CHAPTER 3
Affixation and Prosodic Domains

In the preceding chapter, I argued that WORD-level stems ('Morphological Words') correspond to a prosodic constituent 'Prosodic Word', which is the domain of pitch accent. I showed that some constituents - ROOT-level stems - which lack a consistent semantic interpretation, do not correspond to Prosodic Words, and therefore do not have a one-to-one association with pitch accents.

Since most WORD-level stems (MWds) are also free forms, it might be suggested that this accounts for their prosodic characteristics: compounded MWds simply retain the stress that they have as words. This does not account for the behaviour of WORD-level affixes and clitics however. These are also distinct prosodic domains: each affix or clitic potentially takes its own stress (§3.1.2). Since affixes cannot be free forms, it cannot be the case that they are retaining a stress pattern that they have as words. The behaviour of affixes suggests that speakers have access to WORD-level morphological structure, regardless of whether a morpheme is a free or bound form. I extend the analysis to languages with similar patterns, in §3.2, and show that Alignment constraints cannot handle the same facts.

Prefixes, suffixes, and clitics all have distinct prosodic characteristics. I show that these differences follow partly from position in the word, and partly from an association between pitch accents and semantically 'contentful' morphemes (in §3.3). The prosodic characteristics of prefixes are not the result of special stipulations about prefixes as a class, but follow from general considerations (cf. Selkirk 1996).

I start the chapter with a brief overview of the morphological characteristics of WORD-suffixes, clitics and prefixes.

3.1 The morphology of affixes and clitics

The WORD-level affix and clitic inventory is given in (1-4). In the examples, enclitics are preceded by a '=' boundary, and suffixes and prefixes are preceded/followed by a '-' boundary.

WORD-level suffixes

(1) a. <u>Case</u>

-kgah ~ -kgaga	LOC/ALL
-hgVn	DAT/GEN
-hwala	ABL
-yih	ERG/INST/
	COMIT
-wi	PURP/LAT
-tjji ~ -jih	PRIV

b. <u>Number</u>

-pbulu ~ -bulu	PL	
-pbirrah ~ -birrah		DUAL
-kgoh ~ -goh	DYAD	

c. <u>Verb</u>

-gVn	REL/SUB
-tjjih ~ -jih	FUTURE NEGATIVE

Enclitics

(2) a. <u>Dative Enclitics</u>[1]

=ngini	1st person minimal number
=yikgi	1st person inclusive minimal number
=nggi	2nd person minimal number
=nowi	3rd person minimal number, nonfeminine
=ngoji	3rd person minimal number, feminine
=yerre	1st person exclusive augmented number
=nggorre	1st person inclusive augmented number
=nunggorre	2nd person augmented number
=borre	3rd person augmented number, human

b. <u>Other Enclitics (>10)</u>

=balukgun	source
=bindi	'real'
=bongh	avoidance (used in referring to avoidance relatives; Merlan 1983:70)
=gapbul	collective

Inflectional prefixes

(3) a. <u>Agreement (c. 70)</u>

ngu-	1st person minimal Subject
burru-	3rd person augmented Subject
ngun-	1st person minimal Object
jun-	2nd person minimal Subject/1st person minimal Object

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[1]The minimal/augmented distinction in all person categories except for the 1st person inclusive corresponds to the usual singular/plural distinction. It is the morphology of the 1st person inclusive category which prompted McKay (1975) to propose the minimal/augmented system for Rembarrnga. 1st person inclusive minimal behaves like a singular number, rather than a plural, e.g. it does not take the morpheme (really a recurrent partial) *-rrV* which is common to other augmented forms in agreement prefixes and other pronominal forms. Instead, the partial *-rrV* appears on the 1st inclusive augmented forms such as *-nggorre* (12aDat), *ngurru-* (12aS) which both refer to 'we three or more inclusive'.

b. Noun Class

nu-	I	(masc./animate)
ju-	II	(fem.)
mu-	III	(≈ vegetable)
gu-	IV	(≈ residual)

nu-gu-	I-FAM
ju-gu-	II-FAM
mun-gu-	III-FAM
gun-gu-	IV-FAM

Modifying prefixes (>20)

(4) a. Grouping[2]

watj-	(DU)	'a pair'
garra- ~	(COLL-UNIT)	'together; whole lot'
garrakgarra-		
man-	(COLL-DIST)	'everybody (separately)'
mala-	(COLL)	'together; group'
weleng-		'together'
gorreh-		'alone'

b. Syntactic applicatives

bartda-	COM/APPL	(nominal comitative, rare verbal applicative)
re-	APPL	(lexicalised verbal comitative)
bak-	APPL	regular applicative

c. Others

jah-	'now'
warna-	'continuously'
mele(h)-	'lest'
birditj-	'nearly'
namulu-	'really, properly'
wanyh-	'should',
warna-	'wanted to'
wirli- ~ *li-*	'poor thing'

3.1.1 Distinguishing clitics and affixes

Ngalakgan possesses a large number of bound or semi-bound morphemes. Many of these are derived ultimately from independent stems, and are in various stages of losing their ability to appear independently. Clitics and modifying prefixes are synchronically at the border between stem and affix-like behaviour. In the vast majority of cases, clitics and modifying prefixes are realised as bound elements to some stem. In just a few examples they occur independently as stems themselves, revealing that this process of grammaticalisation is not entirely complete. True affixes, by contrast, never

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[2]Despite a number of attempts I have been unable to determine fully the differences among the various prefixes deriving meanings of collectivity or 'group'.

occur independently. There are certain other differences between clitics and modifying prefixes on the one hand, and inflectional prefixes and suffixes on the other. We shall see that where the characteristics of inflectional affixes and clitics differ, clitics and modifying prefixes approach more closely the characteristics of stems.

Clitics and modifying prefixes have the following range of properties.

(5)　　a.　Most clitics and modifying prefixes modify some head
　　　　b.　Clitics and modifying prefixes do not display allomorphy, unlike suffixes and prefixes
　　　　c.　Clitics and modifying prefixes have the phonotactic patterns of stems[3]

Clitics are distinguished from inflectional affixes by prosodic differences; these are discussed in §3.1.2.1.

Most clitics, like =*bongh* 'AVOID', =*bugih* 'just; only', can be characterised as optional modifiers with adverbial or modal meanings. They do not in general realise core, obligatory functions in the clause: agreement, case, and tense.[4] In terms of semantic contribution, the majority of clitics are more like *stems* than they are like *affixes*.

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[3] The Dative clitics are exceptional, in that two Dative clitics have underlying forms beginning with nasal+stop cluster: /=ŋki/ 2mDat and /=ŋkore/ 12aDat. No other morphemes in Ngalakgan have this characteristic. It is also true that many stems (particularly verb stems) are stop-final, but no clitics or suffixes are. There are modifying prefixes which are stop-final however, e.g. /pak-/ APPL, /piṭic-/ 'nearly'. The most striking phonotactic characteristic distinguishing (WORD-level) suffixes from clitics and stems is the distribution of alternating geminates (see §4.3).

[4] Again, the exception is the class of Dative enclitics, such as =ŋkore 'ours', which are the most commonly occurring clitics. These perform functions similar to those of inflectional person prefixes. Compare (73a-b). The Dative enclitic =ŋkore in (73a) realises three morpho-syntactic categories: person (1st inclusive; contrast =ŋuŋkore 2nd person augmented), number (augmented; contrast =yikki 1st inclusive minimal), and case (dative). The pronominal prefix ŋuruŋ- in example (73b) realises the same three morphosyntactic categories: (1st inclusive; contrast ŋuṇ- : 2nd person a. object), number (minimal; contrast ŋun- : 1 *minimal* object), and case (object; contrast ŋuru- : 12a *subject*).

(73)　　a.　ṇu-ṇe=**ŋkore**　　　　　b.　**ŋuruŋ**-pu-woʔ+wo
　　　　　　2aS-cook.PR-12aDAT　　　　12aO-3a-RED+give.PP
　　　　　　'You mob cook **for us**!'　　　'They gave [it] **to us**.'

Extension of dative pronominal clitics from nominal to verbal words seems to be a common development in many languages; Gooniyandi (McGregor 1990:224) is an example.

There is one attestation of a Dative enclitic occurring independently. In example (6), the Dative enclitic /=ŋkore/ ~ /=kore/ is realised as a word under contrastive intonation.[5]

(6) [ŋumija̰ˀkɔ̀rickɔ́re][6]   [gɔ́re   ŋumugɔ́ric]
     /ŋu-mu-caˀ-koric=ŋkore,   **ŋkore**   ŋu-mu-koric/
     1mS-III-now-grind-12aDAT   12aDAT   1mS-III-grind
     'I'm grinding it now for us, I'm grinding it <u>for us</u>.'   [2/7/96:1B]

Since only words can be associated with contrastive intonation, example (6) indicates that Dative enclitics are regarded as marginal stems by speakers.[7] Inflectional prefixes and suffixes are not attested as independent words in my data.[8]

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[5] In both Ngalakgan and Rembarrnga I regard the underlying form of the 2nd minimal (and in Ngalakgan, also the 1st inclusive augmented) Dative clitic to begin in a nasal+stop cluster /ŋk/. The alternative (e.g. McKay 1975:108) is to regard the initial nasal as an epenthetic segment. The reasons for including the nasal in underlying representation are twofold. Firstly, the 1st inclusive augmented form /=ŋkore/ in Ngalakgan also begins with a nasal+stop cluster. This is cognate with the Rembarrnga form /=ŋakorə/ (same meaning). In both cases, the initial nasal reflects the corresponding verb agreement prefix (Ngkn /ŋur(u)-/, Rmba /ŋar(a)-/), and independent emphatic pronoun forms (Ngkn /ŋurkkaɲiˀ/, Rmba /ŋakurkaŋəˀ/, where the element /+kaɲiˀ ~ +kaŋəˀ/ is common to emphatic pronouns in both languages). Hence, the nasal has a historical basis, at least in the 1st inclusive augmented forms. The same is probably true of the 2nd minimal Dative clitic, since the intransitive prefix in both languages is /ɲiɲ-/, and the emphatic pronouns are /ɲiɲcaɲiˀ/ (Ngkn) and /ɲiɲkaŋəˀ/ (Rmba). Secondly, it is not the case that every stop initial clitic has an allomorph with initial homorganic nasal. The 3rd augmented Dative clitic is /=pore/ in Ngalakgan and /=parə/ in Rembarrnga. In neither language do we find an allomorph /=mpore ~ =mparə/. Hence, the epenthesis rule would still need to be specified to apply only to the 2mDat clitic in Rembarrnga, and the 2mDat and 12aDat in Ngalakgan. In Ngalakgan, it would be the only such epenthesis rule in the language. Such a stipulatory rule seems unwarranted.

[6] The realisation of class III prefix, underlying /mu-/, as [mi] here is due to the following laminal. Fronting of the high back vowel before laminals is regular, particularly in prefixes, but only in unmonitored speech.

