Foot Well-formedness in Western Austronesian Languages

Adrian Clynes
Universiti Brunei Darussalam

1 Introduction

McCarthy & Prince (1990, 1995) have shown that in many languages morphological operations involve prosodic units like the syllable and the (disyllabic) Foot. In this paper I give evidence for the Foot as an active phonological element in word-formation processes in the Western Indonesian language, Balinese. I also give evidence that the arguments adduced for Balinese apply in related languages such as Javanese and Madurese.

I show that a variety of phonological processes produce or target a disyllabic sequence, *ie* the Foot. Many of these processes are mediated by the following constraint, which holds until late in phonological derivations:[1]

(1) Foot Well-formedness:
Morphemes must be prosodically well-formed at the Foot level

Much of the evidence in the latter part of the paper comes from reduplication processes. I argue that certain facts associated with reduplication can be understood in terms of Foot Well-formedness, *if* reduplication is a purely phonological process. This goes against the claim of Prince (1987), that reduplication is always a morphological process. I give evidence that purely phonological reduplication occurs for example in 'inherently reduplicated' morphemes - those whose non-reduplicated base does not occur independently:[2]

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[1]Here I follow the assumption that the phonology is divided into two components, the lexical phonology and the postlexical phonology. Rice (1990:290) lists (amongst others) the following differences in the way rules apply in each (see also Kaisse & Hargus, 1993:16):

	Lexical	Postlexical
a.	may not apply across words	may apply across words
b.	may refer to word-internal structure	cannot refer to word-internal structure
c.	structure-preserving [AC: don't generate non-distinctive elements]	need not be structure-preserving [AC: do generate, for example, 'allophones']
d.	may have exceptions	cannot have exceptions
e.	must precede all postlexical rule applications	must follow all postlexical rule applications

[2]I use the term 'base' for the sequence targetted by reduplication, and 'copy' for the prefix-like element copied from that base (McCarthy & Prince 1995's 'reduplicant').

(2)

Morpheme:	Gloss:	Non-occurring base:
gigi	'tooth'	***gi**
bubu	'fish trap'	***bu**
cakcak	'chop up (vt)'	***cak**
mrésmés	'messy (eating rice)'	***mrés**
nangdanangda	'shilly-shally (vi)'	***nangda**
kupukupu	'butterfly'	***kupu**

(Evidence that all the morpheme-types exemplified in (2) are synchronic reduplications is given in Appendix A).

The paper has the following structure. In §2 I give evidence for the Foot: (i) from constraints on morpheme shape (§2.1, where variations in possible Foot shapes are also discussed) (ii) from a variety of processes giving rise to disyllabic or at most trisyllabic units (§2.2) (iii) in a distinct type of reduplication I term 'Foot-reduplication' (§2.3). In §3 I describe some peculiarities associated with inherent reduplications in Balinese (§3.1, §3.2), I then offer an account of them in terms of Foot Well-formedness (§3.3). In §3.4 I discuss evidence for a distinction between true morphological reduplication and purely phonological reduplication in Balinese . Throughout, the main data comes from Balinese; in many cases I give evidence for parallel phenomena in the neighbouring languages.

2 Evidence for the Foot in phonological processes

2.1 Evidence for the Foot from morpheme size

The first evidence that the Foot, and Foot Well-formedness constrains word-building processes comes from morpheme shapes. McCarthy & Prince give evidence that, in a wide variety of languages, the disyllabic Foot constitutes the minimal morpheme size (their 'Minimal [Prosodic] Word').

For Balinese, a count of a database of 14556 items taken from the main dictionary, Warna et al (1990) gave the following figures:[3]

(4)

		tokens	%'age of total
monosyllabics		475	3.2%
disyllabics		12629	86.8%
trisyllabic		1224	8%
4-syllabic		221	2%
5-syllabic		7	
	Total	14556	100

[3]Counts were done using Fiesta software (Alsop 1990). Warna et al (1990) contains more than 15,000 headwords. Certain items, such as names of literary figures and terms restricted to Old Javanese literary texts were not included in the database.

In Balinese, therefore, 95% of the lexis consists of di- or trisyllabic morphemes. Uhlenbeck (1950) gives similar figures for Javanese. Similar proportions are also found in Madurese (Stevens 1968: 51-53) and in Malay (Adelaar 1985:12) and are reconstructed for proto-Austronesian (eg Dempwolff (1938), discussed by Ross 1994:62).

