NYANGUMARTA PRONOUNS

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1. INTRODUCTION[1]

In many languages it is often difficult deciding on which morphemes constitute affixes and which morphemes constitute free words. Sometimes there is a mismatch between what might be described as a phonological word, morphological word and/or a syntactical word. On the surface the distinction between word and affix might appear as clear cut as that shown in Figure 1 where there is no overlap between word and affix.[2]

	'Word'	'Affix'
Pause word	x	
Case/tense, mood, aspect	x	
Stress word	x	
Minimal word	x	
Position bound[3]		x
Phonological rule domain		x
Buffer vowel domain		x

FIGURE 1: WORD/AFFIX DISTINCTIONS

Nyangumarta is a language in which distinctions between affixes and words are not always clear cut, particularly in the area of pronouns. Nyangumarta has been described as having two sets of pronouns: a set of free pronouns and a set of pronominal affixes attached to the verb (O'Grady 1964; Hoard & O'Grady 1976; Geytenbeek, B. 1991; Geytenbeek, H. 1988; Sharp 1985, 1986; Sharp & Thieberger 1992). (Much of the work on Nyangumarta has been carried out by O'Grady since he began his study of the Nyangumarta spoken at Wallal in 1949. O'Grady's phonological work with James Hoard (1976) deals with this northern Nyangumarta dialect spoken at Wallal (north of Hedland) in the 1950s. The present study although recognising and utilising aspects of the northern Nyangumarta dialect is concerned predominantly with the phonology of the southern Nyangumarta dialect.)

1 I would like to thank John Henderson, Juliette Blevins and Alan Dench for their helpful comments and suggestions regarding this paper. All errors are my own.

2 The criteria used to distinguish affix from word in Figure 1 is concerned with phonological facts for Nyangumarta specifically and may or may not apply to other languages.

3 It is acknowledged that this category is definitely not one which can be used to differentiate words and affixes across languages as fixed order is not only found for affixes and clitics but is also found for words. However, in Nyangumarta the situation is such that generally word order is free (although there are preferred orders) and hence phonological words can occur in any position in the phrase whereas affix order is fixed. In the situation of the verbal pronouns, the order is fixed even though it will be argued that some of these pronouns are in fact phonological words.

Darrell Tryon and Michael Walsh, eds *Boundary rider: essays in honour of Geoffrey O'Grady*, 327–362.
Pacific Linguistics, C–136, 1997.

The mismatch between word and affix has not been discussed previously for the verbal pronouns although Geytenbeek (1992) has touched on the topic in his paper entitled 'Nyangumarta verbalisers—suffixes or separate forms?'. Hoard and O'Grady (1976) have also acknowledged two distinct boundaries for the verbal pronouns: a boundary for 'internal morphemes' and the other boundary for 'external morphemes'.

In this paper the issue of 'word' or 'affix' is investigated for Nyangumarta based on the phonological operations of the verbal phrase and in this regard it is argued that in Nyangumarta there are three distinct sets of pronouns. On one hand there is a set of independent pronouns which pattern with the optional nominals in Nyangumarta sentences occurring with the same case-marking system (see Tables 2 and 3) and operating in a general system of free word order. On the other hand there is a set of verbal pronouns, occurring obligatorily following verbal inflections. It is proposed that the pronouns occurring in the verbal phrase are in fact two distinct phonological sets: one a set of word type pronouns and one a set of affix type pronouns. The major, consistent difference between the two sets is that one set (affix type pronouns) undergo general phonological rules whereas the second set (the word type pronouns) do not undergo the same phonological rules.[4] Stress placement and the minimal word constraint in Nyangumarta are also factors for determining two distinct sets within the verbal phrase.

The verb phrase in Nyangumarta is a phonological phrase defined as a stress group, consisting of one or two phonological words, which cannot be broken by a pause (see Blevins (1993) for a similar referral to the phonological phrase in Gilyak). Phonological words in Nyangumarta usually have the distinctive attribute that in normal speech the speaker can actually stop or pause before the word is uttered and then resume speaking with that particular word as the first word; subminimal words must be uttered in the phrase and cannot be the first utterance after a pause. The 'pause word' feature is utilised within this paper due to the fact that even though there appears to be an unambiguous division between those phonological words which are independent and subminimal words which are clitics or affixes, for the pronouns occurring within the verbal phrase the division is not clear cut and 'pause word' is one criteria used to show the ambiguity between what is argued, two distinct sets.

Section 2 outlines general features and distribution of the three sets of pronouns, §3 outlines some of the relevant phonological facts, particularly facts regarding vowel alternations which apply to the affix type pronouns, §4 establishes the major differences between the two sets of verbal pronouns, and §5 outlines some special cases of Nyangumarta pronouns.

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4 The fact that the verbal pronouns have operated as two distinct sets in the phonology is not new (see Hoard and O'Grady (1976) who use the notation + to refer to the bound pronouns as internal morphemes and # to refer to the rest as external morphemes). Sharp (1985) has argued that affixaton in Nyangumarta occurs on two separate strata; the level 1 affixes being the bound morphemes and the level 2 affixes the free verbal pronouns.

2. NYANGUMARTA PRONOUNS

2.1 NYANGUMARTA DIALECTS

Nyangumarta, a language spoken in the north-west of Western Australia, is a member of the Pama-Nyungan language family which covers about seven-eighths of the Australian continent. Nyangumarta according to O'Grady (1964) and O'Grady, Voegelin and Voegelin (1966) belongs, together with Karajarri and Mangarla, within the Marrngu subgroup of the Nyungic branch of Pama-Nyungan. Traditionally, the Nyangumarta people lived in an area that stretched from south and east of Lake Wakarlikarli (towards Telfer) northwards to a long string of claypans that lie east of Sandfire, and which reach over 120 kilometres into the Great Sandy Desert. There are two principle dialects of Nyangumarta: a northern coastal and a southern desert. The term Walyirli (Wanyarli) is the more common name for the coastal and more northern of the two dialects. The Nyangumarta grammar written by O'Grady (1964) is based on this dialect. The speakers of Walyirli currently live in the area of Broome and La Grange (along with the speakers of several other Aboriginal languages). Geytenbeek (1987) has suggested that the word Walyirli comes from the Nyangumarta word *walyi* 'shoulder' and is used to refer to this group's punishment practice of spearing the shoulder or the thigh. The Ngurlipartu dialect is spoken by people from the southern inland regions of the Pilbara although many Nyangumarta speakers attest that Ngurlipartu is a separate language spoken further east of Nyangumarta.[5] After white pastoralists arrived, some of the northern Nyangumarta people moved westwards. For over a century they were the main occupants of the Eighty Mile Beach area. Today there are about 800 speakers of Nyangumarta. Most of these live within a 200 kilometre radius of Marble Bar or in the La Grange area. The data in this paper encompasses the two major dialects. Where it is necessary, the different dialects have been noted. One of the notable differences between the two principal dialects is the productiveness of the progressive vowel harmony systems, the northern dialect being the more productive of the two.

2.2 NYANGUMARTA PRONOUNS

Nyangumarta pronouns show a distinction of three numbers (singular, dual and plural) and three persons (first, second and third), with an inclusive/exclusive constrast in the first person dual and plural. Table 1 gives the three sets of pronouns (the shaded area gives the forms of the free verbal pronouns as distinct from the affixes).[6]

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5 See Sharp (forthcoming) for a further discussion of Nyangumarta language names.

6 Abbreviations used in this paper are as follows:

ABL	ablative case	ERG	ergative case	NM	nominaliser
ACC	accusative case	EXC	exclusive	NOM	nominative case
ADV	advisory mood	FUT	future tense	PAST	past tense
ALL	allative case	GEN	genitive case	PL	plural
ANT	anticipatory mood	IMP	imperative mood	POT	potential mood
AVER	aversive case	IMPF	imperfective aspect	PRIV	privative case
COM	comitative	INC	inclusive	REM	remote past
DAT	dative case	INCH	inchoative	SG	singular
DEIC	deictic	LOC	locative case	VBS	verbaliser
DES	desiderative aspect	NEG	negative word	VOL	volitional aspect
DU	dual	NFUT	non-future		

TABLE 1: NYANGUMARTA PRONOUNS

		Bound Verbal Pronouns and Free Verbal Pronouns		
Person	Independent	Nominative	Accusative	Dative/Locative
1SG	*ngaju*	*-rnV*	*-nyV*	*-jV*
2SG	*nyuntu*	*-n/npV*	*-ntV*	*-ngu*
3SG	*paliny*	*-Ø/-rrV*[7]	*-Ø*	*-lV/lu*
1DU.INC	*ngali*	*-li*	***ngali-nyi***	***ngali-ku***
1DU.EXC	*ngalayi*	*-layi ~ -liya*	***ngalayi-nyi***	***ngalaya-ku***
1PL.INC	*nganyjurru*	*-nyV*	***nganyjurri-nyi***	***nganyjurra-ku***
1PL.EXC	*nganarna*	*-yirnV*	***ngani-nyi***	***ngana-ku***
3PL	*jana*	*-yV*	***jani-nyi***	***jana-ku***
3DU	*pulany*	***pulu***	***puli-nyi***	***pula-ku***
2DU	*nyumpala*	***nyumpulu***	***nyumpuli-nyi***	***nyumpula-ku***
2PL	*nyurra*	***nyurru***	***nyurri-nyi***	***nyurra-ku***

The free verbal pronouns closely resemble the independent pronouns, the major difference being the type of case-marking system used to encode their function in utterances: independent pronouns are inflected for ergative/absolutive case (as well as dative, allative, locative, ablative and genitive), whereas the word type pronouns operate in a nominative/accusative system and overt case marking can be identified: *-nyi* for the accusative set and *-ku* for the dative set. The bound verbal pronouns do not appear with overt case marking but they do operate in a nominative/accusative system.

The verbal pronouns are so called because their position in the verbal phrase is fixed: they occur following inflections for tense, mood or aspect (except for the anticipatory mood morpheme which is a discontinuous morpheme with the final segment appearing phrase finally). The word type pronouns always occur in the verbal phrase where there is always a distinct ordering of words and morphemes. Independent pronouns (or full nominal expressions) and bound pronouns can co-occur in sentences, although independent and the word type verbal pronouns are rarely found in the same utterance. In most sentence types of Nyangumarta, the verbal pronouns are obligitory and the independent pronouns are optional. However, in advisory constructions (see examples (11)–(14)) the opposite situation occurs: only the independent pronouns occur (although they are still not obligatory).

2.2.1 INDEPENDENT PRONOUNS

Independent pronouns inflect on an ergative/absolutive case-marking system: pronouns in transitive subject function are marked for ergative case whereas pronouns in intransitive subject and transitive object function are unmarked for case. Independent pronouns in indirect object function are marked for dative and at times locative case.

The independent pronouns follow the same pattern of case marking as does the class of nominals. Tables 2 and 3 show the case inflections on independent pronouns and nominals in Nyangumarta. The following examples illustrate the co-occurrence of the independent

[7] The *-rrV* only occurs in the northern dialect of Nyangumarta and only when no other person markers follow it. The morphemes in bold text represent the verbal 'free' pronouns. The independent pronouns are presented in absolutive case which is null.

pronouns and the affix type pronouns in Nyangumarta. Absolutive case marking is unmarked.