[7] McKay (1975:110) cites similar examples in Rembarrnga of Dative enclitics used as free forms. He summarises the situation in Rembarrnga thus: 'The status of the DAT PRON [i.e. Dative clitic] as a surface morpheme is somewhat ambiguous in that it appears to be treated as a suffix in some situations and as a free form in others' (1975:108). The Rembarrnga forms are virtually identical, allowing for regular vowel and consonant correspondences. One example is reproduced here (in surface phonemic form):
    poʈi   miccintaˀ   **kə-ni**
    spear   long.ago   2mDAT-STAT.PP
    'That spear was yours before.'
In this example, the Dative Clitic is inflected with the stative auxiliary (derived from /na+/ 'to sit'). The stative auxiliary derives stative predicates from nominal *stems*. Therefore, the Dative Clitic is behaving like a stem in this example.

[8] Merlan (1983:26) cites a counterexample: *ju-gu-birrah-yih* 'they two', where the dual suffix *birrah* acts as nominal head to the prefix *ju-gu-* (II-FAM) and case suffix *-yih* (ERG). Merlan does not cite the full sentence in which this form appeared, so it is difficult to draw any conclusions from it.

Several modifying prefixes are attested as independent words (7), (8). As independent words, they have their own primary stress. These examples show that, like clitics, modifying prefixes have stem-like properties.[9]

<u>Prefix</u>

(7)   a.   *gu-jah-**namulu**-ru+nga*
          IRR-now-really-burn+FUT
          '[It] will get really cooking now.'   [27/6/96:1B]

<u>Independent word</u>

     b.   *matjji*   *bordewk-me+n*   **namulu**   *gu-rabon-ji*
          indeed   bad-be+PR   really   IRR-go+PR-NEG
          'Because he's sick and he really can't get around.'   [31/5/96:1B]

<u>Prefix</u>

(8)   a.   *burru-**mala**-mangi-tjji+niny*[10]
          3aS-COLL-get-RR+PC
          'They gathered, collected themselves.'   [M: 3-106]

<u>Independent word</u>

     b.   **mala**   *yirri-nanga+n*
          group   1aS-sit+PR
          'We sit as a group.'   [3/9/97:1A]

Some prefixes can be realised as constituents of compound words (9; cf. 8) or reduplicated words (10).

<u>Compound</u>

(9)   a.   *gurnmarnh*   **mala**-*borno*   *burru-gor-miny,*   *burru-yongoni+ny*
          maybe   group-different   3aS-sick-PP   3aS-lie+PC
          'Maybe someone was lying there sick.'   [5/9/97:1B]

<u>Prefix</u>

(10)   a.   *matjji*   *nginy-**gorreh**-nanga-nanga+n*
          indeed   2mS-alone-ITER-sit+PR
          'Really you're too much alone/by yourself.'   [M: 3-285]

<u>Reduplicated word</u>

     b.   **gorreh-gorreh**   *burru-man-nanga+n*
          INTENS-alone   3aS-group-sit+PR
          mijelb-mijelb[11]
          'Every group sits by itself.'   [3/9/97:1A]

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[9]One proclitic has a historically-related independent form:*wanyh=* 'should not, ought not' (proclitic) cf. *wanyba* 'id.' (word).

[10]This PC form of the Reflexive-Reciprocal is anomalous.

[11]Kriol *mijelb* is a general reflexive or contrastive pronoun, unspecified as to person.

One prefix has been attested as a predicate (11; cf. 10).

         <u>Predicate</u>

(11)   *mokgol-goh*   **gorreh**=*borre-pbirrah*
        father-DYAD   alone-3aDAT-DU
        dubela mijelb   [3/7/96]
        'Father and son are alone, the two of them.' [Lit.: 'Aloneness is to the pair of them.']¹²

There are several instances of modifying prefixes taking an unreduplicated stem form of a finite verb (12); the examples in (13) are from Merlan (1983).

(12)   *Mago*! *nginy-**jah**-wo*   *jajabarngh*!
        No!   1mS/2mO-now-give.PP   yesterday
        No, ai bin <u>gibit</u> yu yesdi
        'No! I <u>did</u> give it to you, yesterday!'   [2/9/97:1B]

(13)   a. *ngun-**bartda**-me*   *mu-wapbawapbah*   *ngondo-yih*
            1mO-APPL-get.PP   III-clothing   wind-ERG
            'The wind took the dress from me.'   [M:3-65]

       b. *yirrirn-**jah**-wo*   *nu-gu-bolo-yih*
            1aO-now-give.PP   I-FAM-boss-ERG
            'Now the boss gave it to us.'   [M:3-291]

These examples are significant because the unreduplicated PP form of these verbs can only otherwise occur in a compound. A modifying prefix therefore constitutes a stem for the purposes of this restriction (see §3.3.4).

A distinction between inflectional and modifying prefixes is made in the table in §3.1, and this distinction becomes important when we consider their prosodic characteristics in §3.3. We can distinguish inflectional and modifying prefixes in Ngalakgan with reference to their relative obligatoriness, as well as to the extent that they constitute defining characteristics of word classes or syntactic categories. The class 'nominal' may be defined in Ngalakgan as those words which take noun class prefixes specific to the referent of that nominal. All nominals must be realised in one of the four

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¹²The predicate *gorreh* 'alone' takes an existential argument here.

noun classes, whether or not a prefix realising this class occurs on the nominal in question. Similarly, the class 'predicate' in Ngalakgan may be defined as those words which take agreement prefixes referring to the the argument(s) of that predicate. Predicates cannot occur without agreement prefixes.[13] Therefore, noun class prefixes serve to define words which are nominals, and agreement prefixes serve to define words which are predicates, and are obligatory in this role (modulo zero prefix allomorphs in certain pragmatic and person/tense/mood categories, respectively).

Modifying prefixes, by contrast, do not define categories since any modifying prefix which can occur on nominals can also occur on predicates in Ngalakgan, and most occur on both. They cannot be used as defining characteristics of word classes for that reason. Moreover, while it can be said that noun classes are an obligatory expression of the syntactic category 'nominal', and agreement of the category 'predicate', the same cannot be said of modifying prefixes. Every token of a nominal word requires (explicit or implicit) assignment to a noun class, and every token of a predicate word requires (explicit or implicit) expression of argument person, number, noun class and role. It is not true that every nominal or predicate requires assignment to or expression of some category realised by the class of modifying prefixes.

3.1.1.1 Affix allomorphy

The majority of affixes have two allomorphs, allomorphy is not observed in clitics, and in this respect clitics are again similar to WORD-level stems, which likewise do not exhibit allomorphic variation.

All stop-initial WORD-level suffixes alternate between geminate and singleton realisations of the initial consonant, but no enclitics do so. The geminate/singleton alternation is predictable. Ch 4 argues that the stop is underlyingly geminate in these suffixes; it is realised as a singleton in satisfaction of constraints on the form of stems.

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[13] Class I and II arguments unless specifically plural, and optionally non-human class III and IV, are realised as zero agreement. However, in the Present, Future, and Present Negative an obligatory 'Irrealis' prefix *gu-* occurs on verbal and existential predicates (Merlan 1983:109). This can be regarded as an implicit marker of 3rd person agreement.

In this respect, clitics are more like stems than affixes are. WORD-level stems are not realised with initial geminates (see Ch 4).

Two related WORD-level suffixes exhibit vowel harmony with the preceding stem. The Dative/Genitive suffix /-ʔkVn/ and the Relativising suffix on verbs /-kVn/, are both realised with a copy of the vowel of the preceding syllable, e.g. /caŋku-ʔkVn/ [jaŋgụʔkʊn] 'for meat', /mu-may-ʔkVn/ [mumayʔkan] 'for vegetable food'.[14] Inflectional prefixes with underlying vowel /u/, e.g. /pu-/ '3rd person augmented', have two allomorphs. In one allomorph underlying /u/ corresponds to surface [u], in the other allomorph underlying /u/ corresponds to surface [i]. For example the 3rd person augmented, 2nd position prefix has allomorphs /-pu-/ and /-pi-/. Following prefixes with /i/, the prefix is realised as /pi-/ (Merlan 1983:85), as shown in (14b). The elsewhere form is /-pu-/, shown in (14a); I assume this is the underlying form also.

(14)   a.   /ŋun-**pu**-woʔwo/   b.   /yin-**pi**-woʔwo/
            1mO-3a-RED+give.PP   12mO-3a-RED+give.PP
            'They gave [it] to me'   'They gave [it] to us'

No clitics are attested with either of these vowel harmony patterns, nor are any WORD-level stems. If allomorphy is a characteristic of affixes, clitics are not affixes.

3.1.1.2 Distribution of mid-vowels

Mid-vowels have a restricted distribution in the lexicon of Ngalakgan. While high and low vowels are relatively unrestricted, mid-vowels in roots are almost without exception restricted to peripheral syllables, or, if medial, must be distributed in every syllable from an edge. For example, mid-vowels, if occurring in just one syllable, must occur in an edgemost syllable (15; these are the only examples):

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[14] Examples such as this one constitute evidence that sequences of vowel+glide in Ngalakgan are treated as nucleus+coda sequences, rather as complex nuclei. If the nucleus was treated as a diphthong, we might expect a surface form *[mumaịʔkin] from underlying form /mu-mai-ʔkVn/.

(15)   /ɕeraʈa/ 'women's ceremony'; /wiriyel/ 'aquatic weed sp.'; /wolaway(-mi+)/ 'cool off';
        /ɕuruwe+/ 'rush'

If occurring in more than one syllable, mid-vowels must occur in contiguous syllables, and in every syllable from a medial position to at least one edgemost syllable (16a). If occurring in both edgemost syllables, then every syllable in the root must be a mid-vowel (b-c):

(16)   a. /ɕaworo/ 'patrilineal clan'; /malaʈoʈo/ 'baby bush turkey'
        b. [cὲntɛwέrɛc] ~ [cὲntɛwíric]~ [cìntiwíric] [place name]
        c. /kowelеŋʔ(-mi+)/ 'beckon to'

Therefore, mid-vowels in roots can only appear at the edges.[15] Many clitics have mid-vowels. Six of the nine Dative enclitics have at least one mid-vowel. Other clitics and modifying prefixes also have mid-vowels: =*bongh* 'AV', *jah-* ~ *je-* 'now', *meleh-* 'lest', *gorreh-* 'alone', *weleng-* 'together', *re-* 'APPL'. Most WORD-level affixes contrast just the three vowels /a, i, u/. Only one suffix has a mid-vowel: the Dyadic suffix /-kkoʔ/. Therefore, in affixed words, mid-vowels occur on the whole just in roots, clitics and modifying prefixes, which, as we have seen, are like bound stems.

