

Reduplication as Copy
Evidence from Axininca Campa¹

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Reduplication in Axininca Campa, an Arawakan language spoken in Peru, is problematic for theories which formalize reduplication as an affixational process. As shown in (1), in Axininca the phonological shape of the output varies; two syllables may reduplicate, (1b, 1c, 1d,) or three syllables may reduplicate, (1a). But reduplication is not, as might be expected given the phonological variability of the output, whole morpheme reduplication: the verb alone may reduplicate (1a, 1b), the verb and person prefix may reduplicate, (1c) or part of the verb may reduplicate, (1d). The variable morphological composition of the reduplicating constituent then precludes an analysis of Axininca as whole morpheme reduplication:

(1) Reduplication Data from Axininca Campa (Payne, 1981:144)²

<u>lps</u>	<u>verb</u>	<u>output of reduplication</u>	<u>gloss</u>
a. no-	kawosi	[nokawosikawosi-]	I bathe more and more
b. no-	koma	[nokomakoma-]	I paddle more and more
c. no-	naa	[nonaanonaa-]	I chew more and more
	no- asi	[nasinasi-]	I cover more and more
d. no-	osaNpi	[nosaNpisaNpi-]	I ask more and more

The affixational account of reduplication (suggested by McCarthy, 1981, and developed in Marantz, 1982) holds that "empty" constituents are affixed to a base; association of a copy of the base segments supplies the affix with melody (cf. Marantz, 1982; Levin, 1983; Broselow and McCarthy 1984; McCarthy and Prince 1986; 1988; 1989, for examples; see Clements, 1985, and Steriade, 1988, for alternative theories).

McCarthy (1981) and Marantz (1982) assume reduplication affixes are formed by strings of CV skeleta, a model which falsely predicts that any string of CV skeleta will occur as a reduplicative affix (see McCarthy and Prince, 1986, for arguments). Recent literature views reduplication templates as prosodic constituents (originally, Levin, 1983); most recently McCarthy and Prince (1986 etc.) completely reject the skeleton in phonology and propose that only the prosodic constituents in (2) are possible templates:

(2) Templates in the Prosodic Theory (McCarthy and Prince, 1986)³

syllables:	σ	any syllable, subject to language particular instantiation
	σ_C	core syllable, (C)V
	σ_m	monomoraic syllable, (C \emptyset)V
	σ_{mm}	heavy, bimoraic syllable, (C \emptyset)V x
feet:	mm	bimoraic foot
	$\sigma \sigma$	disyllabic foot
	$\sigma_m \sigma_{mm}$	quantity sensitive, disyllabic foot
prosodic word		undefined

The prosodic theory departs from earlier theories by demonstrating the prosodic nature of templates; surface variability of individual forms results

from the variability of the melody available to associate with the prosodic template (see McCarthy and Prince, 1986, etc, for complete discussion). However, this theory maintains the premise of earlier autosegmental models, that reduplication and root and pattern morphology necessarily specify an affix to which the base melody, or a copy of the base melody, associates.

No affixational model of reduplication posited to date, prosodic or otherwise formalized, can account for the phonological and morphological variability in Axininca. The inadequacy of current theory is first that the "affix" must vary between two and three syllables, an impossibility given the prosodic constituents in (2), or the CV skeleta of earlier theories. Second, the morphological variability is unexplained as one or more morphemes may reduplicate. Third, as three syllables can reduplicate and as the person prefix can reduplicate, these models fail to explain why forms such as [nokomakoma-], (1b), do not reduplicate with three syllables and two morphemes, i.e. as *[nokomanokoma-].

The key to Axininca lies in the recent finding that the base of a morphological operation is in some cases a prosodic rather than a strictly morphological, constituent; in particular the minimal word can be the base of operation (McCarthy and Prince, 1986, 1988, 1989, etc; see section 3.1 for discussion). If we extend the prosodic theory to include other prosodic constituents, in Axininca, the prosodic word, as possible prosodic bases, the forms in (1) result. In Axininca, the prosodic word of the language is minimally a disyllabic, CVCV, constituent, but can be larger, i.e can have more than two CV syllables. In (1) the reduplicant is always at least a CVCV sequence but may be larger (eg. (1a)); the lps reduplicates only when the verb alone cannot supply a prosodic word (eg. (1c)). Assuming the prosodic word as the base of reduplication, where the base is constructed through cyclic syllabification of morphemes until the requirements of a prosodic word constituent are met, explains forms in (1). The base is copied (duplicated) and the correct forms result. In this analysis specification of the base is crucial but the shape of the "affix" -- also a prosodic word -- is redundant.