(1)	*Ngaju-lu*	*kampa-rna-rna*	*mayi.*	
	1SG-ERG	cook-NFUT-1SG.NOM	food	
	I cooked the food.			
(2)	*Ngali-lu*	*ma-na-li*	*partany.*	
	1DU.INC-ERG	get-PAST-1DU.INC.NOM	child	
	We two got the child.			
(3)	*Nganarna-lu*	*kanyji-rni-yirna-lu.*		
	1PL.EXC-ERG	look.for-NFUT-1PL.EXC.NOM-3SG.DAT		
	We all looked for it.			
(4)	*Wirla-lama-rna-nta*	*nyuntu*	*ngaju-lu.*	
	hit-FUT-1SG.NOM-2SG.ACC	2SG	1SG-ERG	
	I will hit you.			
(5)	*Paliny-ju*	*yirri-rni*	*janinyi*	*jana.*
	3SG-ERG	see-NFUT	3PL.ACC	3PL
	He/she saw them.			
(6)	*Partany*	*ya-na*	*nyuntu-karti.*	
	child	go-PAST	2SG-ALL	
	The child went to you.			
(7)	*Partany*	*ya-na-lu*	*paliny-ku.*	
	child	go-PAST-3SG.DAT	3SG-DAT	
	The child went for her/him.			
(8)	*Partany*	*kaja-rna*	*ngaju-ngu.*	
	child	sit-PAST	1SG-LOC	
	The child sat with me.			
(9)	*Pirirri-lu*	*ma-na-lu*	*kuyi*	*paliny-ja.*
	man-ERG	get-PAST-3SG.DAT	meat	3SG-ABL
	The man got meat off him.			
(10)	*Partany*	*ngaju-mili*	*ya-na.*	
	child	1SG-GEN	go-PAST	
	My child went.			

Nyangumarta has distinct forms for third person pronouns, that is, Nyangumarta has both third person pronouns as well as having corresponding third person demonstrative forms.[8] For example, *paliny* '3SG' versus *nyungu* 'this', *pulany* '3DU' versus *nyungu-jirri* 'these-DU', and *jana* '3PL' versus *nyungu-rrangu* 'these-PL'.

8 Many Australian languages do not have 'third person pronouns' that are similar to first and second person pronouns. Instead there is a system of demonstrative pronouns which often involve obligatory specification of whether the person referred to is near to or distant from the speaker, sometimes whether he is visible or not and so on. Dixon (1980:277) claims that these "items combine a deictic semantic role" (i.e. referring to 'this' or 'that' in the environment of the utterance). They have some properties of third person pronouns in that they can make up a noun phrase by themselves (as an alternative to a head noun) or else they can occur with a noun in a noun phrase.

TABLE 2: CASE MARKING ON SINGULAR INDEPENDENT PRONOUNS

	First Person	Second Person	Third Person
Ergative	*ngajulu*	*nyuntulu*	*palinyju*
Absolutive	*ngaju*	*nyuntu*	*paliny*
Dative	*ngajuku*	*nyuntuku*	*palinyku*
Locative	*ngajungu*	*nyuntungu*	*palinyja*
Allative	*ngajukarti*	*nyuntukarti*	*palinykarti*
Ablative	*ngajuja*	*nyuntuja*	*palinyja*
Genitive	*ngajumili*	*nyuntumili*	*palinymili*

TABLE 3: CASE MARKING ON NOMINALS[9]

	ngurra 'camp'	*karru* 'creek'	*mirtawa* 'woman'
Ergative	*ngurralu*	*karrulu*	*mirtawaju*
Absolutive	*ngurra*	*karru*	*mirtawa*
Dative	*ngurraku*	*karruku*	*mirtawaku*
Locative	*ngurrangu*	*karrungu*	*mirtawaja*
Allative	*ngurrakarti*	*karrukarti*	*mirtawakarti*
Ablative	*ngurraja*	*karruja*	*mirtawaja*
Genitive	*ngurramili*	*karrumili*	*mirtawamili*

The independent pronouns (as well as other nominal expressions) occur in advisory main clauses and in non-finite subordinate purposive clauses. In these clause types, neither bound pronouns nor word type pronouns occur. In these types of constructions the verb is inflected with the advisory mood morpheme ((11)-(14)) or else the verb is nominalised and inflected for dative case producing purposive dependent clauses ((15)-(17)).

(11) *Malya-naku mungka ngaju-lu.*
chop-ADV tree 1SG-ERG
I will chop the tree.

(12) *Kanyji-naku paliny-ju narnngula-ku.*
look.for-ADV 3SG-ERG bush.honey-DAT
He's looking around for bush honey.

(13) *Lakarn-pi-naku parirr-ju ma-ninyaku pala narnngula nyuntu-lu.*
peel-VBS-ADV hand-ERG get-ADV that bush.honey 2SG-ERG
You should peel it back with your hand to get the bush honey.

(14) *Munu yirrku-lu karli-nyaku ngapa-majirri.*
NEG still-ERG dig-ADV water-PRIV
Don't keep digging when there is no water./You shouldn't keep digging if there's no water.

(15) *Kurnta-na-ku jakurli-rna paliny-ju.*
sing-NM-DAT persuade-NFUT 3SG-ERG
He persuaded or caused him to sing.

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9 The occurrence of some of these forms is rare owing to the awkwardness of meaning caused by the case inflection (e.g. *ngurra-mili* 'the camp's...', or *karru-mili* 'the creek's...' etc.).

(16) *Wirlarra-lu* *mima-nikinyi-pulinya* *kujarrany-ku* *nyimurlja-jarri-nya-ku*
moon-ERG wait-IMPF-3DU.ACC both-DAT dive-INCH-NM-DAT
paliny-mila-ku-jirri *partany-ku-jirri.*
3SG-GEN-DAT-DU child-DAT-DU
The moon waited till both of his children had dived (under the water).

(17) *Pirirri-lu-jirri* *wika* *ma-na-pulu* *mayi-ku-pa* *kuyi-ku*
man-ERG-DU wood get-PAST-3DU.NOM food-DAT-and meat-DAT
kampa-na-ku *pulany-ju.*
cook-NM-DAT 3DU-ERG
Two men got firewood to cook meat and vegetables.

2.2.2 AFFIX TYPE PRONOUNS

Bound pronouns in Nyangumarta occur attached to the verbal element and are a significant part of the verbal morphology (see Table 4). Generally bound pronouns are monosyllabic and do not bear stress. The two exceptions to this are first person dual exclusive (*-layi/-liyi*) and first person plural exclusive (*-yirni*) which surface as bisyllabic morphemes (although they do not take major stress). These cases will be discussed below.

TABLE 4: AFFIX TYPE PRONOUNS

Person	Nominative	Accusative	Dative/Locative
1SG	*-rnV*[10]	*-nyV*	*-jV*
2SG	*-n/npV*	*-ntV*	*-ngu*
3SG	*-Ø/-rrV*	*-Ø*	*-lV/lu*
1DU.INC	*-li*	____	____
1DU.EXC	*-layV/-liyV*	____	____
1PL.INC	*-nyV*	____	____
1PL.EXC	*-yirnV*	____	____
3PL	*-yV*	____	____
3DU	____	____	____
2DU	____	____	____
2PL	____	____	____

2.2.3 WORD TYPE PRONOUNS

The verbal phrase word type pronouns complete the set of verbal pronouns as is seen comparing Tables 4 and 5. The word type pronouns are all bisyllabic or polysyllabic with major stress occurring on the first syllable. The word type pronouns can be analysed as being inflected for nominative, accusative and dative/locative case due to the fact that each pronoun in the accusative and dative/locative set consists of a word stem and a suffix. The stem undergoes phonological rules which affect the surface form of the final vowel. The accusative pronouns can be analysed as having an accusative suffix *-nyi* and the dative/locative pronouns can be analysed as having an overt dative suffix *-ku* which is also consistent with dative case marker found on nominals. The set of dative/locative pronouns are used to indicate indirect object when the semantics of the predicate requires either a

10 V notation refers to featureless vowel slots; that is, the vowels are unspecified for features in underlying representation and receive feature specifications by phonological rule or default rules.

purpose, locative or benefactor. The dative/locative set can also occur with word-final /a/ as distinct from /u/. This is generally when the sense is purposive (although this does tend to differ from speaker to speaker in the current speech of Nyangumarta people).

TABLE 5: WORD TYPE PRONOUNS

Person	Nominative	Accusative	Dative/Locative
1SG	_____	_____	_____
2SG	_____	_____	_____
3SG	_____	_____	_____
1DU.INC	_____	*ngalinyi*	*ngaliku*
1DU.EXC	_____	*ngalayinyi*	*ngalayaku*
1PL.INC	_____	*nganyjurrinyi*	*nganyjurraku*
1PL.EXC	_____	*nganinyi*	*nganaku*
3PL	_____	*janinyi*	*janaku*
3DU	*pulu*	*pulinyi*	*pulaku*
2DU	*nyumpulu*	*nyumpulinyi*	*nyumpulaku*
2PL	*nyurru*	*nyurrinyi*	*nyurraku*

In Nyangumarta sentences, the affix type pronouns and the word type pronouns can co-occur in the verbal phrase. The word type pronouns always occur as the final elements of the verb phrase (except for the anticipatory suffix as mentioned above). The ordering of the verbal pronouns: subject forms precede object except for first singular pronouns which precede all others, and second singular object and dative forms precede third dual. This ordering constraint puts the 'free' verbal pronouns as the final members of the verb phrase, that is, the affix type pronouns precede the free word type pronouns (except for the third singular dative/locative pronoun *-lV/-lu* which will be discussed below). The free word type verbal pronouns show some interesting (although expected) animacy hierarchical phenomena. When the direct object or indirect object is animate the dative/locative pronoun is overtly marked in the verb phrase; when it is inanimate it is not. Example (18) gives the pronoun form *-li* '3SGDAT/LOC' to indicate the climbing onto the cow whereas in (19) the climbing up the tree is not marked as an argument of the verb. Example (20) gives the indirect object 'the two children' being marked in the verb phrase: *pulaku* '3DU.DAT'.

(18) *Purlika-nga karnti-nyi-li.*
bullock-LOC climb-NFUT-3SG.LOC
He climbed onto a cow.

(19) *Mungka-nga karnti-nyi.*
tree-LOC climb-NFUT
He climbed up the tree.

(20) *Pala-nga partany-ja-jirri paliny-mili-ngi-jirri parruparru parnpi-rni*
that-LOC child-LOC-DU 3SG-GEN-LOC-DU net throw-NFUT
pulaku kujarrany-ja.
3DU.DAT both-LOC
And there he threw the net over both of his children.

3. NYANGUMARTA PHONOLOGY

In Nyangumarta there are thirteen underlying consonants and three underlying vowels. Nyangumarta has five paired stops and nasals, two rhotics and three coronal laterals. There are no fricatives and there is no voicing contrast.

	bilabial	alveolar	post-alveolar	alveo-palatal	velar
stop	*p*	*t*	*rt*	*j*	*k*
nasal	*m*	*n*	*rn*	*ny*	*ng*
lateral		*l*	*rl*	*ly*	
trill/tap		*rr*			
approximant	*w*		*r*	*y*	*w*

FIGURE 2: NYANGUMARTA CONSONANT PHONEMES

The three Nyangumarta vowels are given in Figure 3.

	front	back
high	*i*	*u*
low	*a*	

FIGURE 3: NYANGUMARTA VOWEL PHONEMES

3.1 DISTINCTIVE FEATURES

The following features (Table 6 for consonants and Table 7 for vowels) are assumed distinctive underlyingly for Nyangumarta.