3.1.1.3 Apical distinctions

The previous chapter discussed the distribution of apical distinctions in words (§2.4). Apical distinctions are neutralised in roots and stems in initial position, with the elsewhere realisation being postalveolar. Clitics and modifying prefixes behave like stems with respect to apical distinctions: they too show neutralisation of apicals to postalveolar in initial position. By contrast, initial apicals in ROOT-suffixes are all apico-

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[15]There is one apparent exception: an onomatopoeic term for 'curlew' /kuweʟuʔ/. I discount this as a counterexample on the grounds that onomatopoeic terms frequently violate surface-true lexical patterns. There is also a subsection term /poɳaɳеŋʔ/ ~ /poɳeɳеŋʔ/ which has an otherwise unattested vowel pattern. The subsection system, and the associated terms, have been acquired by the Ngalakgan from Jawoyn to the north west within the last century, and 'perhaps over the last two- to four-score years' (Merlan 1983:vii; and cf. McConvell 1985).

alveolar: there are no postalveolar apicals in this position. As for WORD-suffixes, there are no apical-initial forms at all in this class, making WORD-suffixes quite distinct from stems, clitics and modifying prefixes.

To summarise, clitics and modifying prefixes on the whole are more 'stem-like' than inflectional affixes. One further difference between clitics and affixes is in terms of their respective relationships to pitch accents. This difference is described in the section which follows.

3.1.2 Prosodic characteristics of affixes and clitics

This section exemplifies and discusses the prosodic characteristics of suffixes and enclitics. In §3.1.2.3, I claim that, like MWds, WORD-level suffixes and clitics also constitute morpho-prosodic domains, and that this is a characteristic of Ngalakgan generally, accounting for a range of patterns in the language. A similar generalisation can be made for other Australian languages such as Warlpiri (Nash 1986) and Diyari (Austin 1981). The stress patterns of these languages can be accounted for in the same way that I will account for Ngalakgan.

3.1.2.1 General patterns: disyllabic suffixes and clitics

Every disyllabic suffix and clitic in Ngalakgan is an independent foot. I propose therefore that every suffix and clitic constitutes a separate domain for metrical structure. The examples in (17) exemplify the pattern.[16]

(17)   a.   /(yappanʔ)-p(**piraʔ**)/   [yàppan̪ʔbírạ]
              two-DU   'two (people/animates)'

       b.   /puru-(wulup)+pa-p(**piraʔ**)/   [bʊruwʊ̀lʊppabírạ]
              3aS-swim+FUT-DU   'those two will go swimming'

       c.   /yiri-(ɹapo)+na-p(**piraʔ**)/   [yiriɹábonappìrạ]
              1aS-go+FUT-DU   'we'll go, the two of us'

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[16]The underlying forms in slashes include material which is not present in the surface form in some cases. Suffix-initial geminates are realised as singletons because of constraints on geminates in PrWd domains, discussed in Ch 4. Other differences are due to cluster simplification and assimilation.

d. /puru-(ɳaŋa)-(ɳaŋa)+na-p(**piraʔ**)/   [bʊruɳàŋaɳáŋanappìrạ]
    3aS-ITER-sit+FUT-DU   'those two want to sit around'

e. /ɳu-(mokkol)=(**ŋini**-p)(**piraʔ**)/   [numɔ̀kkɔlŋìnɪppírạ]
    I-father-1mDAT-DU   'my two fathers'

f. /ɳu-(mokkol)=(**yere**-k)kaʔ/   [numɔ̀kkɔlyérɛkkạ]
    I-father-1aDAT-DU   'to our father'

g. /cu-yappa=ŋki-p(**pulu**)/   [jiyappàŋgɪppúlu][17]
    II-sister-2mDAT-PL   'your sisters'

h. /ce=ŋkore-kkaʔ/   [jèŋgɔ́rɛkkạ]
    nose=12aDAT-LOC   'in our noses'

i. /ce=ɳowi/   [jèːɳówi]
    nose=3nfemDAT   'his nose'

j. /ke=ŋini/   [gèːɳíni]
    child=1mDAT   'my child'

Table (18) shows all the disyllabic WORD-level suffixes and the most common disyllabic enclitics.

(18)   Disyllabic suffixes
        -pbulu ~ -bulu   PL
        -pbirrah ~ -birrah   DUAL

        Disyllabic enclitics
        =ngini   1mDAT
        =yikgi   12mDAT
        =nowi   3nfemDAT
        =ngoji   3femDAT
        =yerre   1aDAT
        =nggorre   12aDAT
        =borre   3aDAT

While suffixes and enclitics behave alike in terms of foot structure, they differ in terms of association with pitch accent. Words containing stressed enclitics behave like compounds: stressed enclitics are always associated with a pitch accent. In an encliticised form such as (19a), only the realisation in (19a) - with penultimate primary stress is possible. Words containing stressed suffixes behave like quadrisyllabic roots:

[17]The [u] ~ [i] alternation in the phonetic form here is due to assimilation to the laminal root-initial segment.

there is variation between primary stress on the stem and primary stress on the suffix. In a suffixed form like (19c) either of the prosodic realisations in (19c-d) is possible (pitch accents indicated with 'H').

		H H			H H
(19)	a.	[jiyàppaŋíni]	c.		[jiyàppabʉ́lu]
		/ɕu-(yappa)=(**ŋini**)/			/ɕu-(yappa-p)(**pulu**)/
		II-sister-1mDAT			II-sister-PL

		H			H
	b.	*[jiyáppaŋìni]	d.		[jiyáppabʉ̀lu]

Suffixed forms, then, can be parsed either as a single PrWd, or two PrWds - a prosodic compound.

(20)　a.　ɕu-⌊(yàppa)⌋_PrWd⌊(-púlu)⌋_PrWd　　'(my) sisters'
　　　　　II-sister-PL

　　　b.　ɕu-⌊(yáppa-)(pùlu)⌋_PRWD　　'(my) sisters'
　　　　　II-sister-PL

An encliticised form, if the clitic is stressed, can only be parsed as a prosodic compound:

(21)　a.　ɕu-⌊(yàppa)⌋_PrWd=⌊(ŋíni)⌋_PrWd　　'my sister'
　　　　　II-sister-1mDAT

Other clitics, such as the Collective =*gapbul*, behave in the same way as the Dative enclitics. The behaviour of clitics with respect to pitch accent is analysed formally in §3.1.2.4.

3.1.2.2 Monosyllabic suffixes and clitics

Monosyllabic suffixes and clitics are ignored for footing (22) unless they can be footed with an adjacent morpheme (which will not be a disyllabic suffix) (23).

(22) a. /(ʈotoyʔ)=ŋ**ki**/   [dɔ́dɔyɡi]
          uncle-2mDAT   'your 'uncle"

      b. /(yappa)-**kkoʔ**/   [yáppaɡo̥]
          sister-DYAD   'two sisters; sister and brother'

      c. /(ʈotoyʔ)=ŋ**ki**-p(pulu)/   [dɔ́dɔyɡɪppʊ́lu]
          uncle-2mDAT-COLL   'all your 'uncle'-mob'

      d. /(ʈotoyʔ)=ŋ**ki**-p(pulu-k)**kaʔ**/   [dɔ́dɔyɡɪppʊ́lʊkkḁ]
          uncle-2mDAT-COLL-LOC   'at/to all your 'uncle'-mob'

      e. /(mokkol)=(ɲini-k)**kaʔ**/   [mɔ̀kkɔlŋínɪkkḁ]
          father-1mDAT-LOC   'to my father'

(23) a. /(ʈotoyʔ=ŋ)(**ki-kkaʔ**)/   [dɔ̀dɔyɡíkkḁ]
          uncle-2mDAT-LOC   'at/to your 'uncle"

      b. /ɳu-(puyp)pu=ŋ(**ki-kkaʔ**)/   [nubʊ̀yppʊŋɡíkkḁ]
          I-brother-2mDAT-LOC   'to your elder brother'

      c. /ɳu-(kakka=ŋ)(**ki-kkaʔ**)/   [nugàkkaŋɡíkkḁ]
          I-brother-2mDAT-LOC   'to your younger brother'

      d. /ɕu-(yappa=ŋ)(**ki-kkaʔ**)/   [jiyàppaŋɡíkkḁ]
          II-sister-2mDAT-LOC   'to your sister'

      e. /ku-(puɳ=ŋ)(**ki-yiʔ**)/   [gubʊ̀ŋɡíi̥]
          IV-knee-2mDAT-ERG   'with your knees'

      f. /ɕu-(yappa=ŋ)(**ki-ʔkVn**)/   [jiyàppaŋɡí̥kɪn]
          II-sister-2mDAT-DAT   'for your sister'

Although there are a number of monosyllabic suffixes, there is only one monosyllabic Dative clitic: =*nggi* '2minDAT'. Suffixes include those marking case: -*kgah* ~ -*gah* LOC, -*hgVn* DAT, -*yih* ERG/INST, -*wi* LAT/PURP; and a derivational suffix -*tjji* ~ -*ji* PRIV. The only sequence of monosyllabic suffixes or clitics attested is that where the enclitic =*nggi* '1mDAT' is followed by a case suffix. Case suffixes do not cooccur, and there are no attested examples of more than two consecutive monosyllabic suffixes or clitics; it is doubtful that there are any acceptable combinations.

Monosyllabic suffixes can also be incorporated into a foot with the last syllable of a trisyllabic root (24a-b) below. In this case, however, stress (or pitch accent) assignment is somewhat sporadic, varying with unstressed forms such as (24c-d):

(24) a. [jáwaɳɖàŋgi]   'your beard'
           /(cawaɳ)(ʈa=ŋki)/   whiskers-2mDAT   [22/5/98]

      b. [gáppuɟìji]   'no old people'
           /(kappu)(ci-cci)/   old.people-PRIV

      c. [jáwaɳɖaŋgi]   'your beard'
           /(cawaɳ)ʈa=ŋki/   whiskers-2mDAT   [22/5/98]

      d. [gáppuɟiji]   'no old people'
           /(kappu)ci-cci/   old.people-PRIV

There is just one bound (post-stem) form which is longer than two syllables: =*nunggorre* '2aDAT'. This form varies between initial and second syllable stress:

(25) a. /ɳu-(ke)=(ɳuŋko)re/   [nugèːɳʊ́ŋgoɾe]
          I-son-2aDAT   'your son'

      b. /ɳu-(mokkol)=ɳuŋ(kore-k)kaʔ/   [numɔ̀kkɔlnʊŋgɔ́ɾɛkka̠]
          I-father-2aDAT-LOC   'to your father'

It is important to note that the metrical structure of suffixes and clitics is not dependent on their meaning. Unlike suffixes and clitics, MWds are always associated with a pitch accent regardless of their size. For MWds, we might make a case that this prosodic consistency is due to their inherent semantic *content*.