The redundancy of the affix in Axininca reduplication alone does not prescribe against morphological rules prosodically specifying both base and affix; it is accidental that in Axininca the affix and base are identical. However cross-linguistic data show that whenever a prosodic base must be identified the form of the affix follows. If we assume that in reduplication either an input condition (the base) or an output condition (the affix) is specified, but both are not, this finding is explained; in a theory demanding an affix it is not.

The organization of this paper is as follows: section 2 describes prosodic (word and syllable) structure in Axininca then provides a formal algorithm for deriving well-formed prosodic structures. 3 accounts for reduplication in Axininca using the formal notation developed in 2 under the assumption that reduplication is copy, and then demonstrates the redundancy of the affix in Axininca reduplication once the base is specified. An alternative analysis assuming the prosodic word as the affix is shown to be inadequate to handle the surface variability. 4 argues that reduplication specifies the affix or the base, but not both. Conclusions are given in 5.

2. Prosody in Axininca

2.1 Syllabification

The syllable template for Axininca (following Payne, 1981) is CV(V)(N); the minimal syllable is CV but vowel initial syllables may occur word

initially. Examples are given in (3).

(3) Syllable Templates (Payne, 1981)

CV	sito	'monkey'	V	opaayaa	'beach'
	kiniki	'blue, green'			
CW	taaniča	'I don't know'	VW	aariiti	'black bird'
	manii	'large ant'			
CVN	masoni	'dumb'	VN	inkiti	'sky'
	siŋpoki	'horsefly'			
CVVN	čhiriŋhi	'palm'			

Three vowel phonemes, /i/, /a/ and /o/ occur in Axininca; syllable nuclei can be composed of a single vowel, a geminate, or a diphthong [ai] or [oi]. Three contiguous vowels do not occur and two contiguous vowels are always monosyllabic; thus except for word initially, onsets are required. In the event that two consonants or two vowels become juxtaposed in the course of a morphological derivation, the illicit sequence is resolved through deletion or epenthesis ([t] is the epenthetic consonant and [a] the epenthetic vowel; see Payne 1981:55 for arguments).

The only possible coda is a nasal, N, which is unmarked for any feature but [+nasal] and surfaces only if a stop follows, in which case it has the same place of articulation as the stop.⁴

2.2 The Prosodic Word in Axininca

2.2.1 The shape of free morphemes

A model explicitly characterizing the formal properties of the constituent "prosodic word" is thus far not extensively discussed in the literature. McCarthy and Prince (1988; hereafter M&P) briefly allude to a prosodic word affix to account for total morpheme reduplication in Kolami (M&P, 1988:27). However the five forms cited provide no evidence as to what phonological requirements, if any, constrain this prosodic word. Presumably though, the formal properties of the prosodic word constituent in a given language should be identifiable from the words occurring in that language.

Payne (1981) provides a sample lexicon of approximately 840 forms, of which 572 -- nouns and adjectives -- can be uttered in isolation. Table 1 identifies the three major phonological classes of these 'free morphemes':

TABLE 1

<u>Word type</u>	<u>total forms</u>
A. consonant initial disyllables (CVCV forms): ⁵	83
B. consonant initial 3-5 syllables (CVCVCVCV ₀ forms):	371
C. vowel initial 3-6 syllables (VCVCV(CV ₀) forms):	95
	<u>549</u>

In Table 1, consonant initial forms (A and B) are vastly predominant comprising 81% of the total data base (457/572 forms; included in the numerator are 3 consonant initial exceptions given below in Table 2.C). Notice the property uniting A, B, and C: each of these three classes -- 96% of the data base, (549/572 forms) -- has a disyllabic, CVCV sequence as a subconstituent (bolded in Table 1). Consonant initial disyllabics in Table