TABLE 6: NYANGUMARTA CONSONANT UNDERLYING FEATURES[11]

	p	*t*	*rt*	*j*	*k*	*l*	*rl*	*ly*	*m*	*n*	*rn*	*ny*	*ng*	*r*	*rr*	*w*	*y*
consonant	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
sonorant	(-)	(-)	(-)	(-)	(-)	+	+	+	+	+	+	+	+	+	+	+	+
nasal	(-)	(-)	(-)	(-)	(-)	(-)	-	-	+	+	+	+	+	(-)	(-)	(-)	(-)
coronal		x[12]	x	x		x	x	x		x	x	x		x	x		x
lateral		-	-	-		+	+	+		-	-	-		-	-		-
anterior		+	-	-		+	-	-		+	-	-		-	+		-
distributed		-	-	+		-	-	+		-	-	+		-	-		+
labial	x								x							x	
high				+				+				+				+	+
back																+	

[11] Parenthesis notation is used to denote features which are not distinctive underlyingly in Nyangumarta. These features are filled in by default rules and/or redundancy rules later in the phonology.

[12] X notation is used for privative features such as coronal and labial.

TABLE 7: NYANGUMARTA VOWEL DISTINCTIVE FEATURES

	i	*u*	*a*
high	+	+	(-)
low	(-)	(-)	(+)
back	(-)	+	+
round	(-)	(+)	(-)

3.2 STRESS AND THE MINIMAL WORD CONSTRAINT

3.2.1 STRESS

In Nyangumarta the following generalisations can be made about stress placement:[13]

(21) a. Primary stress occurs on the initial syllable of a word.
b. Secondary stress occurs on alternating syllables after primary stress.
c. Secondary stress occurs on the initial syllable of bisyllabic and polysyllabic suffixes.
d. The final syllable of a word does not bear stress.

The patterns of Nyangumarta stress can be seen in (22). Notice in (22e) and (22f) a contrasting pattern emerges between an affix type pronoun *-yirni* '1PL.EXC.NOM' and a free type pronoun *pulu* '3DU.NOM'. The affix type pronoun does not bear primary stress whereas the free type pronoun interrupts the stress pattern and starts a new pattern of stress. If we take the domain of stress to be the phonological word, then we can state that the word type pronouns constitute phonological words whereas the affix type pronouns do not.

(22)	a.	*wírla-rna.*	He/she hit it.
	b.	*wírla-rnà-rna.*	I hit it.
	c.	*wírla-rnìkinyi.*	He/she was hitting it.
	d.	*wírla-rnìkinyì-rni.*	I was hitting it.
	e.	*wírla-rnìkinyì-yirni.*	We were hitting it.
	f.	*wírla-rnìkinyi púlu.*	Those two were hitting it.
	g.	*wírla-rnìkinyi púlinyi.*	He/she was hitting those two.

To this point, we have seen that on two counts the word type pronouns exhibit word characteristics and on one count an affix characteristic. To summarise then we know that word type pronouns are not pause words (they are part of the verbal phrase stress group which does not allow pauses), they bear primary stress on the first syllable, they are inflected for case and they occur in a set position with respect to other morphemes in the verbal phrase. These findings are given in Figure 4.

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13 See Sharp (forthcoming) for a complete description of stress patterns for Nyangumarta. Also see Nash (1980) for similar findings for Warlpiri and Goddard (1985) for similar stress patterns in Yankuntjatjara.

	'Word'	Word Pronouns	Affix Pronouns	'Affix'
Pause word	x			
Case/tense, mood, aspect	**x**	**x**		
Stress word	**x**	**x**		
Minimal word	x			
Position bound		x	x	x
Phonological rule domain				x
Buffer vowel domain				x

FIGURE 4: WORD/AFFIX DISTINCTIONS IN NYANGUMARTA (STRESS)

3.2.2 MINIMAL WORD

In Nyangumarta there exists a rule of vowel reduction which operates over the domain greater than the minimal word.[14] The rule is prevented from occurring where the result of the rule would create a violation of the minimal word constraint. A minimal word in Nyangumarta is bimoraic with stress on the first mora. If the vowel which is deleted or elided is stressed, then stress shifts to the following vowel with vowel lengthening occurring. The minimal word constraint is represented in (23a), and (23b) shows an instance whereby the constraint is violated.

(23) Minimal Word Constraint
a) [μ μ] word b) *[μ] word

To ascertain the usefulness of this criteria for the analysis of the verbal pronouns, it will be shown how this constraint operates within the phonology of Nyangumarta. This can be done by examining the rule of vowel reduction. The rule is given below and examples (24a)–(24h) show where the rule has applied; (25) shows where the rule does not apply because of the minimal word constraint and (26) shows a contrast between reduplicated forms. In (26a) and (26c) the rule does not apply even though the reduplicated form would fit the structural description of the rule; the reduplicated root does not. In (26b) and (26d) the rule applies to each root. Example (26) again shows the mismatch between morphological word and phonological word. All of the complex forms are morphological words in that their meaning is dependent on the complex form although it appears that each morphological word consists of two distinct phonological words, each with its own stress domain.

Vowel Reduction/Deletion
u/i -------> Ø/V / [-sonorant] ______ r or w

(24) a. *kuwarri* *kwárri* e. *pampuru*[15] *pámpru*
now blind

[14] This rule was pointed out to me by Brian Geytenbeek.

[15] *Pampuru* 'blind' has two alternants: *pampurru* and *pampuyu*, neither of which undergo the rule of vowel reduction. Geytenbeek (1991) notes that the full phonemes /r/, /rr/ and /y/ are often variants in cognates between languages in the Pilbara region. The Ngarla word for Coolibah tree *pirarr* (p'rarr) undergoes the vowel reduction rule but the Nyangumarta word for the same tree *piyarr* occurs with stress on the first syllable and does not undergo the rule because of the /piy/ sequence.

b. *pirirri* *prírri*
man

c. *purungu* *prúngu*
skin section

d. *yunturi* *yúntri*
sulky

f. *kurarr* *krárr*
Native Mesquite

g. *kuwaly* *kwály*
white person

h. *pural* *prál*
rolled up bundle

(25) a. *tira* **trá*
firm, hard

b. *puru* **prú*
aimless

(26) a. *kura-kura* *kúra-kúra*
placename

b. *kuran-kuran* *krán-krán*
species of spinifex

c. *piru-piru* *píru-píru*
uninhibited

d. *pirirr-pirirr* *prírr-prírr*
saw-shark

Evidence such as the operation of the vowel elision/reduction rule suggests that a minimal word in Nyangumarta can be described in several ways including allowing stem-final consonants to take syllable weight, like vowels. Thus the following configurations can occur:

(27) Nyangumarta Minimal Words (μ = mora)

a) C V C_o V
μ μ

b) C V V
μ μ

c) C V C[16]
μ μ

The application of the vowel reduction rule can now be explained. The nominal *tira* 'firm, hard' fits the description of the rule. The lexeme *tira* consists of two morae: the two vowels /i/ and /a/. However, the rule of vowel reduction cannot apply because the resulting form would consist of only one mora—a violation of the minimal word constraint. The lexeme *kurarr* 'Native Mesquite' on the other hand has three morae: two vowels and the final consonant. The vowel reduction rule can apply as the resulting form would not violate the minimal word constraint because the resulting form would still consist of two morae. If we use the minimal word constraint as one of the means for distinguishing affixes from words it can be seen that all of the word type pronouns satisfy the minimal word constraint whereas the majority of the affix type pronouns do not (the two in question, *-layi* and *-yirni*, will be discussed in §3). Figure 5 gives a summary.

16 As predicted by this representation there are words of this form in Nyangumarta: *lurn* 'kingfisher', *muny* 'rump bone', *ngurr* 'growl', *tily* 'a cracking noise', *jirr* 'spread out'. The only possible consonants occurring in this position are sonorants.

	'Word'	Word Pronouns	Affix Pronouns	'Affix'
Pause word	x			
Case/tense, mood, aspect	x	x		
Stress word	x	x		
Minimal word	**x**	**x**		
Position bound		x	x	x
Phonological rule domain				x
Buffer vowel domain				x

FIGURE 5: WORD/AFFIX DISTINCTIONS IN NYANGUMARTA (MINIMAL WORD)

3.3 PHONOLOGICAL RULES

Many of the phonological rules in Nyangumarta apply to words and morphemes within the verbal phrase, that is, the verb stem plus inflections for tense, mood, aspect and verbal phrase pronouns. The vowel harmony rules, for example, apply almost exclusively to the morphemes within the verbal phrase (with some harmony occurring in restricted nominal morphemes). The following discussion briefly outlines some of the phonological processes relevant to the verbal phrase. The significant aspect of investigating the application of the following phonological phenomena is that processes which apply to the phonological word as the domain of application only affect the affix type verbal pronouns whereas those applying across word boundaries affect the free word type verbal pronouns.

3.3.1 VOWEL ELISION

A rule of vowel elision operates whereby the first vowel of a sequence of two adjacent vowels is deleted. This is seen clearly in the NY conjugation forms of the imperative and the potential mood. Example (28) gives forms of the imperative and potential mood where vowel elision has occurred; it also gives forms of the non-future where the final vowel of the verb stem remains unchanged.

Vowel Elision Rule[17]

V------> Ø / _______V

(28) a. *ngalp-a* — *ngalp-u* — *ngalpa-nyi*
enter-IMP — enter-POT — enter-NFUT

b. *karnt-a* — *karnt-u* — *karnti-nyi*
climb-IMP — climb-POT — climb-NFUT

c. *karl-a* — *karl-u* — *karli-nyi*
dig-IMP — dig-POT — dig-NFUT

[17] See Hoard and O'Grady (1976) and Sharp (1985) for a similar rule in the northern, coastal dialect of Nyangumarta.

3.3.2 EPENTHESIS

Many forms of the verbal morphemes are determined by a general rule of epenthesis which inserts *-pV* whenever two coronal consonants are juxtaposed across morpheme boundaries. For example, the second singular nominative morpheme *-n* appears as *-npV* after suffixation of morphemes beginning with a coronal consonant.[18] The remote past morpheme *-l* also occurs as *-lpV*[19] after suffixation of morphemes beginning with a coronal consonant. See (29), (30) and (31) for examples of these forms:

Epenthetic *pV* Rule

Ø ------> pV / [coronal, +son] (V) _____ #[20] [coronal, +son]
| |
C C

(29) Second Person Singular Nominative *-n*

	Underlying Forms	Surface Forms
a.	*ngalp-a-n-lV*	*ngalp-a-npi-li*
	enter-IMP-2SG.NOM-ANT	
b.	*ngalpa-nyV-n*	*ngalpa-nyi-n*
	enter-NFUT-2SG.NOM	

(30) Remote Aspect *-l*

	Underlying Forms	Surface Forms
a.	*wirla-rnVl-li*	*wirla-rnalpa-li*
	hit-REM-1DU.INC.NOM	
b.	*wirla-rnVl*	*wirla-rnal*
	hit-REM	
c.	*wirla-rnVl-rnV*	*wirla-rnalpa-rna*
	hit-REM-1SG.NOM	
d.	*wirla-rnVl nyurrV*	*wirla-rnal nyurru*
	hit-REM 2PL.NOM	

(31) Future Tense *-lkulVny/-lV*

	Underlying Forms	Surface Forms
a.	*wirla-lkulVny*	*wirla-lkuliny*
	hit-FUT	
b.	*wirla-lV-yV*	*wirla-lapi-yi*
	hit-FUT-3PL.NOM	
c.	*wirla-lV-yVrnV*	*wirla-lapi-yirni*
	hit-FUT-1PL.EXC.NOM	

---

18 This rule appears to refer to vowels as well as sonorant consonants in some dialects of Nyangumarta where the purposive suffix *-a* exists. For example, *ngalpa-nyi-np-a* 'you went in (for a reason)' compared with *ngalpa-nyi-n* 'you entered'. The additional vowel is deleted by the rule of vowel elision.