But whether or not a suffix or enclitic constitutes a foot is not a function of its meaning. For instance, the Ablative case suffix -*hwala* and the Locative -*kgah* ~ -*gah* are both local cases, yet the first is consistently associated with a foot (26a), while the second only becomes part of a foot contingently (26b). The same is true of the Dative clitics =*ngini* '1mDAT' and =*nggi* '2mDAT'. The first is always a foot (26c), the second only contingently so (26d):

(26) a. [yèlɛwála]   b. [yélɛkka̠]
          /(yele-ʔ)(wala)/   /(yele-k)kaʔ/
          hole-ABL   hole-LOC

c. [numɔ̀kkɔlŋíni]   d. [numɔ́kkɔlŋgi]
    /ŋu-(mokkol)=(ŋini)/   /ŋu-(mokkol=ŋ)ki
    I-father-mine   I-father-yours

The metrical structure of suffixes *is* dependent on their inherent characteristics, but of *size*, rather than semantics, whereas the reverse is true of MWds, as I now show.

3.1.2.3 Morphemes as prosodic domains

It is possible to sum up the preceding examples with the following generalisation (and c.f. Nash 1986:100):

(27)   Polysyllabic WORD-level suffixes and clitics are *inherently* footed, but the footing of monosyllabic suffixes and clitics is *contingent* on their surrounding environment.

The stress patterns in (17-25) above seem to be widely attested among Australian languages. Similar patterns have been described for e.g. Warlpiri (Nash 1986; Berry 1999) and Diyari (Austin 1981: 30-31). The essential generalisation - that each WORD-level suffix and clitic forms its own domain for foot structure - is, I believe, the right one. Nevertheless, the simple generalisation has been theoretically problematic for a number of scholars. In the analysis to follow I take an approach which encodes the generalisation in (27) in a constraint applicable to all WORD-level morphemes, not just suffixes and enclitics.

The second part of this generalisation - that monosyllabic suffixes are footed 'contingently' - can be attributed to the constraint PARSE(SYLL) (P&S 1993:58). I define this constraint in (28).

(28)   PARSE(SYLL):   'Every syllable must be parsed.'[18]

---

[18]I follow P&S (1993:58) in omitting mention of 'foot' in the constraint. It is unclear whether 'Parse(Syll)' should be distinct from e.g. 'Parse(Syll, Foot)' or 'Parse(Syll, PrWd)'. Perhaps Parse(Syll) can be regarded as the underdetermined form of the constraint.

PARSE(SYLL) demands that as many syllables as possible be included in feet. It has the effect of 'cleaning up' stray syllables which are not subject to some other constraint demanding they be part of feet. In (29) for instance, MWD ≈ PRWD makes sure that the stem is associated with at least one foot; and PARSE(SYLL) prefers the form where remaining syllables are also parsed into feet:

(29)   MWD ≈ PRWD   PARSE(SYLL)
     a. [(**yappa**=ŋ)ki-kka?]   b. [(yappa=ŋ)(**ki-kka?**)]
         sister-2mDAT-LOC

     c. *[yappa=ŋ**ki-kka?**]   d. *[(yappa=ŋ)**ki-kka?**]

The (d) form violates PARSE(SYLL).

Suffixes behave in a similar way to MWds in one respect. Suffixes are not required to be Prosodic Words, but they *are* required to constitute distinct domains at some level of prosodic structure. Szpyra (1989, 1992) and Rubach and Booij (1990) propose that prefixes in Polish constitute phonological and prosodic domains independent of the following stem.[19] I suggest that something like this is true of *all* WORD-level morphemes in Ngalakgan. Along with MWD ≈ PRWD, then, there is a more general constraint requiring that every WORD-level morpheme constitute a 'metrical domain'. I define metrical domain as 'foot' or 'PrWd', the smallest prosodic constituents within which a distinction between strong and weak metrical beats can be made.

(30)   M ≈ PRDOMAIN: 'Every WORD-level morpheme is a metrical domain.'[20]

---

[19]Rubach and Booij propose that prefixes in Polish constitute a prosodic constituent they call the 'mot' (the term is from Liberman and Prince 1977). Szpyra (1992:209) shows that Polish prefixes are not domains for stress however; prefixed words are stressed as single prosodic domains.

[20]I have abbreviated the constraint as 'PRDOM', rather than, say, 'M-DOM' because 'Pr' is iconic for prosodic structure; 'M' is already used for 'M(orpheme)'. Since metrical structure is considered to be part of prosodic structure, this does not seem unjustified. However, it is interesting to consider whether grammars should be able to distinguish metrical structure - rhythmic alternation - from prosodic structure, which includes moras and syllables, as well as feet and prosodic words. M&P (1993b:5) make a distinction between what they call the 'skeletal level', encompassing the mora and segment, from the prosodic hierarchy proper: syllables, feet, and PrWd.

The constraint is satisfied by words in which each morpheme corresponds to at least one metrical foot. It does not require that the morpheme be realised with a pitch accent, so PrWd correspondence is not a requirement here, unlike MWD ≈ PRWD. We could thereby term the constraint 'Parse(Morpheme-to-Foot)'. I am not sure that this is a necessary or even desirable stipulation. While a constraint enforcing correspondence between morphological and prosodic *words* seems natural, there does not seem to be any reason why morphemes should necessarily want to be foot-sized.

Rather, the intuition behind M ≈ PRDOM is that speakers use prosodic structure as a way of 'signalling' the morphological structure (Trubetzkoy 1939[1969]:277). Evidence for this claim is the fact that only WORD-level morphemes, and not ROOT-level ones, are required to be prosodic domains. There is no need to signal the boundaries of ROOT-level morphemes, since ROOT-complex forms are interpreted as units.

The advantage of using M ≈ PRDOM is its wide applicability. It captures a generalisation about prosodic structure in Ngalakgan: that every meaningful morpheme constitutes a separate domain for metrical structure. M ≈ PRDOM itself is not restricted to any class of morphemes (e.g. 'suffix', 'clitic'): all morphemes behave similarly in this respect. Whether or not each morpheme *in fact* constitutes a metrical domain at the surface is due to other considerations. These are explored in the following sections.

M ≈ PRDOM is perhaps responsible for the fact that under certain conditions, bound morphemes such as affixes can be pronounced separately by speakers. When artificially slowing speech down, speakers divide words into their constituent morphemes. An example is given here.

(31) a. /yiriŋ-pi-pak=woc+ma/ [yírɨŋ]^[bíː]^[bák]^[wɔ́cma]
1aO-3a-APPL=steal+[get]PR 'they always steal from us' [2/7/96:2A]

Note, firstly, that speakers do not break words up into syllables or feet and, secondly, that the ROOT-compound *wotj+ma+* 'steal' is treated as a single item. There are numerous similar examples from the elicitation sessions. It is for this reason that I

treat complex prefixes such as /yiriŋ-pi-/ as two separate morphemes (albeit subject to allomorphy and ordering rules) rather than a portmanteau prefix, which seems to be the view of Merlan (1983).

M ≈ PRDOM also applies to a number of other Australian languages, such as Warlpiri (Nash 1980[1986]), and Diyari (Austin 1981) (I discuss these languages in §3.2.1).

3.1.2.4 Analysis of affix and clitic patterns

In this section I analyse the prosodic patterns in suffixes and clitics using M ≈ PRDOM (prefixes are addressed separately). I show that the following ranking accounts for their behaviour:

(32)   MWD ≈ PRWD >> IDENT[mora] >> M ≈ PRDOM >> PARSE(σ)

M ≈ PRDOM is distinct from, and must dominate PARSE(σ). This is shown in the tableau in (33). A form which parses suffixes and clitics isomorphically, but violates PARSE(σ) twice, wins over a competing candidate in which every syllable is parsed, but in flagrant violation of M ≈ PRDOM.

(33)

/ʈòtoyʔ=ŋki-ppulu-kkaʔ/ uncle-yours-PL-LOC	M ≈ PRDOM	PARSE(σ)
☞ a. (ʈòtoyʔ)=ki-p(púlu-k)kaʔ	**	**
b. (ʈòtoyʔ)=(kǐ-ppu)(lú-kkaʔ)	***!	

I return to this example in §3.2.2 to show why Align constraints cannot capture the same facts.[21]

---

[21] We must assume high-ranking syllabification constraints here prevent the geminate-initial suffix /-ppiraʔ/ from being parsed entirely within the same foot. Equally, constraints dominating M ≈ PRDOM make sure that the geminate remains in the surface form, and is not degeminated in order to better-satisfy the constraint. I abstract away from these considerations in what follows.

PARSE(σ) can still do work in 'cleaning up' stray syllables; this is shown in the tableau in (34). When a sequence of two monosyllabic morphemes occurs, parsing them together or not at all both violate M ≈ PRDOM equally. They are optimally parsed as a single foot, as in (34a), since this satisfies PARSE(σ) better than leaving them unparsed. PARSE(σ) is decisive in this case.

(34)

/yappa=ŋki-kka?/ sister-yours-LOC	M ≈ PRDOM	PARSE(σ)
☞ a. (yàppa=ŋ)(kí-kka?)	**	
b. (yáppa=ŋ)ki-kka?	**	**!

Since monosyllabic suffixes are never realised with long vowels, Faithfulness to moras outranks M ≈ PRDOM, as shown in the following tableau. Candidate (35a) violates M ≈ PRDOM twice, once for each of the enclitic and suffix which are not parsed isomorphically to any metrical constitutent. Candidate (35b), even though it maximally satisfies M ≈ PRDOM, fails IDENT[μ]: it surfaces with a long vowel which is not present in the input. It is more important for affixes to maintain Correspondence than it is for them to constitute a metrical domain.

(35)

/ʈotoy?=ŋki-ppulu-kka?/ uncle-yours-PL-LOC	IDENT[μ]	M ≈ PRDOM
☞ a. (ʈòtoy?)=ki-p(púlu-k)ka?		**
b. (ʈòtoy?)=(kǐ$_{μμ}$-p)(pùlu-k)(ká$_{μμ}$?)	**!	

Suffixes differ from WORD-level roots/stems (MWds) in that the latter *can* force violation of Faithfulness, as we have seen: CV roots show long vowels in surface forms as in (36).

(36) a. /ce/   [jéː]   'nose'
      b. /ce=ŋowi/   [jèːŋówi]   'his nose'

Long vowels in surface forms in Ngalakgan violate IDENT[μ], since all vowels are underlyingly monomoraic.

In a form which combines a monosyllabic MWd, and a monosyllabic suffix, the MWd, but not the suffix, must be long. The MWd /ce/ must constitute a PrWd, and must therefore be bimoraic (by the Prosodic Hierarchy, Strict Layering, and Foot Binarity - §2.1). It is more important for MWds than for other morphemes to constitute a separate metrical domain, and for that domain to be a Prosodic Word.

(37)

/ce=ŋowi-kkaʔ/ nose-his-LOC	MWD ≈ PRWD	FTBIN	IDENT[μ]	M ≈ PRDOM
☞ a. [(cèμμ)]=(ŋówi-k)kaʔ			*	*
b. [(ce=ŋo)](wí-kkaʔ)	*!			***
c. [(cèμμ)]=(ŋówi-k)(kàμμʔ)			**!	
d. [(cè)]=(ŋówi-k)kàʔ		*!		*

Note that candidate (37b), where the MWd is parsed together with the first syllable of the following suffix, violates MWD ≈ PRWD and M ≈ PRDOM. An MWd which does not constitute its own metrical domain violates both constraints.