Of the few lexical bases in Balinese listed in Warna et al (1990) and larger than three syllables - the maximum in the native lexis is five syllables - all are analysable as complex in some way. They contain either recurrent affixes attached to bound roots, or consist of at least two recurrent 'meaningless morphemes', or morphs, and so of two prosodic Feet (Clynes, in preparation). Uhlenbeck (1978) similarly describes how quadri-syllabic 'morphemes' behave phonologically like compounds of two disyllabic units in Javanese.

The figures in (4) constitute the first evidence for both the disyllabic Foot as the preferred prosodic template, and for the following hierarchy of Foot templates determining morpheme shape (cf McCarthy & Prince 1995):[4]

(5) Optimal Foot: σσ
Maximal Foot: σσσ
Minimal Foot: σ

To be prosodically well-formed, then, morphemes in Balinese *must* satisfy one of the Foot templates in (5). So too must the output of processes applying to them during the lexical phonology. I assume that in the latter contexts, the Optimal (disyllabic) Foot is imposed whenever possible, by the Foot Well-formedness rule given in (1), and repeated here:

(6) Foot Well-formedness
Morphemes must be prosodically well-formed at the Foot level

Foot Well-formedness applies throughout the lexical phonology: it is a condition both on the input to, and the output of, phonological processes.[5] Monosyllables are either grammatical morphemes (which cross-linguistically are not subject to disyllabicity requirements, McCarthy & Prince 1995), loanwords, or expressives. Trisyllabics are restricted to the latter two classes (Clynes, in preparation). Uhlenbeck in his detailed study (1950) reported the same distributions in Javanese.

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[4]I use the term Maximal Foot for simplicity of exposition. McCarthy & Prince (1995) claim that the maximal Foot size is the disyllable, and that the three-syllable unit is a Foot plus extraprosodic final syllable.

[5]See footnote 6 on Foot Wellformedness as a condition on the input to lexical processes.

2.2 Processes creating morphemes of Optimal foot size

Other evidence for the disyllabic Foot in the phonology includes various processes which create disyllabic units.

(i) Before most monosyllabic words, including loanwords, /ə/ is optionally inserted:

(7)	**ling**	~	**eling**	'weeping (n)'
	nu	~	**enu**	'still (aspectual)'
	bé	~	**ebé**	'meat; fish'
	bom	~	**ebom**	'bomb'
	bél	~	**ebél**	'car horn' (from Dutch *bel*)

Speakers disagree as to which surface form of such doublets is the most basic one; Warna et al (1990) lists both forms, but gives priority to the monosyllabic root. The initial schwa does not surface when such morphemes bear suffixes or occur in compounds

(8)	**ling-ang**	[liŋaŋ]	*[əliŋaŋ]	'cry-APP; make cry'
	dum-a	[dum3]	*[ədum3]	'share-3; shared by him'
	bé siap	[besiap]	*[əbesiap]	'chicken meat'

No other vowels are 'deleted' in these contexts, suggesting that these morphemes are underlyingly monosyllabic, with initial /ə/ functioning to produce the preferred surface disyllabic unit where they would otherwise surface as monosyllables. This in turn can be seen to follow from a disyllabic minimum limit on grammatical words.

Similar facts apply in Javanese. Dictionaries, like Prawiroatmojo (1985), list many morphemes both as monosyllables, and as disyllables with [ə] filling the initial syllable. As in Balinese, in Javanese loanwords often are expanded to disyllabics by addition of [ə] initially:

(9)	**ebon**	'give credit'	Dutch *bon* 'receipt'
	etik	'type(write)'	Dutch *tikken* 'id.'
	esop	'soup'	Dutch *soep* 'id.'

(ii) {N-} the 'AGENTIVE' prefix normally 'replaces' initial stops consonants with their homorganic nasal equivalent (10a), and surfaces as /ŋ/ before vowels (10b):

(10)	a.	***mañcing***	%N-paɲciŋ %	'AP-angle'
		negak	%N-təgak %	'AP-sit'
		ñagur	%N-jagur %	'AP-punch'
		ngelah	%N-gəlah %	'AP-possess'
	b.	**ng-alih**	%N-alih %	'AP-look for'
		ng-ambil	%N-ambil %	'AP-take.HI'