high] feature from dorsal node to the preceding consonants oral node, in this event the /n/ delinks its coronality and share [+high] feature value. Therefore /n/ is interpreted as [ɲ] because /n/ contains [+high] feature.

The problem with this analysis however is that underlying /i/ has to be represented as the semivowel /j/, which has a higher tongue position than /i/ and which is the only element that can induce palatalization in this context. In other words it seems as if a semivocalization process had to proceed this operation.

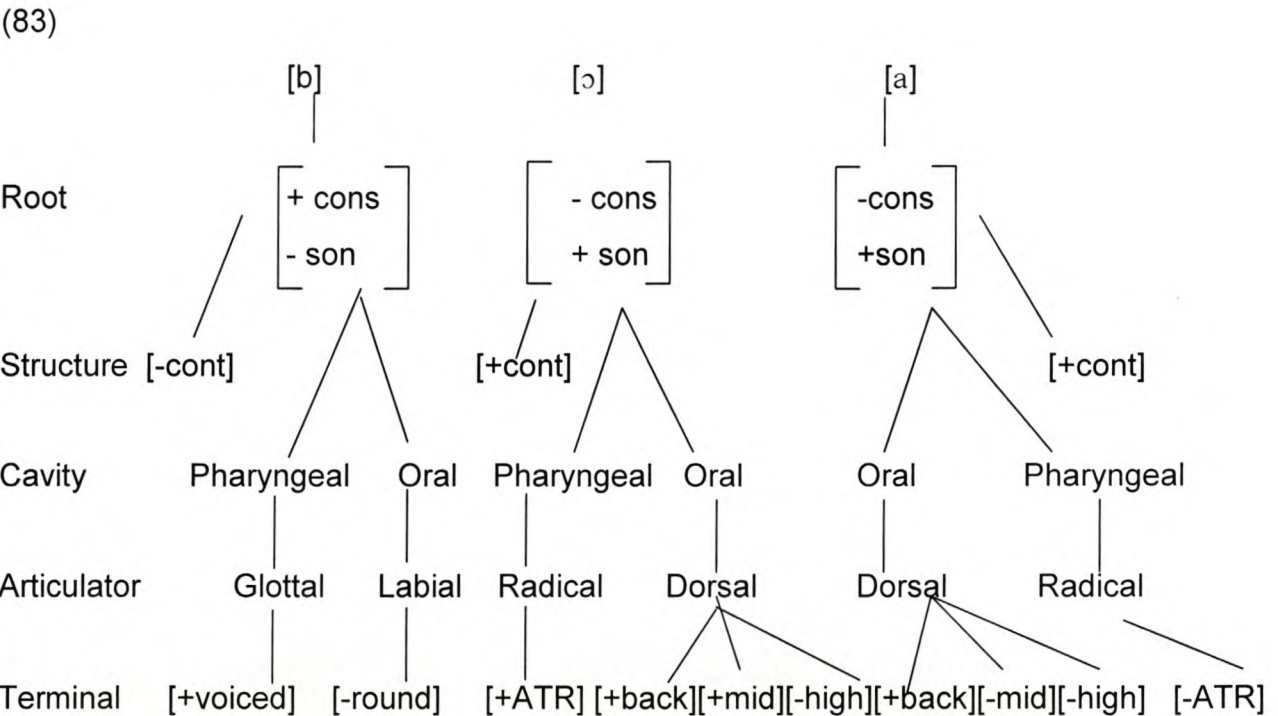
SET C

Compare the following example with SET (52)

(82) = (68) mulambwana < mulambo “river”

- (a) Phonetic representation [mulambjana]
- (b) Underlying representation / mulambo + ana /

The above representation may be presented as follows:



This analysis exemplifies the problem in (83): It is not possible to spread any [+high] feature towards the consonant in order for it to become palatalized. Only after an intermediary step of semivocalization has taken place, i.e. converting /ɔ/ to /w/ which contains a [+high] feature, then would it be possible to account for palatalization. There is no way to present this sequencing of events within the FG model.