Recall from the preceding discussion that clitics, when stressed, are also associated with a pitch accent. It is this characteristic which distinguishes them from suffixes. The following constraint states that clitics begin a new PrWd domain:

(38)   ALIGNL(CLITIC, PRWD):   Align the left edge of every clitic to the left edge of some PrWd. (Award violation marks for every syllable separating the left edge of any clitic from the left edge of a PrWd.)

Unlike MWds, which must be at least bimoraic at the surface, we do not observe vowel-lengthening in clitics in order to achieve Prosodic Word-hood. Therefore AlignL(Clitic) must be ranked below IDENT[mora], shown in (39). The ill-formed candidate (39c) violates the latter constraint. Of the two candidates (39a-b), the one which associates the clitic with a PrWd (39a) is optimal. AlignL and M ≈ PRDOM do not conflict, and are unranked in tableau (39). Because of the constraint ALIGNR(PK, P-WD) introduced in Ch 2, the penultimate stress in (39a) must also be the primary one. (Square brackets in bold indicate PrWds.)

(39)

/yappa=ŋki-kkaʔ/ sister-yours-LOC	IDENT[μ]	ALIGNL (CLITIC, PRWD)	M ≈ PRDOM	PARSE(σ)
☞ a. **[**(yàppa=ŋ)**][**(kí-kkaʔ)**]**			**	
b. **[**(yáppa=ŋ)**]**ki-kkaʔ		*!	**	**
c. **[**(yàppa=ŋ)**][**(kí$_{\mu\mu}$-k)kaʔ**]**	*!		*	*

To summarise: I have proposed a constraint 'M ≈ PRDOM' which demands isomorphic associations between WORD-level morphemes and constituents of metrical structure, the Foot in the first instance. The analysis has shown that it can account straightforwardly for the stress patterns of morphologically complex words, with a ranking of MWD ≈ PRWD over IDENT[mora], and IDENT[mora] over M ≈ PRDOM.

3.2 Further applications of M ≈ PRDOM

In this section I show how the same constraint M ≈ PRDOM successfully accounts for the stress patterns of other languages. Two are considered here: Warlpiri (Nash 1980[1986]) and Diyari (Austin 1981).

Previous analyses of languages like Warlpiri and Diyari, where - as in Ngalakgan - foot structure and morphemes are isomorphic, have concentrated on

Alignment approaches (e.g. Kager 1996, Crowhurst and Hewitt 1996, Berry 1999). I argue here that Alignment can not capture the same facts, and is inherently unsuited to do so.

3.2.1 Warlpiri and Diyari stress

Warlpiri (Nash 1980[1986]) and Diyari (Austin 1980) have both been described with stress systems that are like that described for Ngalakgan here. In all three languages, polysyllabic morphemes are footed consistently and independently, while monosyllabic morphemes have inconsistent metrical structure.

In Diyari, Austin (1981:31) states the following rule:

(40)   'Primary stress falls on the first vowel of a root and secondary stress is assigned to the third vowel of a four syllable root...and to the first vowel of a disyllabic suffix.'

Some examples are shown in (41) (from Austin 1981:31):[22]

(41)   a.   kána   man
        b.   pínadu   old man
        c.   wílapìna   old woman
        d.   kána-wàɹa   man-PL
        e.   pínadu-wàɹa   old man-PL
        f.   wílapìna-wàɹa   old woman-PL
        g.   kána-ɲi   man-LOC
        h.   kána-ɲi-màʈa   man-LOC-IDENT
        i.   kána-wàɹa-ŋu   man-PL-LOC
        j.   kána-wàɹa-ŋùndu   man-PL-ABL

It is not clear from Austin's description whether two adjacent monosyllabic suffixes can be footed together. In other respects, foot structure in Diyari and Ngalakgan are the same.

For Warlpiri, Nash (1986:100) states the following rules (cf. Austin's rule in 40):

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[22]I have supplied morpheme boundaries, based on Austin's glosses, and stress to the phonemic representations, based on Austin's phonetic representations.

(42)   'Primary stress is uniformly on the initial syllable of a word...The first syllable of a morpheme of two or more syllables always bears a stress.'

Some examples of Nash's generalisation are given in (43) (from Nash 1986:102).[23]

(43)   'man'   'tree'   'spinifex plain'
     a.   wáti   wátiya   mánaŋkàra
     b.   wáti-ŋka   wátiyà-ḷa   mánaŋkàra-ḷa   (LOC)
     c.   wáti-ŋkà-ḷu   wátiya-ḷà-ḷu   mánaŋkàra-ḷà-ḷu   (LOC-ERG)

As shown by example (43c), Warlpiri behaves like Ngalakgan in allowing foot parsing to 'clean up' stray morphemes where possible: that is, where the regular isomorphic relationship M ≈ PRDOM would not be otherwise disturbed.

Both Diyari and Warlpiri are amenable to an analysis using M ≈ PRDOM, as I have done in the previous sections. (44) shows an example tableau for Warlpiri.[24] This example is analogous to the Ngalakgan example (ʈòtoyʔ)=ki-p(púlu-k)kaʔ 'to your uncles' analysed previously (33). As in Ngalakgan, in Warlpiri it is better to parse each morpheme as a separate metrical domain wherever possible, even though to do so leaves more syllables unparsed.

(44)   **Warlpiri**

/wati-ŋka-ḷaɲu-ḷu/ man-LOC-too-ERG	M ≈ PRDOM	PARSE(σ)
☞ a. (wáti-ŋ)ka-(ḷàɲu)-ḷu	**	**
b. (wáti-ŋ)(kà-ḷa)(ɲù-ḷu)	***!	

In the following section, I consider two alternative analyses which have attempted to capture these facts: Hewitt & Crowhurst (1996) and Kager (1996).

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[23](43) replicates Nash's presentation except that I have used a phonemic orthography, rather than the established Warlpiri practical orthography.

[24]David Nash p.c. has confirmed the stress pattern in this form, and it follows his description of stress in Nash (1986:100).

3.2.2 Against Align

Hewitt & Crowhurst (1996) and Kager (1996) presented analyses of Diyari and Warlpiri using Alignment constraints. In this section I argue that Alignment constraints are inherently unsuited to an analysis of languages like Ngalakgan, Warlpiri and Diyari. This is because Alignment constraints cannot capture the generalisation which applies to these languages: that morphemes are isomorphically associated with metrical structure, as far as possible.

To understand the issue let us return to the definition of 'Generalised Alignment' given in M&P (1993b:2).

(45)   Generalized Alignment
             Align(Cat1, Edge1, Cat2, Edge2) =$_{def}$
                 $\forall$ Cat1 $\exists$ Cat2 such that Edge1 of Cat1 and Edge2 of Cat2 coincide.

         Where
             Cat1, Cat2 $\in$ PCat $\cup$ GCat
             Edge1, Edge2 $\in$ (Right, Left)

Constraints of this form are designed to enforce association at a designated edge (left or right) between two categories. The categories are drawn from those of prosody and morphology: e.g. PrWd, Foot, Syllable; Root, Stem, Word, Suffix.

Alignment constraints do not enforce a one-to-one association between two constituents, say a suffix and foot. Alignment constraints can only refer to the edges of such constituents: every instance of a morpheme boundary ']$_{MWD}$', '[$_{MWD}$' and of a foot boundary '($_{FT}$', ')$_{FT}$' is evaluated independently for Alignment. This characteristic makes Alignment constraints unsuited to describe isomorphic morpheme-to-prosody associations in languages like Ngalakgan. The qualitative difference between the morpheme boundary of an inherently footable morpheme and that of an inherently unfootable one cannot be captured.

Consider an example of this approach: Kager (1996), who addresses Warlpiri stress. Noting that 'poly-syllabic affixes are stressed on their initial syllable' Kager (1996:15) proposes the following constraint:

(46)   ALIGN-MO-L   Align(Morpheme, Left, PrWd, Left)

This constraint demands that every morpheme start a new Prosodic Word.[25] A further, undominated constraint rules out PrWds which do not contain feet:

(47)   ALIGN-WD-L   Align (PrWd, Left, Foot, Left)

The constraint rules out PrWds which do not begin immediately with the left edge of a foot, including instances where a foot straddles a PrWd boundary.

The analysis works for the Warlpiri examples (43a-c) presented in Nash (1986:102). I repeat Kager's tableaux (1996:16) here (square brackets represent PrWd boundaries, parentheses enclose feet):[26]

(48)

/watiya-ḻa/ 'tree-LOC'	ALIGN-WD-L	ALIGN-MO-L	PARSE(σ)
☞ a. [(wáti)(yà-ḻa)]		*	
b. [[(wáti)ya]-ḻa]		*	**!
c. [(wáti)ya][-ḻa]	*!		**

---

[25]Kager offers no justification for internal PrWd boundaries in Warlpiri words.
[26]In his tableaux, Kager includes a further constraint 'All-Feet-Left' which is ranked below Parse(Syll). This constraint does no work in the examples repeated here and I omit it.

(49)

/watiya-ɭa-ɭu/ tree-LOC-ERG	ALIGN-WD-L	ALIGN-MO-L	PARSE(σ)
☞ a. [(wáti)ya][(-ɭà-ɭu)]		*	*
b. [(wáti)(yà-ɭa)-ɭu]		**!	*
c. [[[(wáti)ya]-ɭa]-ɭu]		**!	***
d. [(wáti)ya][-ɭa][-ɭu]	**!		*

Kager's analysis works by building PrWd boundaries wherever possible (in accordance with morphological structure). Only those PrWds which enclose at least one disyllabic foot are licensed. And since only polysyllabic morphemes can satisfy both ALIGN-WD-L and ALIGN-MO-L simultaneously, these morphemes make the best candidates for association to feet. This is how Kager captures the fact that polysyllabic suffixes maintain their metrical integrity.

This aspect of the analysis is shown in (50) (Kager 1996:16). Both candidates leave one syllable unfooted. The disyllabic suffix /-ŋuɭu/ (ELAT) must be associated with a foot, because to do so better satisfies ALIGN-MO-L.

(50)

/yapaɭa-ŋuɭu/ FaMo-ELAT	ALIGN-WD-L	ALIGN-MO-L	PARSE(σ)
☞ a. [(yápa)ɭa][(-ŋùɭu)]			*
b. [(yápa)(ɭà-ŋu)ɭu]		*!	*

Kager's analysis also accommodates Ngalakgan examples like (22) (ʈòʈoyʔ)=ŋki-p(púlu)/, (23) (yàppa=ŋ)(kí-kkaʔ), and (24) (cáwaŋ)(ʈà=ŋki) above, which are prosodically analogous to the Warlpiri forms shown here. Notably, his analysis will not work for Warlpiri examples such as (wati-ŋ)ka-(ɭàŋu)-ɭu, analysed previously; tableau (51) shows why.