19 The remote past inflection has several allomorphs depending on the verbal conjugation. In the NY class it occurs as *-nyil*, in the RN class it occurs as *-rnVl*, and in the N class it occurs as *-nVl*.

20 # notation refers to morpheme boundary.

3.3.3 NASAL ASSIMILATION

A rule of nasal assimilation (informally written below) explains the surface form contrast of the future tense morpheme when it occurs with bound pronouns. Nasal assimilation occurs only in the context of the future tense morpheme and follows *-pV* epenthesis.

Nasal Assimilation[21]

p ------> m / ___ V [nasal]

(32)

	Underlying Forms	Surface Forms
a.	*ya-nku-lV-li* go-POT-FUT-1DU.INC.NOM	*ya-nku-lupa-li*
b.	*ya-nku-lV-nyV* go-POT-FUT-1PL.INC.NOM	*ya-nku-lumi-nyi*
c.	*wirla-lV-yV* hit-FUT-3PL.NOM	*wirla-lapi-yi*
d.	*wirla-lV-nyV* hit-FUT-1PL.INC.NOM	*wirla-lami-nyi*

3.3.4 PALATAL CLUSTER REDUCTION[22]

A rule of palatal cluster reduction occurs as an external sandhi rule. The rule does not apply within phonological words, only within the verbal phonological phrase. Whenever two consonants with the feature [+distributed] occur across word boundaries, the first is deleted. This rule is generally optional but is obligatory in the future tense morpheme for both dialects and the remote past in the northern dialect.

Palatal Cluster Reduction (Optional)[23]

[+distributed] ------> Ø /_____ V_o #[+distributed]

See (33) for examples of the rule occurring in the verbal phrase whereby the 2PL.NOM pronoun *nyurru* appears word finally and the rule occurs deleting the palatal consonant which precedes it. See (34) for examples whereby the rule has not occurred in the nominal morphology (see discussion below).

(33)

	Underlying Forms		Surface Forms
a.	*yaja-rnV-nyV* follow-NFUT-1SG.ACC	*nyurrV* 2PL.NOM	*Yaja-rni-nyurru.* You followed me. (cf. *Yaja-rni-nyi nyurru.*)
b.	*ka-ngkulV-nyV* take-FUT-2SG.NOM	*nyurrV* 2PL.NOM	*Ka-ngu-lumi-nyurru?* Will you take me? (cf. *Ka-ngku-lumi-nyi nyurru?*)

---

21 See Hoard and O'Grady (1976) and Sharp (1985) for a similar rule for Nyangumarta.

22 See Hoard and O'Grady (1976) for a description of the truncation rule: *nji* -----> *ó* / ____ # *nj*. The # notation in their analysis indicates an external morpheme boundary. The truncation rule explains surface forms or *ngalpi#njumpulu* and *ngalpi#njurru* as distinct from *ngalpi+nji#njumpulu* and *ngalpi+nji#njurru*.

23 This rule (which is a post-lexical rule) feeds the vowel elision rule which appears as a lexical and a post-lexical rule. The vowel harmony (VH) rule also applies as a lexical rule and a post-lexical rule.

c.	*ka-ngkulV-jV* take-FUT-1SG.DAT	*nyurrV* 2PL.NOM	*Ka-ngu-lupi-nyurru?* Will you take it for me? (cf. *Ka-ngku-lumi-ji nyurru?*)
d.	*wirla-rnVkVnyV* hit-IMPF	*nyurrV* 2PL.NOM	*Wirla-rna-ki-nyurru.* You all were hitting it. (cf. *Wirla-rna-kinyi nyurru.*)
e.	*wirla-lkulVny* hit-FUT	*nyurrV* 2PL.NOM	*Wirla-lku-lu-nyurru.* You all will hit it. (cf. **Wirla-lku-luny nyurru.*)

(34) a. *partany-ju* child-ERG
b. *Wanywany-ju* name-ERG
c. *milpiny-ja* fingernail-LOC
d. *kurntany-ja* shame-LOC
d. *pikaly-ja* happy-ABL

Examples where the palatal cluster reduction rule fails to apply within phonological words (across morpheme boundaries) include instances where the ergative, locative and ablative allomorphs *-ju*, *-ja/-ji* and *-ja* are suffixed to nominals: *partany-ju* 'child-ERG', *Wanywany-ju* 'name-ERG', *milpiny-ja* 'fingernail-LOC', *kurntany-ja* 'shame-LOC' and *pikaly-ja* 'happy-ABL' as seen in (34) above.

3.4 Vowel Alternations

There are two types of vowel alternations in Nyangumarta. An unbounded rule of progressive assimilation and a local rule of regressive assimilation. Rightward vowel alternations are triggered by the final vowel of a verb or nominal stem, vowels within specific bound morphemes and by consonants. Leftward assimilation is consonant induced generally although in one special case there is leftward assimilation triggered by a vowel. Vowel positions are generally the targets of both rules.

3.4.1 Progressive Alternations

The vowels of some Nyangumarta morphemes surface with the same vowel as the final vowel of the stem. The effects of these vowel alternations can be seen below.

(35) Nominal Morphology: Locative

a. *pirti-ngi*
hole-LOC

b. *paru-ngu*
spinifex-LOC

c. *ngurra-nga*
camp-LOC

Example (35) shows that the locative suffix *-ngV* occurs as *-ngi*, *-ngu* or *-nga*. The vowel qualities of the suffix are determined by the final vowel of the stem to which it is added. This is also seen in (36) below where the non-future tense morpheme *-rnV* can occur as *-rni*, *-rnu* or *-rna* depending on the final vowel of the verb stem.

(36) Verbal Morphology: Non-Future

a. *yirri-rni*
see-NFUT

b. *warli-rni*
touch, detain-NFUT

c. *kalku-rnu*
keep-NFUT

d. *wirla-rna*
hit-NFUT

Example (37) gives the vowel alternations occurring when bound pronouns with featureless vowel slots are affixed to the verb; (38) illustrates vowel alternations occurring in the imperative morpheme; and (39) those occurring in the remote past.

(37) Verbal Morphology: Bound Pronouns

	Underlying Forms	Surface Forms
a.	*yirri-rnV-rnV* see-NFUT-1SG.NOM	*yirri-rni-rni*
b.	*warli-rnV-rnV* touch, detain-NFUT-1SG.NOM	*warli-rni-rni*
c.	*kalku-rnV-rnV* keep-NFUT-1SG.NOM	*kalku-rnu-rnu*
d.	*wirla-rnV-rnV* hit-NFUT-1SG.NOM	*wirla-rna-rna*
e.	*kalku-rnV-ntV* keep-NFUT-2SG.ACC	*kalku-rnu-ntu*
f.	*yirri-rnV-ntV* see-NFUT-2SG.ACC	*yirri-rni-nti*
g.	*wirla-rnV-ntV* hit-NFUT-2SG.ACC	*wirla-rna-nta*
h.	*kalku-lku-rnV* keep-POT-1SG.NOM	*kalku-lku-rnu*
i.	*yirri-rnV-rnV-ntV* see-NFUT-1SG.NOM-2SG.ACC	*yirri-rni-rni-nti*

(38) Verbal Morphology: Imperative[24]

	Underlying Forms	Surface Forms
a.	*yirri-lV* see-IMP	*yirri-li*
b.	*kalku-lV* keep-IMP	*kalku-lu*

[24] The pronouns occurring with the imperative morpheme will be discussed in §5.

c. *wirla-lV* *wirla-la*
hit-IMP

(39) Verbal Morphology: Remote Past[25]
Underlying Forms Surface Forms
a. *paji-rnVl-rnV* *paji-rnilpi-rni*
bite-REM-1SG.NOM

b. *paji-rnVl-yV* *paji-rnilpi-yi*
bite-REM-3PL.NOM

c. *paji-rnV-l-nyV* *paji-rnilpi-nyi*
bite-REM-1PL.INC.NOM

Although vowel alternations are generally triggered by the final vowel of a stem and they generally target affixes with featureless vowel slots (such as the non-future morpheme *-rnV*, the remote past allomorph *-lpV* and the first person singular nominative morpheme *-rnV*), there are instances of vowel alternations occurring within stems and within suffixes. There are also instances of morphemes with unalternating vowels which in turn trigger vowel alternations. Example (40) gives instances of vowel alternations occurring within stems, (41) gives forms where the final vowel of the genitive suffix alternates between /i/ and /a/, and (42) gives forms whereby the desiderative mood morpheme triggers vowel alternations.

(40) Alternations in Stems
Underlying Forms Surface Forms
a. *ngunilV* *ngunili*
that same one (cf. *ngunila-lu*)[26]

b. *kujungurrV* *kujungurru*
sea (cf. *kujungurra-lu*)

c. *walypilV* *walypili*
whitefellow (cf. *walypila-lu*)

(41) Nominal Morphology
Underlying Forms Surface Forms
a. *ngaju-milV* *ngaju-mili*
1SG-GEN (cf. *ngaju-mila-ku*)[27]

(42) Alternations triggered by potential mood morpheme
Underlying Forms Surface Forms
a. *yirri-lku-rnV* *yirri-lku-rnu*
see-POT-1SG.NOM

b. *kalku-lku-rnV* *kalku-lku-rnu*
keep-POT-1SG.NOM

---

25 When the verb stem is *u* progressive harmony does not occur in the remote past for the southern dialect. Instead the following forms occur: *kalku-rnalpa-rna* 'hold-REM-1SG.NOM', *kalku-rnalpi-nyi* 'hold-REM-1PL.INC.NOM', and *kalku-rnalpi-yi* 'hold-REM-3PL.NOM'.

26 *-lu* is the ergative case marker with a non-alternating /u/ vowel.

27 *-ku* is the dative case marker with a non-alternating /u/ vowel.

c. *wirla-lku-rnV* *wirla-lku-rnu*
hit-POT-1SG.NOM

Examples (43), (44) and (45) show instances where vowel alternations do not occur for the desiderative and the volitional mood morphemes in the southern Nyangumarta dialect. Alternations do occur in these forms in the northern dialect.