SET D

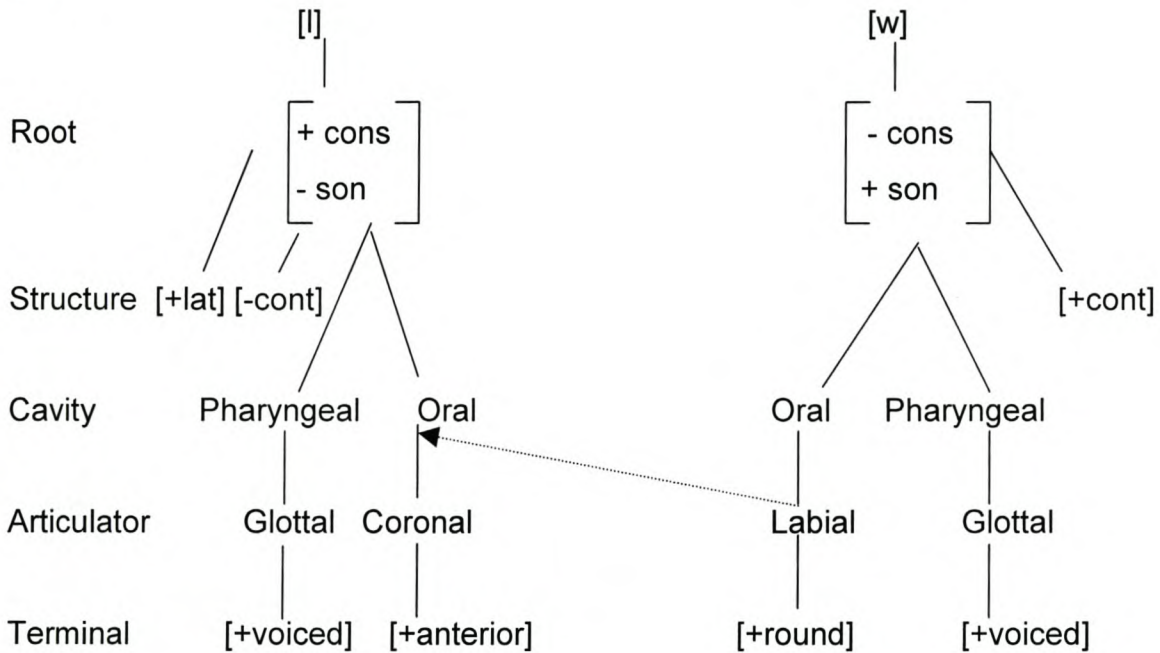
This example should be compared with SET D (53) in Labialization.

(84) = (71) lilwa < lila “cry”

- (a) Phonetic representation [li^wwa]
- (b) Underlying representation /li + w + a/

Within a FG model the following representation of the above mentioned may be presented.

(85)



The semivowel /w/ is one of the major causes of labialization taking place. In this presentation the [+round] feature of the labial node spreads to the oral node of the previous consonant imparting its labial features to the consonant. In this case the FG model is fully capable of explaining the labialization process taking place with Passives in Tshivenda.