The critical problem is the Alignment constraint 'Align(Morpheme, L, PrWd, L)'. Alignment cannot distinguish between the equal violations of candidates (51a) and (51b). The unattested candidate (51b) wins because it better satisfies PARSE(σ). This is despite the fact that candidate (51b) runs counter to the general character of the language, which is that morphemes and metrical domains are isomorphic, as far as possible. The analysis therefore also fails for the analogous Ngalakgan example (ʈòtoyʔ)=ki-p(púlu-k)kaʔ in (35)(the symbol '💣※' indicates a candidate form which is unattested but nevertheless optimal on the given constraint ranking: i.e. a winning candidate we do not want).[27]

(51)

/wati-ŋka-ḷaŋu-ḷu/ man-LOC-too-ERG	ALIGN-WD-L	ALIGN-MO-L	PARSE(σ)
☞ a. [(wáti-ŋ)ka][(-ḷàŋu)-ḷu]		**	**!
💣※ b. [(wáti-ŋ)][(kà-ḷa)][(ŋù-ḷu)]		**	
c. [(wáti-ŋ)][ka][(-ḷàŋu)][-ḷu]	**!		

Hewitt and Crowhurst (1996) is an attempt to 'fix' Alignment with a kind of dependency. They propose to capture the stress patterns of Diyari using a 'conjoined' constraint. Their constraint is given in (52) (Hewitt and Crowhurst 1996:109).[28]

(52)   AlignL(Morpheme, Foot) $\wedge^{\text{Morph}}$ AlignR(Morpheme, Foot)

The symbol '∧' is the operator 'and' of Boolean logic. The constraint is satisfied only when both conditions are satisfied, and is violated if either one or both are violated.

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[27]To be fair to Kager, examples like that in (51) are not presented in Nash's (1986) discussion of stress. However, the correct candidate, (51a), is generated by his stress rules (1986:100), and the unattested, but successful candidate, (51b) violates the rule.
[28]Crowhurst and Hewitt use the equivalent constraints Align(Morpheme, L, Foot, L) and Align(Morpheme, R, Foot, R). These are notational variants of AlignL(Morpheme, Foot) and AlignR(Morpheme, Foot), respectively.

The superscript 'morph' is designed to relativise both conjuncts to a particular (i.e. existentially-quantified rather than universally quantified) instance of 'morph'. Thus, the constraint is interpreted as "For any morpheme, it must be true that both the left and right edges are aligned with some foot".

I take it as an argument in favour of my approach that their constraint does much the same work that M ≈ PRDOM does. But the two constraints are *not* equivalent. In the first place, the conjoined Alignment constraint predicts that every morpheme should be evenly footable: this is not the case. For instance, Crowhurst and Hewitt note (1996:113) that their constraint predicts that trisyllabic morphemes will lack stress entirely. A further prediction of the Alignment approach is that there might be languages where every root is either disyllabic or quadrisyllabic (i.e. evenly footable), but there are no trisyllabic roots. Such languages do not seem to exist.

Secondly, allowing the possibility of conjoined constraints amplifies the power of a constraint-based grammar, by increasing the total number of potential constraints. This makes OT less restrictive as a theory, and less universal. It is not clear whether any two constraints can be conjoined and if there are any principled upper limits on the number of conjoins allowed.

A constraint like 'M ≈ PRDOM' has neither of these shortcomings. It accounts for morphological prosody regardless of morpheme size. It is also inherently constrained by independently-motivated factors: the morphological analysis of a language, and universal prosodic constituent structure.

In conclusion, I have shown that an 'isomorphic' approach using M ≈ PRDOM can capture the stress facts in Ngalakgan in a straightforward fashion. The analysis also extends to languages such as Diyari and Warlpiri which have similar systems, as I have shown. In contrast, an Alignment approach requires significant tweaking: either Alignment must be made to behave more like an isomorphic constraint (Hewitt and Crowhurst 1996), or else it must fail where the inherent differences in suffixes become crucial (Kager 1996).

3.3 The pre-head string

The string of elements before the *morphological head* of a word is morphologically and prosodically diverse.[29] It includes compounded stems, modifying and inflectional prefixes. The fact that needs to be accounted for is that modifying prefixes behave like enclitics - polysyllabic modifying prefixes are associated with pitch accents (§3.3.1) - but inflectional prefixes are never associated with pitch accents (§3.3.2).

Inflectional prefixes *do* have metrical organisation: the initial syllable of an inflectional prefix string is audibly more prominent than the rest.[30] But inflectional prefixes are almost never associated with pitch accents, and the whole prefix string is associated with a steady, low tonal contour.[31] Selkirk (1996) claims that tonal contrasts are optimally associated with lexical, 'content' words, and not with function words. In §3.3.3 I propose that the asymmetry between content and function words extends to the constituents of words in Ngalakgan: only contentful morphemes, not function morphemes, are eligible to be associated with pitch accents.[32] This constraint, interacting with the right edge bias for primary stress in complex words, derives the observed asymmetry between suffixes and prefixes.

3.3.1 Prosody of modifying prefixes

Modifying prefixes show variable behaviour for stress, depending on their size, frequency, and semantics. The most consistent predictor of stress in these prefixes is

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[29]The 'morphological head' is the stem morpheme which determines syntactic category and inflectional class. I avoid the terms 'root' or 'stem' here because these have been used for general morphological categories in Ch 2.

[30] For instance, like stressed syllables in general, the vowel of the first syllable of an inflectional prefix is normally phonetically 'centralised' (i.e. lower and 'laxer'): [yɪriŋáŋan] 'we (excl.) are sitting', where the 1st augmented intransitive prefix /yiri-/ takes a centralised allophone of the vowel in the first syllable; see §4.1.2 for the conditions on vowel allophony in Ngalakgan. In phonological terms, the initial syllable of an inflectional prefix may be the head of a metrical foot, but cannot be the head of a PrWd; see §3.3.3.

[31] Exceptions to this characterisation are noted at the end of §3.3.2.

[32]I avoid the term 'lexical' here as a characterisation of semantic richness, since I have used 'lexical' previously to mean 'of the lexicon', and 'lexicalised' to mean 'listed'. Aronoff (1994:19) prefers the term 'lexemic': 'having to do with lexemes', where 'lexemes' are members of Chomsky's (1965) 'major lexical categories', i.e. noun, verb, adverb/adjective.

size: in this respect modifying prefixes behave like enclitics. All polysyllabic modifying prefixes are (pitch) accented, monosyllabic ones are unaccented.

Examples of accented, polysyllabic **prefixes** (in bold) are shown in (53).

(53)   a.   [nunbɨɟ̊ɪcŋariɲbéɲ]
            /ɳun-**piʈic**-ŋariɲ-pe+ɲ/[33]
            2aO-nearly-hand-bite+PP
            '[It: dog] nearly bit your hand.'   [31/5/96:1B]

       b.   [nuguwàŋabakwakkéna]
            /ɳuku-**waŋa**-pak-wakke+na/
            1mS/2aO-still-APPL-return+FUT
            'I might still come back to you mob.'   [3/7/96]

       c.   [guja̠ɳàmuluɹʊ́ŋa]
            /ku-caʔ-**ɳamulu**-ɹu+ŋa/
            IRR-now-really-burn+FUT
            '[It] will get really cooking now.'   [27/6/96:1B]

These prefixes are more like bound adverbial stems than they are like inflectional prefixes.[34] I have already noted (§3.1.1) that several of the attested modifying prefixes can occur as independent adverbial words, or display other 'stem-like' behaviour.

Some examples of monosyllabic modifying prefixes are presented in (54). These prefixes are not associated with pitch accents, and in this respect are just like inflectional prefixes of any size.[35]

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[33]Pitch accent on the syllable [ʈic] of proclitic /piʈic=/ here is due to syllable weight effects on stress examined in Chapter 5. I do not hear a pitch accent on the stem /ŋariɲ/ 'hand', though according to MWD ≈ PRWD it should be there. I speculated in §2.2.3 that this is because of a preference for just two PrWds (and two pitch accents) per Phonological Word. At this point, there are too few words of this kind in the corpus to decide the issue.

[34]Most modifying prefixes are rare in natural speech. There are a few prefixes which are quite frequent, such as mele(ʔ)- 'lest', ca(ʔ)- 'now', and the applicative prefix pak-. It is notable that these are all fairly closely integrated into the aspectual/modal, and agreement marking systems, respectively. The 'lest' prefix combined with the Evitative inflection derives the Evitative form of the verb. Since for almost all verbs the Evitative inflection is identical to the Present, the 'lest' prefix is indispensible in this function. Similarly, the 'now' prefix can distinguish the various interpretations of the Present and Future tense inflections, which can otherwise be ambiguous between Indicative and Potential moods.

[35]The exception to this is the Applicative prefix /ɹe-/. This prefix is analysed in following sections.

(54)   a.   [ŋʊnbubakwɔ́cme]
/ŋun-pu-**pak**-woc+me/
1mO-3a-APPL-steal+[get].PP
'They stole [it: glasses] from me.'   [2/9/97:1A]

       b.   [bʊrʊɳbubakjùɣˀjúɣˀya]
/puruɳ-pu-**pak**-cuyˀ-cuyˀ-ya/
3aO-3-APPL-ITER-send-FUT
'They'll send [it] back with [?for] them.'   [9/9/97:1A]

       c.   [ŋʊrʊɳbubakwàkkɹiwʊ́na]
/ŋuruɳ-pu-**pak**-wakkiɹi+wu+na/
12aO-3-APPL-return.with+[give+]FUT
'They'll bring [it] back for us.'   [31/5/96:1B]

       d.   [ŋʊrʊɳbubakbáwʊ̠ˀmiɲ]
/ŋuruɳ-pu-**pak**-pawunˀ-mi+ɲ/
12aO-3-APPL-leave+AUX+PP
'They left [it] with us.'   [31/5/96:1B]

       e.   [ŋumiɟagɔ̀rickɔ́re]
/ŋu-mu-**ca**ˀ-koric=kore/
1mS-III-now-grind-12aDAT
'I'm grinding it (III:food) for us now.'   [27/6/96:1B]

The behaviour of modifying prefixes can be accounted for by assigning them either to the class of lexical stems (MWds) or to the class of inflectional prefixes, as I show in §3.3.3. But first let us consider the prosody of inflectional prefixes, which is quite different.

3.3.2 Prosody of inflectional prefixes

The general pattern is for inflectional prefixes to entirely lack pitch accent (55) (the **stems** here are in bold, representing the accented part of the word). Examples (55a-c) show that monosyllabic prefixes lack accent, and (55d-g) show that the same is true of disyllabic prefix strings.