(43) Desiderative (southern) Desiderative (northern)
a. *yirri-rnama* *yirri-rnimi*
see-DES see-DES

b. *kalku-rnama* *kalku-rnumu*
keep-DES keep-DES

c. *wirla-rnama* *wirla-rnama*
hit-DES hit-DES

(44) Volitional (southern) Volitional (northern)
a. *yirri-rnaka* *yirri-rniki*
see-VOL see-VOL

b. *kalku-rnaka* *kalku-rnuku*
keep-VOL keep-VOL

c. *wirla-rnaka* *wirla-rnaka*
hit-VOL hit-VOL

(45) Future (southern) Future (northern)
a. *yirri-lama-rna* *yirri-limi-rni*
see-FUT-1SG.NOM see-FUT-1SG.NOM

b. *kalku-lama-rna* *kalku-lumu-rnu*
keep-FUT-1SG.NOM keep-FUT-1SG.NOM

c. *wirla-lama-rna* *wirla-lama-rna*
hit-FUT-1SG.NOM hit-FUT-1SG.NOM

3.4.2 Consonant Induced Alternations

Palatal consonants ([+distributed +high]) induce vowel assimilation to the right. Example (46) illustrates the possible surface forms of pronominal affixes. In (46a-e) the surface form of the vowel is attributed to progressive harmony triggered by the palatal consonants /ny/, /y/ and /j/. In instances where the vowel surfaces as /a/, a buffer vowel effect has occurred (see §3.4.4).

(46) Pronominal Affixes
Underlying Forms Surface Forms
a. *-nyV* *-nyi*
-1PL.INC.NOM (cf. *-nya*; **-nyu*)

b. *-yV* *-yi*
-3PL.NOM (cf. *-ya*, **-yu*)

c. *-jV* *-ji*
-1SG.DAT (cf. *-ja*, **-ju*)

d.	*-nyV* -1SG.ACC	*-nyi* (cf. *-nya*, **-nyu*)
e.	*-yirnV* 1PL.EXC.NOM	*-yirni* (cf. *-yirna*, **-yirnu*)

The allomorph of the locative suffix *-ngV*: *-jV* also occurs with a vowel alternating between /i/ and /a/.

(47)		Nominal Morphology	
		Underlying Forms	Surface Forms
	b.	*partany-jV* child-LOC	*partany-ji* ~ *partany-ja*[28]

3.4.3 REGRESSIVE ASSIMILATION

A local rule of regressive assimilation occurs in Nyangumarta where a palatal consonant causes the vowel to its left to surface as /i/.

(48)		Word type pronouns with accusative case marking	
		Underlying Forms	Surface Forms
	a.	*pulVnyi* 3DU.ACC	*pulinyi* (cf. *pulu*)
	b.	*nyurrVnyi* 2PL.ACC	*nyurrinyi* (cf. *nyurru*)
	c.	*nyumpulVnyi* 2DU.ACC	*nyumpulinyi* (cf. *nyumpulu*)

(49)		Underlying Forms	Surface Forms
	a.	*wirla-rnV-nyV* hit-NFUT-1PL.INC.NOM	*wirla-rni-nyi*
	b.	*kalku-rnV-nyV* keep-NFUT-1PL.INC.NOM	*kalku-rni-nyi*
	c.	*wirla-rnVmV-nyV* hit-DES-1PL.INC.NOM	*wirla-rnami-nyi*
	d.	*wirla-rnVmV-lpV-nyV* hit-DES-REM-1PL.INC.NOM	*wirla-rna-ma-lpi-nyi*
	e.	*wirla-rnV-lyV* hit-NFUT-1DU.EXC	*wirla-rni-layi* (northern dialect)

3.4.4 BUFFER VOWEL EFFECTS

Although many suffixes in Nyangumarta have alternating vowels, there are some bound morphemes which have non-alternating vowels. The 1DU.INC.NOM suffix *-li* and the

[28] For some speakers of southern Nyangumarta, the locative suffix does not have an alternating vowel. This is seen in the form following final vowels as *-nga* as well as the *-ja* form following consonants.

2SG.DAT suffix *-ngu* are two such suffixes. The following data show that vowels which normally alternate, do not alternate and surface as /a/ when they immediately precede a non-alternating vowel. This has been termed the 'buffer vowel' effect by Hoard and O'Grady (1976:65) and Archangeli (1986). The following examples illustrate the buffer vowel effect.

(50)		Underlying Forms	Surface Forms
	a.	*yirri-rnV-li*	*yirri-rna-li*
		see-NFUT-1DU.INC.NOM	(cf. **yirri-rni-li*)
	b.	*kalku-rnV-li*	*kalku-rna-li*
		keep-NFUT-1DU.INC.NOM	(cf. **kalku-rnu-li*)
(51)	a.	*yirri-rnV-li-ntV*	*yirri-rna-li-nti*
		see-NFUT-1DU.INC.NOM-2SG.ACC	(cf. **yirri-rni-li-nti*)
	b.	*kalku-rnV-li-ntV*	*kalku-rna-li-nti*
		keep-NFUT-1DU.INC.NOM-2SG.ACC	(cf. **kalku-rnu-li-nti*)
	c.	*wirla-rnV-li-ntV*	*wirla-rna-li-nti*
		hit-NFUT-1DU.INC.NOM-2SG.ACC	
(52)	a.	*yirri-rnV-ngu*	*yirri-rna-ngu*
		see-NFUT-2SG.DAT	(cf. **yirri-rni-ngu*)
	b.	*kalku-rnV-ngu*	*kalku-rna-ngu*
		keep-NFUT-2SG.DAT	(cf. **kalku-rnu-ngu*)
	c.	*wirla-rnv-ngu*	*wirla-rna-ngu*
		hit-NFUT-2SG.DAT	(cf. **wirla-rni-ngu*)
(53)	a.	*yirri-rnV-lyV*	*yirri-rna-layi*
		see-NFUT-1DU.EXC.NOM	(cf. **yirri-rni-layi*)
	b.	*kalku-rnV-lyV*	*kalku-rna-layi*
		keep-NFUT-1DU.EXC.NOM	(cf. **kalku-rnu-layi*)
(54)	a.	*yirri-rnV-lyV-ntV*	*yirri-rna-layi-nti*
		see-NFUT-1DU.EXC.NOM-2SG.ACC	(cf. **yirri-rni-layi-nti*)
	b.	*kalku-rnV-lyV-ntV*	*kalku-rna-layi-nti*
		keep-NFUT-1DU.EXC.NOM-2SG.ACC	(cf. **kalku-rnu-layi-nti*)
	c.	*wirla-rnV-l.yV*	*wirla-rna-layi*
		hit-NFUT-1DU.EXC.NOM	(cf. **wirla-rni-layi*)
	d.	*wirla-rnV-layV-ntV*	*wirla-rna-layi-nti*
		hit-NFUT-1DU.EXC.NOM-2SG.ACC	

(55) Buffer Vowel Effects with Dative Case Marking

		Underlying Forms	Surface Forms
	a.	*pulVku*	*pulaku*
		3DU.DAT	(cf. **puluku*)
	b.	*nyurrVku*	*nyurraku*
		2PL.DAT	(cf. **nyurruku*)
	c.	*nyumpVlVku*	*nyumpulaku*
		2DU.DAT	(cf. **nyumpuluku*)

3.4.5 Previous Analyses

Nyangumarta vowel harmony has been described previously by Hoard and O'Grady (1976), Rennison (1987), Archangeli (1986), Archangeli and Pulleyblank (1986), van der Hulst and Smith (1985) and Sharp (1986). The analysis by Hoard and O'Grady incorporated a traditional linear analysis whereby progressive and regressive assimilation was described by a complicated linear rule. Rennison's account offered an alternative account of Nyangumarta morphology. Non-linear accounts have been given by van der Hulst and Smith (1985), Archangeli (1986), Archangeli and Pulleyblank (1986) and Sharp (1986). In these accounts the morphemes undergoing harmony are analysed with completely unspecified vowel slots with the /i/ and /u/ vowels triggering vowel alternations. Van der Hulst and Smith use the features [+high, -back] for /i/, [+high, +back] for /u/ and [-high] for /a/. Archangeli (1986) and Sharp (1986) introduced a more restricted theory of underspecification where the vowel /a/ was left totally unspecified for features in underlying representation. This also meant that all features of /a/ were left unspecified for any vowel: [-high], [+low], [-labial] and [+back]. This left the features [+high] for /i/ and [+high, +round] for /u/. Both van der Hulst and Smith (1985) and Archangeli (1986) assumed that in instances where vowels in verb stems did not trigger harmony, the vowel is extrametrical (the /a/ vowel in *kalkulumurnu* 'I will keep it') or else the vowel matrix itself is extrametrical (the /a/ vowel in *wirlalamarna* 'I will hit/kill it'). Sharp's (1986) analysis of the southern Nyangumarta dialect incorporates much the same use of vowel representations and rule formulations as Archangeli's. Because the /a/ vowel was represented as the default vowel, the analysis for the southern Nyangumarta data (which consists of many instances of idiosyncratic lack of harmony in morphemes that in other circumstances undergo harmony) required that non-alternating /a/ vowels were underlyingly V slots connected to a featureless vowel matrix. Archangeli and Pulleyblank's (1986) account differed from the earlier analysis in the representation of the /u/ vowel as [+round] underlyingly with a redundancy rule filling in the value of [+high] before the application of the spread rule. The feature geometry also differed. In the latter account, spread was triggered by a secondary place node spreading the features [+high] or [+high, +round]. In this account the feature hierarchy is incorporated making it distinct from previous accounts whereby consonants and vowels were represented on separate planes. Archangeli (1986), Archangeli and Pulleyblank (1986) and Sharp (1986) all invoked the Obligatory Contour Principle (OCP) (McCarthy 1986) to explain the appearance of buffer vowels between two harmony domains.

In this account vowel harmony will be shown to occur as a result of the spreading of the dorsal node which will necessitate the use of dorsal node features for vowel specifications: high, low, back (but not round which is dominated by the place node). Thus vowel specifications will include: /i/ has the feature [+high], /u/ the features [+high, +back] and the appearance of non-alternating /a/ in stems and in bound morphemes will necessitate that /a/ be specified in underlying representation for the feature [+back].[29] Palatal consonants are also specified as [+high] reflecting the fact that they trigger vowel harmony.

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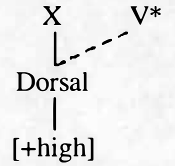
29 The /a/ vowel could have equally been represented as [-high] or [+low] or even fully specified.

3.4.6 THE ANALYSIS: VOWEL HARMONY

In this section the harmony process of Nyangumarta will be examined. Progressive rightward spread is reflected in the following vowel harmony rule for Nyangumarta in which featureless vowel slots rightward of a vowel specified for the feature [+high] receive the feature [+high].

Vowel Harmony (VH)



V* notation refers to any number of featureless vowel slots (or nuclei) and the X notation refers to either a consonant or a vowel specified for [+high].[30] The feature geometry relevant to the Nyangumarta data is given in Figure 6. Only relevant nodes have been included.

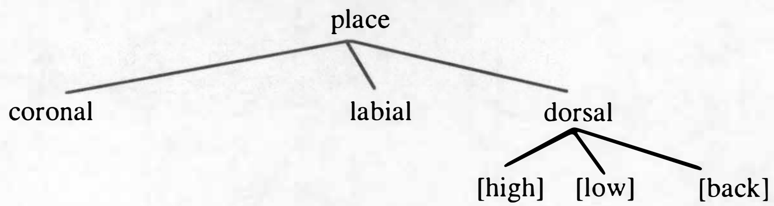


FIGURE 6: FEATURE GEOMETRY

The progressive harmony rule as given above predicts that spreading is triggered by the vowels /i/ and /u/ and the palatal consonants /ny/ /y/ /ly/ and /j/ as these phonemes are specified with the feature [+high] underlyingly (see Table 8). The velar consonants /k/ and /ng/ are not triggers for progressive harmony although both are specified for [+high] with full feature representation.[31] In this analysis then, it is assumed that both /k/ and /ng/ lack dorsal nodes (hence do not have underlying specifications for [+high]).