1.A are exactly a CVCV sequence, an onset initial disyllabic foot (non-initial syllables are always minimally CV syllables). Consonant initial, three -- five syllable forms in Table 1.B also have a CVCV subconstituent, and have additionally, up to three extra syllables. The initial syllable again has an onset. The third class, vowel initial, three -- six syllable forms, also has a minimal constituent, CVCV; excluding the vowel initial syllable, at least a disyllabic, onset initial subconstituent remains:

(4) V initial forms

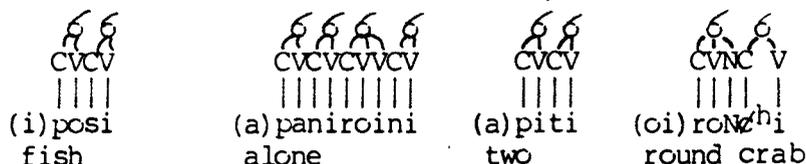


Table 1 forms, 96% of the data base, are shape invariant in that each has a CVCV sub-constituent, in other words, a consonant initial disyllabic foot as a minimal realization of the word.

M&P (1988, 1989) argue that the Arabic Broken Plural, a morphological process whose surface forms were previously viewed as enormously chaotic, can be unified by assuming that the quantity sensitive foot as the specified template of each surface form (see M&P, 1988, 1989 for complete discussion). Thus in Arabic, the morphology of the Broken Plural is rendered shape invariant -- despite a profusion of surface forms -- by assuming the quantity sensitive foot as a subcomponent of each surface form. The uniformity of the Axininca prosodic word is equally transparent once we recognise that it must contain a disyllabic foot (i.e. minimal word = disyllabic foot); it may contain additional syllables.⁶ The initial onset of this minimal word results because the disyllabic foot is itself built from syllables which minimally contain both an onset and a nucleus.

2.2.2 /NCV/ forms⁷

The major phonological classes of words are given in Table 1. Table 2 lists the other words found in Payne's lexicon:

TABLE 2

<u>Word type</u>			<u>total</u>
A. vowel initial forms with three moras:			9
aNpii	'cotton'	irii	'it'
aaka	'we'	irco	'it'
aa ^h i	'trail'	corYa	'sun'
imaa	'very'	iiki	'already'
iiro	'no'		
B. vowel initial forms with two moras:			6
iN ^h a	'go'	oNko	'edible plant'
iNki	'peanut'	awo	'bird'
oyi	'rainbow'		
ana	'edible plant'		

C. consonant initial, bimoraic, monosyllabic forms: 3

mii 'otter' soo 'sloth'
caa 'anteater'

D. consonant initial monomoraic forms (CV): 3

hi 'yes' ti 'no' ha 'oh!'

E. Spanish Loans 2

o 'or' eskuera 'school' 23

D and E will not be considered as they are interjectory 'non-words', (D), or are loans, (E); 18 exceptions to the prosodic word as given above remain. Contrasting A and B with C, we see that the exceptional forms violate either the disyllabic requirement on the minimal prosodic word, (C), or the requirement that the initial syllable have an onset. The generalization is that where a word violates the productive minimal word, it is always minimally a bimoraic foot (9 of the exceptional forms are trimoraic) thus these exceptions, though not composed of two CV syllables, are at least bimoraic. Taking these forms as exceptions, we see that vowel initial words (Table 1.C) contain three or more syllables. We might assume that the minimal nature of vowel initial words (three syllables) is explained by positing CV as the minimal syllable and two syllables, CVCV, as the minimal word.

But recall from section 2.1 that vowel initial syllables are allowed word initially. Therefore assuming a disyllabic foot plus CV as the productive syllable template does not explain the virtual absence of /VCV/ forms. If however vowel initial syllables are assumed to be extrametrical (in the sense of Hayes, 1981) then the form of vowel initial words is explained. A prosodic word must be at least two syllables; in order for vowel-initial words to satisfy the prosodic word, two syllables must follow the extrametrical one (in figure (4) interpret the parenthesized syllable as extrametrical). Under this assumption, the trisyllabic quantity of vowel initial words is explained, the absence of /VCV/ forms is expected.