(55)   a.   *burr-**be+ny***   [bʊrbéɲ]
            3aS-bite+PP   'they bit [him]'   [30/5/96:1A]

       b.   *gu-**ye***   [guyéː]
            IRR-put.PR   '[someone] puts [it]'   [27/6/96:1B]

c.	*nu-**ma***	[numáː]
	2aS-get.IMPER	'you mob get [it]'	[27/6/96]

d.	*yirr-mi-**ye***	[yɪrmiyéː]
	1aS-III-put.PR	'we put it (III)'	[DP]

e.	*yirr-bi-**datj***	[yɪrbiɖác]
	1aS-3a-cut	'we cut them'	[27/6/96:1A]

f.	*yirr-mi-**ma***	[yɪrmimáː]
	1aS-III-get.PR	'we get it (III)'	[DP]

g.	*yirr-mi-**jo***	[yɪrmijóː]
	1aS-III-chop.PR	'we chop it (III)'	[DP]

The vowel-lengthening in the stems of the words in (55) shows that the prefix is not part of the Prosodic Word. The reason for their exclusion from PrWd is addressed in §3.3.3 below.

Even when the prefixal string is much longer than the root, as in (56a-d) below, prefixes still lack accent, though the initial syllable of a string of prefixes is audibly more prominent than other syllables in the prefix, as noted. Stressed syllables without pitch are not marked when they are external to a PrWd domain.[36] In example (56a), two syllables are passed over before accent is assigned to the root, and in (56b) three syllables. Examples (56c-d) both have four syllables worth of prefix before accent.

(56)	a.	*ngurrurn-**ru***	[ŋʊrʊɳɹúː]
		12aO-burn.PR/EVIT	'we're getting burnt/we might get burnt'[37]
				[13/3/95:3A]

	b.	*ngurrurn-mu-**ne***	[ŋʊrʊɳmuŋéː]
		12aO-III-burn.PR	'It [sc.'sun' III] burns us.'
				[13/3/95:3A]

	c.	*ngurrurn-bu-bak-**borlk+bu+n***	[ŋʊrʊɳbubakbɔ̞lkbʊn]
		12aO-3a-APPL-noise-[hit+]PR	'they are making noise on us' (i.e.'talking over the top of us')

	d.	*yirrirn-bi-bak-**wotj+ma***	[yɪrɪɳbibakwɔ́cma]
		1aO-3a-APPL-steal+[get]PR	'they always steal from us'

---

[36] This only applies to inflectional prefixes, and some modifying prefixes, as discussed in §3.3.3.
[37]This example is interesting from the point of view of agreement, since *ru+* 'burn' is intransitive, but *ngurrurn-* (12aO) is an object prefix.

The effect is not limited to verbs, nominal prefixes also lack accent, whether monosyllabic (57) or disyllabic (58), and the only productive prefix on adverbs behaves in the same way (59).

(57)   a.   [muwɔ́m]
             *mu-**wom***
             III-black.plum (*Vitex glabrata*)

         b.   [mubák]
             *mu-**bak***
             III-pond.algae

         c.   [gubɨ́ŋ]
             *gu-**birn***
             IV-rock/money

(58)   a.   [gʊngujéː]
             *gun-gu-**je***
             IV-FAM-nose

         b.   [gʊngubóː]
             *gun-gu-**bo***
             IV-FAM-river

         c.   [gʊngubɨ́ŋ]
             *gun-gu-**birn***
             IV-FAM-rock/money

         d.   [nugugóŋ]
             *nu-gu-**gony***
             I-FAM-kangaroo

(59)   a.   [yibáy]
             *yi-**bay***
             ALL-north

         b.   [yiwálam]
              *yi-**walam***
             ALL-south

All inflectional prefixes fail to count for word minimality, and as a result open monosyllabic roots must have long vowels at the surface:

(60)   a.   [gujéː]
             *gu-**je***
             IV-nose

b. [guyéː]
*gu-**ye***
IRR-put.PR

These forms show that the morphological structure of these prefixes at least is [prefix [PRWD **jeː**]], which means the pitch accent association to the Prosodic Word and its lexical status follows, as I now show. [38]

3.3.3 Analysis of prefix prosodic structure

In this section I propose an association between lexemic, content items and pitch accents, governed by a constraint PRWD ⊃ ROOT. Given this constraint, the asymmetry between prefixes and suffixes, and the differences between types of modifying prefixes in terms of accent, is a straightforward consequence.

The analysis rests on the basis of some assumptions which have already been presented in Ch 2. The first assumption concerns the nature of pitch accent.

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[38] Occasionally I have heard variant pronunciations of some prefixed words, where the prefix is associated with a pitch accent. (74) shows some examples of verbs, and (75) of nominals.

(74)	a.	***ngurrurn**-mu-ne*	[ŋ�òruŋmuɲéː]		
		12aO-III-burn.PR	'It [sc. 'sun' III] burns us.'	[13/3/95:3A]
	b.	***mu**-yerrert-mi+ny*	[mìyɛrɛ́ʈmiɲ] ~ [miyɛ́rɛʈmiɲ]		
		III-grow-AUX+PP	'it [III] grew'	[3/9/97:2A]
	c.	***gu**-mu-yerrert*	[gʊ́muyɛ̀rɛʈ] ~ [gumuyɛ́rɛʈ]		
		IRR-III-grow	'it grows'	[3/9/97:2A]
(75)	a.	***gu**-ruwurr*	[gʊ́ɹuwur] ~ [guɹúwur]		
		IV-ridge		[3/9/97:1B]
	b.	***gu**-yotjjong*	[gíyɔccɔŋ] ~ [guyɔ́ccɔŋ]		
		IV-not.sacred		[3/9/97:2A]
	c.	***mu**-wom*	[múwɔm] ~ [muwɔ́m]		
		III-black.plum (*Vitex glabrata*)		

The exceptions - which are in every case variants of the standard generalisation - fall into two distinct patterns. The pattern in (74b-c) and (75) is one of stress shift leftwards past the root, where the root-initial consonant is an approximant; I discuss this pattern in §5.4.1. The pattern in (74a) is distinct, and is perhaps due to a constraint against overlong intonational phrase-initial sequences lacking a pitch accent, as discussed for English in M. Beckman (1996:31). There might be a contrast in Ngalakgan between prefixes which are phrase-initial (in elicitation for example) as against those which are phrase-medial (e.g. in texts); I have not examined this possibility. These variants do not detract from the basic generalisation applicable to Ngalakgan.

(61)   Pitch accent represents a Prosodic Word domain.

I have noted in the preceding section that prefixes have metrical organisation, but cannot be associated with pitch accent. Therefore, if premise (61) is true, they can never constitute PrWds.

The second assumption concerns the headedness and structural characteristics of the higher prosodic constituents.

(62)   Prosodic Words form left-headed, adjacent domains; Phonological Words form right-headed, embedded domains.

Importantly, Phonological Words cannot form left-branching structures.

So far, there is nothing in the analysis which would prevent prefixes from being PrWds. They are optimally metrical domains at least, by M ≈ PRDOM, so this constraint would also allow prefixes to be PrWds. In addition, we have seen that there can be more than one PrWd per Phonological Word: one for every MWd. So there is no principled upper limit on the number of PrWds which can be built.

It is not uncommon to find that pitch or stress realisation is restricted by what we might term 'semantic weight': 'lexical' or 'content' words are stressed in preference to 'grammatical' or 'function' words (Selkirk 1984, 1996; M&P 1993a:86).[39] With rare exceptions, it is content elements which may be focussed in English and Ngalakgan, that is, associated with contrastive intonation and (in the case of Ngalakgan) moved to the front of the phrase. I propose that the constraint MWD ≈ PRWD has a reverse implicational. I follow McCarthy and Prince (1993a:86) in adopting the following constraint:

(63)   PRWD ⊃ ROOT   'PrWds include a Root.'

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[39]This dichotomy is a traditional one, but in modern form it is explicated notably by Sapir (1921).

Pitch accents are preferably associated with roots, or 'lexemes': members of major lexical categories Noun, Verb, and Modifier.[40] Pitch accents cannot be associated with 'grammatical' or 'function' elements. In the major lexical categories I include all MWds: noun and verb stems, and also adverbial and adjectival modifiers, including modifying prefixes, and independent pronouns. Clitics are also included in this class, since as we have seen (§3.1.1), they behave more like stems than affixes in some respects. Both clitics and modifying prefixes may be independent words, and both have the phonotactic and many of the semantic properties of stems. In the 'function' class I include inflectional prefixes, and WORD-level suffixes. That is, PrWd ⊃ ROOT targets any morpheme which can be a stem: a base for inflection, and excludes elements which are purely inflectional. In what follows, **lexemes** in examples are in bold.

With these constraints in hand, we can derive the attested pattern whereby prefixes are metrically footed, but cannot be associated with a pitch accent, as shown in tableau (64). Prefixes are subject to M ≈ PRDOM: the general constraint which derives the patterns we observe in the language: that every WORD-level morpheme should constitute a metrical domain. However, prefixes cannot be parsed beyond the level of Foot. They cannot be realised as Prosodic Words because PrWds cannot be associated with grammatical elements like prefixes. Hence, both candidates (c) and (d) are ruled out.

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[40]In English, this constraint serves in part to derive the difference between content and grammatical words discussed in e.g. Selkirk (1984:343), where content words are always parsed by metrical structure but function words such as 'the', 'a' typically are not, unless under Focus (M&P 1993b:84). Selkirk (1996) proposes Alignment constraints to make sure that 'lexical categories' are associated with Prosodic Words and vice versa. I have presented reasons not to adopt an Alignment analysis above.

(64)

/ŋuruɲ-ɹu/ 1mO-burn.PR	ALIGNR (PK, P-WD)	PRWD ⊃ ROOT	M ≈ PRDOM
a. {ŋuruɲ-[(ɹúː)]PRWD}			*
☞ b. {(ŋuruɲ-)[(ɹúː)]PRWD}			
c. {[(ŋùruɲ-)]PRWD[(ɹúː)]PRWD}		*!	
d. {[(ŋúruɲ-)]PRWD[(ɹùː)]PRWD}	*!	*!	

The asymmetry between prefixes and suffixes follows from the 'Peak Alignment' and constituency principles given in Ch 2; the reasons are detailed here. Suffixes fall to the right of any lexical element in the stem, and are included in the prosodic domain which begins with the first lexical element in the word. Because suffixes, and every other phonological segment, must be parsed to Phonological Word (according to the version of the Strict Layering hypothesis adopted in Ch 2), the following therefore holds:

(65)   Every }P-WD must be right-aligned with the end of the word.

From this condition, candidates (66a) and (b) below are both acceptable parses of a word consisting of an inflected root followed by a word-level suffix. Candidates (a) and (b) are both well-formed outputs: the two realisations are in variation.[41] Candidate (a) satisfies PRWD ⊃ ROOT, because the only PrWd is associated with the only lexeme. It does so at the expense of AlignR, however.[42] Candidate (b) satisfies ALIGNR(PK, P-

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[41]M&P (1993a:86) suggest that PrWd ⊃ Root is undominated in word-level phonology, but may be dominated at the phrase level, to allow focussing of and stress shift to grammatical elements in English (Selkirk 1984:343). An examination of citation forms and forms embedded in intonational phrases may reveal a similar distinction in Ngalakgan.