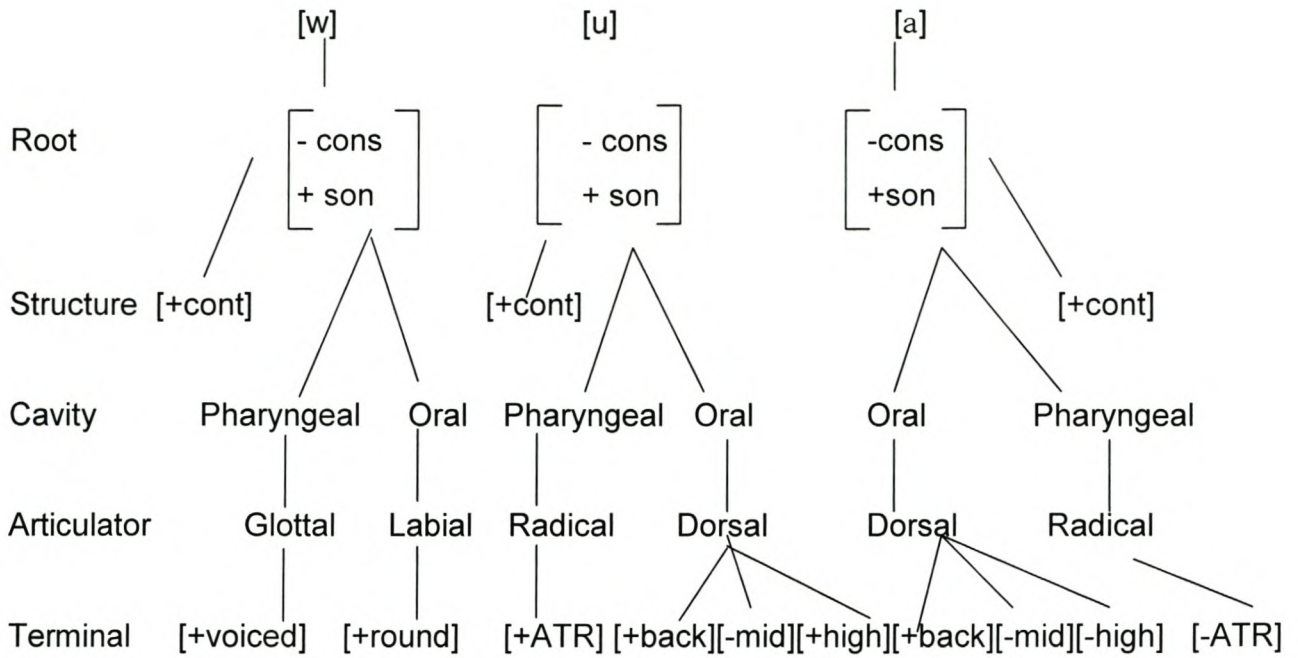
SET E

Compare the following example with SET E (54)

(86) = (74) ndawana < ndau "lion"

- (a) Phonetic representation [ndawana]
- (b) Underlying representation /ndau + ana/

The above representation is presented in an FG model as follows:



It is clear from this presentation that it is not possible to generate a semivowel /w/ from an underlying representation /u/. The model therefore is inadequate to account for such a change in Tshivenda.

4.6 EVALUATION

It appears as if the FG model cannot provide an adequate description or explanation for the phenomena of palatalization and labialization in Tshivenda.

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

The transformational linear (TG) generative theory of Chomsky and Halle (1968) proved to be inadequate to present credible explanations for different phenomena in a number of languages to which it had been applied. This resulted in further development of the model to the point of the so-called Feature Geometry Theory (FG Theory). This theory views distinctive features not as an unordered bundle of features, but as part of a hierarchical set of relationships. The FG theory also does away with the concept of derivations and assumes that phonological processes may be best viewed as a formal representation in which features may spread from one hierarchical node to the other; where nodes may be deleted or retained.

This study mainly centred around the application of the TG and FG models to the phenomena of palatalization and labialization in Tshivenda.

5.2 AIM OF THIS STUDY

In Chapter One the main aim of the study was given. The aim of this study was to evaluate the nature of the application of both theories to the phenomenon of Palatalization and Labialization as assimilation processes in Tshivenda in order to determine which of these two models present the most plausible explanation for these phonological process.

5.3 FINDINGS

5.3.1 LINEAR MODEL

The application of the TG model to the process of Palatalization in Tshivenda the following are rules that play the most important role:

- (a) Semi vocalization rule
- (b) Palatalization rule
- (c) Semivowel Deletion rule

It was shown that these rules used to be applied in a specific linear order, i.e. in most cases in the order (a), (b), (c) above. The application of, for instance, the Semivocalization rule created the environment for Palatalization to apply, and if necessary also for the Semivowel Deletion rule to apply. The important point to be made here is that a model allowing for the application of rules in temporal order, seems to stand a good chance to account for the phenomena of palatalization and labialization in Tshivenda.

Labialization is characterized by the set of feature values [+back; +high and +round].

5.3.2 NON-LINEAR MODEL

The application of an FG model to the phenomenon of palatalization in Tshivenda proved to be problematic. The sole reason for this is the fact that both semivowels /w/ and /j/ act as triggers for PAL to take place. These segments, however, need to be created from an underlying sequence of vowels (normally from /n + a/ or /l + a/) and this does not seem to be possible within the current theory. On the other hand, if /w/ and /j/ were to be accepted as underlying representations, the problem would be addressed to a certain extent. This, however, would place the credibility of the model at stake.

5.3.3 EVALUATION

Given the results of this investigation, it appears as if the classical TG model has more to offer than its more contemporary counterpart, the FG model when it comes to the description and explanation of palatalization and labialization in Tshivenda.

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