TABLE 8: MINIMAL DISTINGUISHING VOWEL FEATURES

	i	*u*	*a*
high	+	+	
back		+	+

The derivations for *paji-rni-rni* 'bite-NFUT-1SG.NOM' and *kalku-rnu-rnu* 'keep-NFUT-1SG.NOM' are given in (56) and (57). Note that the dorsal node spreads (not the individual features) which means that both the features [+high] and [+back] spread by the same rule and that the representation only includes the place and dorsal nodes (all others have been suppressed).

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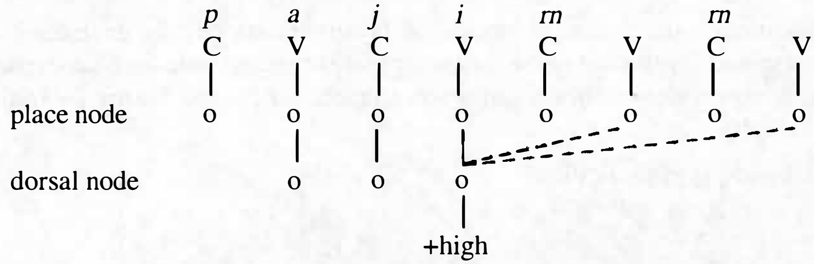
30 See Levin (1985) for further explanation of the use of X notation.

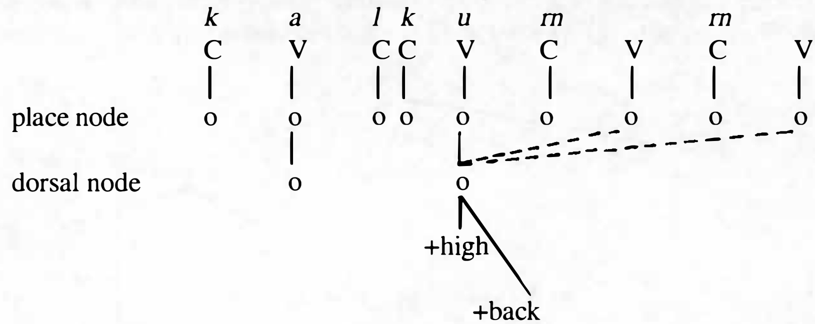
31 The rule and the feature specifications also predict that the phoneme /w/ triggers and blocks vowel harmony. Evidence for this is given in Sharp (1986).

(56) Progressive Harmony: *paji-rni-rni* 'bite-NFUT-1SG.NOM'



In (56) spreading is triggered by the final vowel of the verb stem *paji* 'bite' and spreads rightward to all V slots unspecified for features. In (57) we see the spread of /u/ as the final vowel of the verb stem *kalku* 'keep' is specified for [+back] in addition to [+high].

(57) Progressive Harmony: *kalku-rnu-rnu* 'keep-NFUT-1SG.NOM'



3.4.7 Buffer Vowels

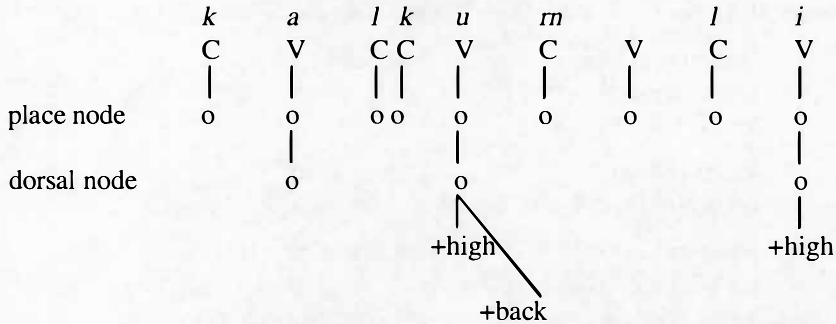
Recall the data in (50), (51) and (52) repeated here as (58), (59) and (60). The non-future morpheme *-rnV* surfaces as *-rna* when it immediately precedes a morpheme specified for the value [+high] such as the 1DU.INC.NOM pronoun *-li* and the 2SG.DAT pronoun *-ngu*; (59) also illustrates that the 1DU.INC.NOM pronoun *-li* initiates a harmony domain to the right: *-nti* (2SG.ACC).

		Underlying Forms	Surface Forms
(58)	a.	*yirri-rnV-li* see-NFUT-1DU.INC.NOM	*yirri-rna-li* (cf. **yirri-rni-li*)
	b.	*kalku-rnV-li* keep-NFUT-1DU.INC.NOM	*kalku-rna-li* (cf. **kalku-rnu-li*)
(59)	a.	*yirri-rnV-li-ntV* see-NFUT-1DU.INC.NOM-2SG.ACC	*yirri-rna-li-nti* (cf. **yirri-rni-li-nti*)
	b.	*kalku-rnV-li-ntV* keep-NFUT-1DU.INC.NOM-2SG.ACC	*kalku-rna-li-nti* (cf. **kalku-rnu-li-nti*)
	c.	*wirla-rnV-li-ntV* hit-NFUT-1DU.INC.NOM-2SG.ACC	*wirla-rna-li-nti*
(60)	a.	*yirri-rnV-ngu* see-NFUT-2SG.DAT	*yirri-rna-ngu* (cf. **yirri-rni-ngu*)

b.	*kalku-rnV-ngu* keep-NFUT-2SG.DAT	*kalku-rna-ngu* (cf. **kalku-rnu-ngu*)
c.	*wirla-rnv-ngu* hit-NFUT-1DU.INC.DAT	*wirla-rna-ngu* (cf. **wirla-rni-ngu*)

Buffer vowel effects are explained here by adopting earlier suggestions (Archangeli (1986) and Sharp (1986) which invoke the Obligatory Contour Principle. The OCP prohibits representations in which there are identical phonemic matrices adjacent on the same melodic level. In this analysis the OCP is invoked when a rule would result in two identical adjacent dorsal nodes. Consider (58b) *kalku-rna-li* 'keep-NFUT-1DU.INC.NOM' in which a buffer vowel /a/ appears in the non-future morpheme. This surface form is accounted for by the OCP (see (61)).

(61)



The harmony rule does not apply thus preventing an OCP violation, that is, if the [+high, +back] features were to spread to the suffix *-rnV* then two adjacent dorsal nodes would have identical specifications of the feature [+high]. The resulting vowel therefore surfaces with the values for the /a/ vowel. Since /a/ is the vowel which results whenever harmony does not occur, this has been taken to be evidence for leaving all values for /a/ unspecified underlyingly (Archangeli 1986; Sharp 1986). The fact that there are instances of idiosyncratic lack of harmony in morphemes that generally undergo harmony with /a/ appearing in surface forms (seen in (62)) is also further evidence for /a/ as the default vowel.

(62)	Underlying Forms	Surface Forms
a.	*kalku-rnV-rnV* keep-NFUT-1SG.NOM	*kalku-rnu-rnu*
b.	*kalku-rnV-rnV* keep-NFUT-1SG.NOM	*kalku-rna-rna*
c.	*kalku-rnVmV* keep-DES	*kalku-rna-ma* (cf **kalku-rnu-mu*)[32]

If we were to assume that /a/ is totally unspecified for features in underlying representation then the features for Nyangumarta vowels could be as presented in Table 9. The difference between this specification and that of Archangeli (1986) is that Archangeli uses [+round] for /u/ not [+back] as this is an unspecified feature for /a/. However, this degree of underspecification is not invoked in this analysis. The minimal underlying vowel

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[32] Recall that this form is the one found in the northern dialect.

features as presented in Table 9 do not address the question of why there are surface forms with a non-alternating /a/ vowel such as in the ablative suffix *-ja*.

TABLE 9: MINIMAL DISTINGUISHING VOWEL FEATURES

	i	*u*	*a*
high	+	+	
back		+	

3.4.8 REGRESSIVE HARMONY RULE

A local rule of regressive harmony operates in Nyangumarta. The forms in (49) (repeated here as (63)) show that the non-future *-rnV*, the desiderative *-mV* and the remote *-lpV* morphemes all surface with the vowel /i/ when they are followed by a palatal consonant.

(63) Underlying Forms — Surface Forms

a. *wirla-rnV-nyV* — *wirla-rni-nyi*
hit-NFUT-1PL.INC.NOM

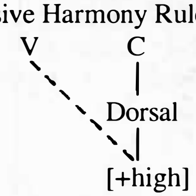
b. *kalku-rnV-nyV* — *kalku-rni-nyi*
keep-NFUT-1PL.INC.NOM

c. *wirla-rnVmV-nyV* — *wirla-rna-mi-nyi*
hit-DES-1PL.INC.NOM

d. *wirla-rnVmV-lpV-nyV* — *wirla-rna-ma-lpi-nyi*
hit-DES-REM-1PL.INC.NOM

e. *wirla-rnV-lyV* — *wirla-rni-layi* (northern dialect)
hit-NFUT-1DU.EXC

Regressive Harmony Rule (local)[33]



The rule is a local rule and only affects those V slots that are featureless. It does not change values of vowels to the left. This is seen in (64) whereby the /u/ vowel of the potential mood morpheme does not undergo the rule.

[33] See Archangeli and Pulleyblank (1986) for a similar regressive harmony rule which spreads [+hi] but not the entire secondary place node (equivalent to the dorsal node in this description). In that description only palatal consonants are triggers (although in Nyangumarta the anticipatory morpheme *-li* triggers regressive harmony in cases like *wirla-la-rni-li* 'hit/kill-ANT-1SG.NOM-ANT'). The other issue to consider regarding this rule is: what is to prevent [k] and [ng] both with [+high] specifications after full specification from triggering regressive harmony? In this account there is the problem of allowing full specification of all segments except for [a] prior to the rule. There is also the problem of [k] and [ng] triggering regressive harmony. There are instances of [k] being a possible trigger in the imperfective morpheme *-kVnyV* in cases like *wirla-rnikinyi* 'hit/kill-IMPF'. More investigation is needed to resolve these issues.

(64) Underlying Forms / Surface Forms

	Underlying Forms	Surface Forms
a.	*wirla-lku-nyV*	*wirla-lku-nyi*
	hit-POT-1PL.INC.NOM	(cf. **wirla-lki-nyi*)
b.	*kalku-lku-nyV*	*kalku-lku-nyi*
	keep-POT-1PL.INC.NOM	(cf. **kalku-lki-nyi*)

The regressive harmony rule is not sensitive to the OCP (as the rule is not blocked when the vowel in the previous syllable is [+high]) and it is claimed that the rule occurs late in the phonology after full specification of features has occurred.