[42]Actually, given the dominance of Peak-to-Head (Prince's 1983 Continuous Column Constraint) presented in §2.2.4, candidate (a) satisfies AlignR as much as is possible within this structure. A pitch accent on the initial syllable of the suffix would violate the Continuous Column Constraint, because this syllable is a head at the Foot level, while the initial syllable of the root is a head at the PrWd level. Only the latter is eligible for a pitch accent, under the constraint. Nonetheless, candidate (66b) satisfies AlignR better in an absolute sense. The violation marks awarded to each form reflect this intuition.

WD) (while satisfying undominated FtForm) because the peak is at the right edge of the word. In this case, it is PRWD ⊃ ROOT which is violated: the suffix is not a root.

(66)

/ɲu-ɲe+ŋa-ppiraʔ/ 2aS-burn+FUT-DU	ALIGNR (PK, P-WD)	PRWD ⊃ ROOT	M ≈ PRDOM
☞ a. {ɲu-[(ɲé+ŋa-p)]ₚᵣWD(pïraʔ)}	*		
☞ b. {ɲu-[(ɲè+ŋa-p)]ₚᵣWD[(pïraʔ)]ₚᵣWD}		*	
c. {ɲu-[(ɲé+ŋa-p)]ₚᵣWD[(pïraʔ)]ₚᵣWD}	*!	*!	
d. {ɲu-[(ɲé+ŋa-p)(pïraʔ)]ₚᵣWD}	*!	*!	**

Any MWds included in the word must constitute PrWds, because of high-ranking MWD ≈ PRWD. MWD ≈ PRWD and PRWD ⊃ ROOT do not conflict (they are essentially reciprocal requirements), and are shown unranked in the tableau. In contrast to the suffixed form in (66), in forms containing two MWds there is less reason for variation between primary stress on the first or the second PrWd, since one candidate - (a) - satisfies all constraints simultaneously.

(67)

/ŋun-ŋariɲ-pe+ɲ/ 1mO-hand-bite+PP	ALIGNR (PK, P-WD)	PRWD ⊃ ROOT	MWD ≈ PRWD
☞ a. {ŋun-[(ŋàriɲ-)]ₚᵣWD[(pé+ɲ)]ₚᵣWD}			
b. {ŋun-[(ŋáriɲ-)]ₚᵣWD[(pè+ɲ)]ₚᵣWD}	*!		
c. {ŋun-(ŋariɲ-)ₚᵣWD[(pé+ɲ)]ₚᵣWD}			*!

Therefore, PRWD ⊃ ROOT is a constraint which is motivated both by the behaviour of inflectional elements in Ngalakgan, and the similar behaviour of 'function' words in languages such as English.

3.3.4 Modifying prefixes

Modifying prefixes are assigned either to the class of inflectional prefixes, or to the class of lexemic, contentful stem-like elements. On the whole this assignment is predictable based on the size of the prefix: adverbial prefixes larger than a monosyllable have the characteristics of stems, monosyllabic ones have the characteristics of prefixes.

A three way contrast exists in the prosody of the three Applicative prefixes, shown in (68).

(68) a. /pak-/   Productive verbal Applicative
      b. /paʈʈa-/ Productive nominal Comitative, unproductive verbal Applicative
      c. /ɹe-/   Unproductive verbal Applicative

All three have distinct prosodic characteristics. /pak-/ has the same characteristics as monosyllabic agreement prefixes: it is never pitch accented. /ɹe-/ has the same characteristics as a monosyllabic root: the vowel is long, and /ɹe-/ is associated to a pitch accent. /paʈʈa-/ also has the characteristics of a root: it is associated to a pitch accent. Merlan (1983:48) notes that /pak-/ seems to be taking over the functions of /paʈʈa-/ in verbs, since /pak-/ can appear wherever /paʈʈa-/ can, but not vice versa.[43] /ɹe-/ appears to be entirely lexicalised: it is attested with just two verbs: /ɹe-ɲoʔ-mi+/ 'take away' (cf. /ɲoʔ-mi+/ 'go away') and /ɹe-ccuruwe+/ 'rush away with' (cf. /curuwe+/ 'rush away'). Only the first is attested in my data. The form of the second verb lends support to the proposal that /ɹe-/ is a frozen prefix: only in ROOT-compounds are roots attested with geminate-initial forms.

Those adverbial prefixes which are associated with pitch are included in the 'lexical element' class, and satisfy PRWD ⊃ ROOT thereby. I will term them 'bound adverbs'. Synchronically this is valid, some of the adverbial prefixes are attested as

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[43]This is only true of verbs. /paʈʈa-/ also appears on nouns, as part of a circumfix marking accompaniment or instrument, e.g. /paʈʈa-poɳʈok-yiʔ/ 'with a woomera [spear-thrower]', /paʈʈa-piɳ-yiʔ/ 'with a rock'. /pak-/ cannot be used in this construction. No doubt the accompaniment construction is related to the use of /paʈʈa-/ as a comitative applicative in verbs.

independent words, as shown in §3.1.1. These are accounted for by constraints already introduced, given the following ranking:

(69)   ALIGNR(PK, P-WD), PRWD ⊃ ROOT, MWD ≈ PRWD >> IDENT[mora] >> M ≈ PRDOM

Tableau (70) presents a sample derivation. Only /ɲamulu/, and /ɹu+ŋa/ constitute lexemes in (70). They are the only elements licensed to be associated with a pitch accent, by PRWD ⊃ ROOT. Candidate (70b) then is ill-formed: /caʔ-/ 'now' is not an acceptable lexeme to license pitch accent. Candidate (70c) is ill-formed for the same reason, as well as for the fact that it fails to parse each prefix isomorphically, violating MWD ≈ PRWD and M ≈ PRDOM.

(70)

/ku-caʔ-ɲamulu-ɹu+ŋa/ IRR-now-really-burn+FUT	ALIGNR (PK, P-WD)	PRWD ⊃ ROOT	MWD ≈ PRWD	M ≈ PRDOM
☞ a. {ku-caʔ-[(ɲàmu)lu-]ₚᵣᵥᵥ[(ɹú+ŋa)]ₚᵣᵥᵥ}				*
b. {ku-[(cà:ʔ-)][(ɲàmu)lu-]ₚᵣᵥᵥ[(ɹú+ŋa)]ₚᵣᵥᵥ}		*!		
c. {ku-[(càʔ-ŋa)(mùlu-)]ₚᵣᵥᵥ[(ɹú+ŋa)]ₚᵣᵥᵥ}		*!	*!	**

The analysis predicts that non-lexemic modifying prefixes should be able to bear pitch just if there is no other eligible item in the word. This prediction is confirmed by the existence of prefixes compounded with bound verb roots, described in §3.1.1. Modifying prefixes are associated with pitch in examples such as ⌊cáʔ-wo⌋ (now-give.PP) and ⌊páʈʈa-me⌋ (APPL-get.PP).[44] The constituents /wo/ and /me/ are ROOT-level bound stems, which are not subject to MWD ≈ PRWD, as shown in Ch 2. The only way they can surface as WORDs is by reduplicating at the ROOT-level: /woʔwo/, /meʔme/, or as elements of a compound, as in (71).

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[44]A discussion of the prosody of reduplication can be found at §5.5.4.

Since neither /caʔ-/ nor /wo/ are MWds, neither is an acceptable lexeme for PRWD ⊃ ROOT, so all candidates violate this constraint. Candidates (b-c) violate IDENT[mora] (or *[V:]) fatally. The difference between candidates (a) and (d) comes down to violation of ALIGNR(PK, P-WD): candidate (a) violates this constraint less than candidate (d) and is the attested outcome. In other respects the two candidates are equal.

(71)

/ŋiɲ-caʔ-wo/ 1mS/2mO-now-give.PP	IDENT [μ]	ALIGNR (PK, P-WD)	PRWD ⊃ ROOT	M ≈ PRDOM	PARSE (σ)
☞ a. {ŋiɲ-[(cáʔ-wo)]ₚRWD}		*	*	***	*
b. {ŋiɲ-caʔ-[(wóː)]ₚRWD}	*!		*	**	**
c. {[(ŋĭɲ-caʔ)]ₚRWD-[(wóː)]ₚRWD}	*!		**	**	
d. {[(ŋíɲ-caʔ)-wo]ₚRWD}		**!	*	***	*

This example argues for the following constraint ranking.

(72)   IDENT[μ] >> ALIGNR(PK, P-WD) >>
PRWD ⊃ ROOT >> M ≈ PRDOM >> PARSE(σ)

There are no constraints compelling prefixes to be pitch accented, comparable to MWD ≈ PRWD and ALIGNL(CLITIC, PRWD). There is only the general isomorphic parsing constraint: M ≈ PRDOM. This constraint has little effect on prefixes due to the dominance of PRWD ⊃ ROOT. Given the right edge bias of primary stress in complex words, the characteristic lack of accent in prefixes in Ngalakgan falls out.

The analysis predicts that prefixing languages with a strong left-edge bias for primary stress should allow accented prefixes. In this case, the constraint on peaks would be Align*Left*(Pk, P-Wd). Even with a constraint PRWD ⊃ ROOT in these languages, prefixes would be stressed, just as suffixes in Ngalakgan are, regardless of PRWD ⊃ ROOT. This appears to be true of Marra and Alawa, at least from my informal

impressions based on working with speakers of these languages (and Denise Angelo p.c.). In these languages, which are also prefixing, primary stress is associated with the initial syllable of the prefix. Prefixed words in Marra and Alawa are analogous to unprefixed words, which also have primary stress on the initial.

Therefore, being accentless is not *necessarily* a condition of being a prefix (cf. Selkirk 1996:445). It falls out of general considerations: the initial/penultimate bias for primary stress, and the preference for accents to be associated with semantic content.

3.4 Conclusion

This chapter has shown that all WORD-level morphemes in Ngalakgan optimally constitute metrical domains: isomorphic parsing is a general characteristic of the language. Within this general tendency, there are biases and other constraints which account for the asymmetric distribution of stress we observe. Morphemes with high semantic salience - roots and stems - are always privileged in prosodic structure. The most stem-like of the bound morphemes - modifying prefixes and enclitics - are also privileged, but to a lesser extent.

Both prefixes and suffixes are subject only to M ≈ PRDOM - the general parsing constraint. The differences between them amount to a special relationship between lexical content and pitch, and to the right edge bias for primary stress. The constraints on this relationship restrict the domain of accent to begin as much as possible with the first lexeme in a word. There are no such constraints on the right edge. Indeed, the right-headedness of P-Wd entails that any enclitics and suffixes must be included in the domain of stress. Inflectional prefixes are stressless, then, because they lack lexical content, and purely because of their position to the left of any other such contentful items in the word. There is no need for a special stipulation to the effect that prefixes may not be accented; indeed, as (71) shows, on occasion they *may* be accented, just if no other position in the word is eligible.

The second part of the thesis discusses issues of a more theoretical nature. In Ch 4, I examine prosodically-conditioned allomorphy of suffixes in Ngalakgan: the geminate/singleton alternation. In Ch 5, the nature of syllabic weight is discussed, and contrasted with segmental quantity.