4. EVIDENCE

The following discussion will outline the division between the verbal pronouns based on the application of phonological rules including vowel harmony rules. We will see that the phonological rules treat the pronouns (in the verbal phrase) as two distinct sets: one a set of verbal affixes and the other a set of free phonological words although syntactically bound in the verbal phrase. We have already seen the division in the two types of pronouns using criteria such as stress and the minimal word. It has been shown that minimal phonological words in Nyangumarta must have the following features: i) primary stress falls on the first syllable or mora; and ii) the word must consist of at least two morae. Using these two criteria, the verbal pronouns can be divided into the following groups:

(65) Nyangumarta Verbal Pronouns

		Affixes		Words
1SG	NOM	*-rnV*	1DU.INC.ACC	*ngalinyi*
	ACC	*-nyV*	1DU.INC.DAT	*ngaliku*
	DAT	*-jV*	1DU.EXC.ACC	*ngalayinyi*
2SG	NOM	*-n/npV*	1DU.EXC.DAT	*ngalayaku*
	ACC	*-ntV*	1PL.INC.ACC	*nganyjurrinyi*
	DAT	*-ngu*	1PL.INC.DAT	*nganyjurraku*
3SG	NOM	*-Ø/-rrV*	1PL.EXC.ACC	*nganinyi*
	ACC	*-Ø*	1PL.EXC.DAT	*nganaku*
	DAT	*-lV/lu*	3PL.ACC	*janinyi*
1DU.INC.NOM		*-li*	3PL.DAT	*janaku*
1DU.EXC.NOM		*-l.yi*	3DU.NOM	*pulu*
1PL.EXC.ACC		*-nyV*	3DU.ACC	*pulinyi*
1PL.EXC.NOM		*-yirnV*	3DU.DAT	*pulaku*
3PL.NOM		*-yV*	2DU.NOM	*nyumpulu*
			2DU.ACC	*nyumpulinyi*
			2DU.DAT	*nyumpulaku*
			2PL.NOM	*nyurru*
			2PL.ACC	*nyurrinyi*
			2PL.DAT	*nyurraku*

The forms shown in (65) in the column for 'words' indicate that the free words consist of two morphemes with the root morpheme being bimoraic. Primary stress occurs on the first syllable of the free forms.

There are two bound or affix pronouns which require further discussion: the 1DU.EXC.NOM morpheme *-layi* and the 1PL.EXC.NOM morpheme *-yirni*, both of which consist on the surface as morphemes of two morae.

As noted earlier the surface form of first person dual exclusive nominative is *-layi* or for some speakers *-liyi.*[34] However, this has been represented underlyingly as *-l.yV*. The motivation for this analysis is due to the fact that it causes a buffer vowel effect as given in (66) and can trigger regressive spread in the northern dialect as given in (67). An epenthetic vowel breaks up the sequence of *l* + *y*, a sequence not allowable in consonant clusters of Nyangumarta. This proposed epenthesis rule is not epenthetic *-pV* as discussed earlier owing to the fact that the sequence does not occur over a morpheme boundary.

(66)	Underlying Form	Surface Form
	yirri-rnV-l.yV	*yirri-rna-layi*
	see-NFUT-1DU.EXC.NOM	(cf. **yirri-rni-layi*)
(67)	Northern Nyangumarta	
	Underlying Form	Surface Form
	wirla-rnV-l.yV	*wirla-rni-layi*
	hit-NFUT-1DU.EXC.NOM	(cf. **wirla-rna-layi*)

As also noted earlier, 1PL.EXC.NOM is another example where a bound pronoun suffix consists of two morae. The explanation for this could be that *-yirni* consists of two morphemes: a plural marker *-yi* and a first person marker *-rnV*. Whenever *-yirnV* occurs the first syllable becomes a glide of the final syllable of the verb stem and it does not take primary stress.

Another possible explanation for these two forms would be to assume that *-yi* is an exclusive marker and that *-li* and *-rnV* are markers for dual and first person. Thus *-layi* consists of dual marker + exclusive marker (compare *-li* first person dual inclusive) and *-yirni* consists of exclusive marker + first person marker (compare *-rnV* first person singular). The combination is unambiguously plural because dual is marked (*-li*) and first person singular does not have an inclusive/exclusive contrast.

4.1 EPENTHETIC *-pV*

Observing the application of the epenthetic *-pV* rule again shows two distinct groups of pronouns. Whereas the affix pronouns undergo the epenthetic *-pV* rule, the word type pronouns do not. The following examples illustrate these differences: (68a) and (68b) give the form *-npi* for the second singular nominative pronoun when it occurs before the anticipatory suffix *-li* and the first singular accusative pronoun *-nyV*; (68c) gives the form *-n* for the second singular nominative pronoun when it occurs word finally and (68d) gives the form *-n* before the pronoun *nganinyi* '1PL.EXC.ACC'.

34 Although *-liyi* is a cited form for this pronoun by Geytenbeek (1991) my data consistently records this pronoun as *-layi*. If we were to propose that underlyingly the form was *-liyV*, then buffer vowel effects and regressive assimilation effects could be accounted for. The surface form can also be *-laya* when the purposive clitic occurs.

(68) Second Person Singular Nominative *-n*

	Underlying Forms		Surface Forms
a.	*wirla-lV-n-lV*		*ngalp-a-npi-li*
	enter-ANT-2SG.NOM-ANT		
b.	*wirla-rnV-n-nyV*		*wirla-rna-npi-nyi*
	hit-NFUT-2SG.NOM-1SG.ACC		
c.	*wirla-rnV-n*		*wirla-rna-n*
	hit-NFUT-2SG.NOM		
d.	*wirla-rnV-n*	*nganVnyV*	*wirla-rna-nnganinyi*
	hit-NFUT-2SG.NOM	1PL.EXC.ACC	

Example (69) gives the forms of the remote past with person markers for the verbs *paji-RN* 'bite' and *karnti-NY* 'climb'. The forms given here show clearly that the epenthetic *-pV* rule only applies to the affix pronouns and not to the word type pronouns.

(69)

Person	RN Class	NY Class
1DU.INC	*paji-rnilpa-li*	*karnti-nyalpa-li*
1PL.INC	*paji-rnilpi-nyi*	*karnti-nyalpi-nyi*
1SG.EXC	*paji-rnilpi-rni*	*karnti-nyalpa-rna*
1DU.EXC	*paji-rnilpa-layi*	*karnti-nyalpa-layi*
1PL	*paji-rnilpi-yirni*	*karnti-nyalpi-yirni*
2SG	*paji-rnilpa-n*	*karnti-nyalpa-n*
2DU	*paji-rnil nyumpulu*	*karnti-nyal nyumpulu*
2PL	*paji-rnil nyurru*	*karnti-nyal nyurru*
3SG	*paji-rnil*	*karnti-nyal*
3DU	*paji-rnil pulu*	*karnti-nyal pulu*
3PL	*paji-rnilpi-yi*	*karnti-nyalpi-yi*

4.2 Vowel Alternations

The two rules of vowel assimilation also indicate a distinction between two types of person markers in the verbal phrase: those that cause buffer vowel effects versus those that do not, and person markers that trigger regressive assimilation versus those that do not. The affix pronouns block the progressive assimilation rule causing a buffer vowel effect, whereas the word type pronouns do not; the affix pronouns also trigger regressive assimilation, the word type pronouns do not.

Example (70) gives forms comparing instances whereby the affix pronouns block progressive assimilation and cause buffer vowel effects and the word type pronouns do not.

(70) Buffer Vowel Effects

	Underlying Forms		Surface Forms
a.	*yirri-rnV-li*		*yirri-rna-li*
	see-NFUT-1DU.INC.NOM		(cf. **yirri-rni-li*)
b.	*yirri-rnV*	*pulV*	*yirri-rni pulu*
	see-NFUT	3DU.NOM	(cf. **yirri-rna pulu*)
c.	*yirri-rnV-ngu*		*yirri-rna-ngu*
	see-NFUT-2SG.DAT		(cf. **yirri-rni-ngu*)

d. *yirri-rni* *nyumpulV* *yirri-mi nyumpulu*
see-NFUT 2DU.NOM (cf. **yirri-rna nyumpulu*)

It would seem that the OCP, even though it is sensitive to skeletal positions across morpheme boundaries, is not sensitive to skeletal positions across phonological word boundaries. If *pulu* '3DU.NOM' was an affix attached to the verb, then the grammar would predict that **yirri-rna-pulu* would be well formed. The fact that *pulu* and the other free verbal pronouns do not invoke OCP effects is strong evidence for the free verbal pronouns being separate phonological words.

Example (71) shows contrasting examples of regressive assimilation being triggered by the palatal consonant /ny/ when it occurs morpheme initially in an affix pronoun but not in a free pronoun.

(71) Regressive Assimilation

	Underlying Forms		Surface Forms
a.	*wirla-rnV-nyV*		*wirla-rni-nyi*
	hit-NFUT-1PL.INC.NOM		
b.	*wirla-rnV*	*nyurrV*	*wirla-rna nyurru*
	hit-NFUT	2PL.NOM	(**wirla-rni nyurru*)
c.	*kalku-rnV-nyV*		*kalku-rni-nyi*
	keep-NFUT-1PL.INC.NOM		
d.	*kalku-rnV*	*nyurrV*	*kalku-rnu nyurru*[35]
	keep-NFUT	2PL.NOM	(**kalku-rni nyurru*)
e.	*wirla-rnVmV-nyV*		*wirla-rna-mi-nyi*
	hit-DES-1PL.INC.NOM		
f.	*wirla-rnVmV*	*nyurrV*	*wirla-rna-ma nyurru*
	hit-DES	2PL.NOM	(**wirla-rna-mi nyurru*)

4.3 Palatal Cluster Deletion

The rule of palatal cluster deletion affects forms of the future tense. The future tense has several allomorphs which can be divided into two distinct groups as can be seen in (72). The forms which have bound pronouns suffixed to them generally have the form *-lV* which is realised as *-lVpV* when it precedes a sonorant consonant (with the rule of nasal assimilation determining the occurrence of *-lVmV*). The other form is potential + *-lVny*, which is realised as potential + *-lV* before palatal consonants. The palatal cluster deletion rule has applied to the string *paji-lkulVny nyumpulu* and *paji-lkulVny-nyurru* to derive the surface form of *paji-lkulu nyumpulu* and *paji-lkulu nyurru*. It has also applied to the string *ka-ngku-lV-nyV nyurru* to derive the surface form *ka-ngku-lumi-nyurru* 'take-POT-FUT-1SG.ACC-2PL.NOM: Will you (plural) take me?' Notice in this form the allomorph for the future tense is that which is used for affix pronouns, which indicates that the nasal assimilation rule and the rule of regressive assimilation have both applied to the string prior to palatal consonant

35 In some idiolects of Nyangumarta *kalku-rnu nyurru* can occur as *kalku-rna nyurru*. This appears to be unconnected to OCP sensitivities. Rather it is part of the process of the weakening of the harmony process in the southern Nyangumarta dialect.

deletion. Example (72) gives a verbal paradigm for the verb *paji-RN* 'bite' with nominative pronouns.

(72) Future Tense Paradigm (*-lV/-lkulVny* are the two basic allomorphs)
RN Conjugation Class *paji-RN* 'bite'

Person	Singular	Dual	Plural
1INC		*paji-lapa-li*	*paji-limi-nyi*
1EXC	*paji-lama-rna*	*paji-lapa-layi*	*paji-lipi-yirni*
2	*paji-lama-n*	*paji-lkulu nyumpulu*	*paji-lkulu nyurru*
3	*paji-lkuliny*	*paji-lkuliny pulu*	*paji-lipi-yi*

Notice that in forms where there is zero marking for third person singular, the future tense verbal word appears as *paji-lkuliny* which is precisely the underlying forms for instances whereby word type pronouns occur. When the accusative and dative forms occur with the future tense (when subject is third person singular) they follow an identical pattern as seen in (73) which gives the accusative case paradigm.

(73) RN Conjugation Class *paji-RN* 'bite' Accusative Pronouns

Person	Singular	Dual	Plural
1INC		*paji-lkuliny ngalinyi*	*paji-lkuliny nganyjurrinyi*
1EXC	*paji-lkulinypi-nyi*	*paji-lkuliny ngalayinyi*	*paji-lkuliny nganinyi*
2	*paji-lkulinypa-nta*	*paji-lkulu nyumpulinyi*	*paji-lkulu nyurrinyi*
3	*paji-lkuliny*	*paji-lkuliny pulinyi*	*paji-lkulu janinyi*

The palatal cluster deletion rule does not operate within the verbal word as is shown below where first person plural inclusive, first person plural exclusive and third person plural have not undergone palatal cluster reduction in contrast with second person dual and plural.

(74) RN Conjugation Class *paji-RN* 'bite'

Person	Singular	Dual	Plural
1INC		*paji-rnikinya-li*	*paji-rnikinyi-nyi*
1EXC	*paji-rnikinyi-rni*	*paji-rnikinya-layi*	*paji-rnikinyi-yirni*
2	*paji-rnikinyi-n*	*paji-rniki nyumpulu*	*paji-rniki nyurru*
3	*paji-rnikinyi*	*paji-rnikinyi pulu*	*paji-rnikinyi-yi*

The paradigm again shows a distinction between two sets of pronouns. The palatal deletion rule does not apply within a phonological word such as *paji-rnikinyi-nyi* (cf. **paji-rni-ki-nyi*) or *paji-rnikinyi-yirni* (cf. **paji-rni-ki-yirni*) but it does apply as an external sandhi rule deleting the first of two palatal consonants across phonological words: *paji-rniki nyumpulu* and *paji-rniki nyurru.*[36]

4.5 SUMMARY

The verbal pronouns in Nyangumarta can be divided into two distinct sets: affixes and free words. Table 10 summarises the difference between the two sets according to the application of phonological rules.

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36 In text though the deletion is strictly within the verbal phrase. This rule of palatal deletion is optional in the imperfective aspect of the southern dialect.

TABLE 10: SUMMARY OF THE FEATURES OF THE VERBAL PRONOUNS

	Affix Pronouns	Word Pronouns
Satisfies minimal word constraint		x
Primary stress on initial mora		x
Palatal deletion rule applies		x
Epenthetic -*pV* rule applies	x	
Causes buffer vowel effects	x	
Triggers regressive harmony (1st syllable)	x	
Vowel harmony domain	x	

Table 10 indicates a neat division between two types of phonological segments: a bound type and a free word type. However, when you look at the wider picture and incorporate features such as the inability to pause on a segment in conjunction with a distinctive ordering constraint (two features not consistent with other free words in the language) you find that the word type pronouns could be classed as a subgroup of free words with some affix type characteristics. The original distinction in the language between 'words' and 'affixes' is not so clearly defined. This is given in Figure 7. At most we can say that the phonology of the language is clearly an important factor regarding the status of morphemes. In this regard it is significant then to suggest that the apparent case-marking features present in the word type pronouns yet absent in the affix type pronouns could be phonologically based (as distinct from syntactically motivated), that is, the word type pronouns in object and indirect object positions are marked for accusative *-nyi* and dative *-ku* and this marking apppears to be directly related to the fact that these types of pronouns function phonologically as 'words'. The case marking is not present in the affix type pronouns. However, the two sets obviously behave as a syntactic class and the class of pronouns is bound in its position in the phonological phrase.

	'Word'	Word Pronouns	Affix Pronouns	'Affix'
Pause word	x			
Case/tense, mood, aspect	x	x		
Stress word	x	x		
Minimal word	x	x		
Position bound		x	x	x
Phonological rule domain			x	x
Buffer vowel domain			x	x

FIGURE 7: WORD/AFFIX DISTINCTIONS

5. OTHER CONSIDERATIONS

The division of the two sets of pronouns into two distinct sets according to whether they constitute phonological words or not appears quite straightforward when we examine the facts given above. However, there is further evidence to consider. One area to examine is the form of pronouns used in the imperative mood; the other is the function of the third singular locative and dative pronouns *-lV* and *-lu* which occur following all other pronouns, and if we assume that one set of pronouns constitutes free words then they are probably best described as phrasal affixes or clitics.

5.1 IMPERATIVE

In nominative case, only second person pronouns occur in the imperative mood for Nyangumarta: Ø for second person singular, *pulu* for second person dual and *-yi* for second person plural (see Table 11). These forms are identical to the third person singular, dual and plural pronouns (which is very common in languages in the Pilbara and neighbouring areas: Manyjilyjarra (Marsh 1976), Warnman, Ngarla, Nyamal, Yankunytjatjara (Goddard 1985, etc.).

TABLE 11: IMPERATIVE NOMINATIVE PRONOUNS

	Singular	Dual	Plural
Class NY			
enter	*ngalpa*	*ngalpapulu*	*ngalpa-yi*
climb	*karnta*	*karntapulu*	*karnta-yi*
Class RN			
hit	*wirla-la*	*wirla-lapulu*	*wirla-la-yi*
keep	*kalku-lu*	*kalku-lu pulu*	*kalku-lu-yi*
see	*yirri-li*	*yirri-li pulu*	*yirri-li-yi*
Class NG			
take	*ka-wa*	*ka-wa pulu*	*ka-wa-yi*
give	*yi-wa*	*yi-wa pulu*	*yi-wa-yi*
Class N			
go	*ya-rra*	*ya-rra pulu*	*ya-rra-yi*
get	*ma-rra*	*ma-rra pulu*	*ma-rra-yi*

The interesting feature of the dual and plural forms is their similarity to each other regarding the application of phonological rules. The second dual pronoun *pulu* does not block harmony. This can be seen in forms like *kalku-lu pulu* and *yirri-li pulu* whereby the progressive harmony rule is not blocked by the /u/ vowel of the pronoun. This is what we would expect if *pulu* was a free word. However, the plural pronoun *-yi* also fails to block harmony: *kalku-lu-yi* (**kalku-la-yi*) and *yirri-li-yi* (**yirri-la-yi*). In addition the plural pronoun does not trigger regressive harmony which is expected if it is a bound affix: *wirla-la-yi* (**wirla-li-yi*).

The imperative can occur with accusative and dative/locative pronouns as seen in (75)-(78).

(75) *Kalku-lu-yi* *janinyi* *partany-karrangu.*
keep-IMP-2PL.NOM 3PL.ACC child-PL
All of you take care of the children.

(76) *Kalku-lu-yi* *janaku* *mirtawa-rrangu-ku.*
keep-IMP-2PL.NOM 3PL.DAT woman-PL-DAT
All of you take care of it for the women.

(77) *Kuyi* *yi-wa-la* *partany-ja.*
meat give-IMP-3SG.LOC child-LOC
Give the meat to the child.

(78) *Kuyi* *yi-wa-lu* *partany-ku.*
meat give-IMP-3SG.DAT child-DAT
Give the meat to him for the child.

5.2 THIRD SINGULAR DATIVE/LOCATIVE

As illustrated in the following examples, third person singular dative/locative occurs following word type pronouns. In (79) *-lu* is a third person singular locative marker which follows the free pronoun *pulu.* Locative case is used with the verb 'tell' and therefore the underlying form of the pronoun is *-lV* as distinct from the purposive pronoun *-lu.* In (79) we can see that no buffer vowel effect has occurred (which again indicates that it is underlyingly *-lV*); hence *pululu* (cf. *pulalu*).

(79) *Pala-nga lirrjal-ju-jirri partany-ju-jirri wurra-rna-pulu-lu...*
that-LOC greedy-ERG-DU child-ERG-DU tell-NFUT-3DU.NOM-3SG.LOC
And those two greedy children said to him...

When dative case is used as an adjunct to the sentence such as in (80) and (81), the purposive pronoun *-lu* occurs. The effect of using a dative adjunct is often to indicate a benefactor/purpose of an action.

(80) *Nyampa ya-na pula-lu pulany paliny-ku.*
quick go-PAST 3DU.NOM-3SG.DAT 3DU 3SG-DAT
Those two went too quickly for him.

(81) *Pulany nyampa mirti-jarri-nyi pula-lu warnku-karti-jakun*
3DU quick run-INCH-NFUT 3DU.NOM-*lu* rock-ALL-only
pala-nga kuku-jarri-nyi pula-lu jurnti-ngi.
that-LOC hide-INCH-NFUT 3DU.NOM-*lu* cave-LOC
Those two quickly ran from him to the cave where they hid from him.

However, when the adjunct occurs following a dative pronoun as seen in the following examples, the meaning can be genitive as well as purposive.

(82) *Pirirri-lu wirri-rna kawa-rnikinyi pula-ka-lu majangu-rrangu*
man-ERG put-NFUT travel-IMPF 3DU-DAT-*lu* flesh-PL
kuyi warnku-ngu kankarni.
meat rock-LOC on.top.of
The man kept putting the/their meat on top of the rocks for those two (children) as he was travelling along.

(83) *Wirla-lapi-yirni nyumpula-ka-lu kuyi.*
hit-FUT-1PL.EXC.NOM 2DU-DAT-*lu* meat
We (plural exclusive) will kill (shoot) the meat for you/your meat.

(84) *Yija-ngarra kuyi yirri-rni rankurrji minyji-rni pula-ka-lu*
truly-DEIC meat see-NFUT bustard set.light.to-NFUT 3DU-DAT-*lu*
partany-ju.
child-ERG
The meat he saw was certainly turkey and he lit the fire for those two/their fire.

(85) *Pala-ja paliny-ju nyampa-lu ji-ni pulaka-lu wirlarra-lu*
that-ABL 3SG-ERG quick-ERG do-NFUT 3DU.DAT-*lu* moon-ERG
parruparru mungka-ja.
net tree-ABL
After that he, the moon, quickly made a net for those two/their net from the tree.

(86)	*Partany-karrangu*	*malya-rni-yi*	*ngalayi-ka-lu*	*mungka*
	child-PL	chop-NFUT-3PL.NOM	1DU.EXC-DAT-*lu*	tree
	kaju-jartiny-ju.			
	axe-COM-ERG			

The children with an axe, chopped the tree for us (two) /our tree.

The situation of the third singular dative/locative pronoun is interesting. It is the only affix pronoun which follows free verbal pronouns when they occur (otherwise it is affixed to the verb: *wurrarna-la* 'she/he said to him/her'. The other interesting aspect of the occurrence of these two pronouns is the fact that its reference is either a nominal adjunct or the same reference as the other dative pronoun. The alternative analysis for *-lu* is to analyse it as a purposive/genitive marker, not a pronoun.

6. CONCLUSION

I have provided phonological evidence for a division of the verbal pronouns in Nyangumarta by showing that phonological rules applying within the verbal phrase treat the pronouns as two distinct sets: one a set of verbal affixes and the other a set of free phonological words. Table 11 summarises the similarities and differences between the two sets based on these rules and Figure 7 gives an overview of Nyangumarta 'words' and 'affixes' incorporating the categories of prototypical words and affixes. As suggested earlier, the match up between Nyangumarta phonological, morphological words and syntactic words does not show a one-to-one correspondence. However, if we were to assume that compounding processes in Nyangumarta produce distinct morphological words from two phonological words, we could account for the word type pronouns occurring in a fixed position in the verbal phrase. Other types of compounding processes in the language would need to be investigated further to assess whether the feature of natural breaks (or the notion of the 'pause word') is also a feature of other compounds.

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