In sum, the data presented above show that the minimal realization of a prosodic word in Axininca is a disyllabic foot but may contain more than two syllables. Up to four additional syllables are found in the prosodic words listed in the lexicon if vowel initial, and up to three additional syllables are found in prosodic words if consonant initial (the maximal length difference between vowel initial and consonant initial words, six syllables and five syllables respectively, is explained by the assumption that initial vowels are extrametrical; excluding the initial vowel, all words are maximally five syllables).

The syllables composing the disyllabic foot of the minimal prosodic word are minimally a CV sequence. Thus the minimal realization of a prosodic word surfaces as a CVCV template. Note that just as the Axininca prosodic word may contain optional syllables, so too can the syllable have optional elements: a branching nucleus or a nasal coda are optional in Axininca syllables.

2.3 An Algorithm for Word Building in Axininca

The facts in 2.2.2 are evidence that strict requirements hold on

Axininca syllables, feet and words; these constituents are formalized below.

In a string of segments, the obligatory portions of the syllable (onset and nucleus) are syllabified; if a vowel or a coda N follows (optional components), these are appended to the syllable as given in (5):

(5) Axininca Syllabification

Obligatory syllable geminate nucleus coda



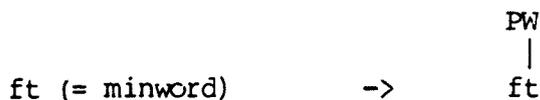
Foot structures, as shown in (6), can only be constructed if two well-formed syllables are available; foot construction follows syllable formation.

(6) Foot (ft) construction



In Axininca, a minimal word is a disyllabic foot; therefore, once a foot is constructed the minimal requirement of the prosodic word is satisfied:

(7) Prosodic Word (PW) Construction



Well-formed prosodic structures (syllables, feet, PWs) are built "bottom up": melody satisfies syllable structure, syllable structure satisfies foot structure; foot structure satisfies prosodic word structure in a manner consistent with and exemplifying the prosodic hierarchy (Selkirk 1984; M&P, 1989). The surface realization of a PW therefore results from the combined realization of subordinate prosodic constituents, syllables and feet.⁸

So far, only prosodic word = minimal word is constructed by the prosody building rules in (5)-(7). As prosodic words can have more than two syllables, and may be larger than the minimal word, any syllables or feet in a domain not dominated by a PW after (7) applies are incorporated by the adjunction rule in (8).

(8) Prosodic Word Adjunction



center columns of (9b) and (9c); since [r] in [mulari] has not been copied, it cannot associate to the affix and *[mularmulari] does not result.

The apparent base transfer effects in Yidiny contrast with Lardil, where no base transfer occurs. M&P explain the behavior of Lardil in terms of the base: because the base of reduplication is a morpheme in this language (and crucially is not a phonological foot subconstituent of the base), base transfer does not occur. As shown in (10) since the base is [pareli] and all the segments of the base are copied, and because codas are allowed in Lardil, [l], an onset in the base, is realized as a coda in the affix:

(10) Lardil (M&P, 1988:16)

a.

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  o o   o o o   o o   o o o
  |||||  |||||  |||||
+ pareli -> pareli pareli -> [parelpareli]/*[parepareli]

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3.2 The Prosodic Word Base in Axininca Reduplication

The variability in surface forms of reduplication exemplified in (1) results if we assume that the base of reduplication is a prosodic word as formalized in 2.3. I assume there is no overt affix in reduplication and argue for this assumption in section 4; rather identification of the base plus copy alone results in the attested output. The reduplication gloss is given in (11)¹⁰ and (12) gives reduplication data:

(11) Reduplication gloss¹¹

n(o) - N- reduplication - ([a] wai - t - i
 1st future more and more ([epen])continuative [epen]future
 "I will continue to ___ more and more" (Payne 1981:143).

(12) Axininca reduplication forms (Payne, 1981:144)¹²

<u>verb</u>	<u>reduplicated forms</u>	<u>gloss</u>
i. di- and trisyllabic verbs, consonant initial, vowel final		
a. koma	no-N-koma-koma-wai-ti	paddle
b. kiN ^h a	no-N-kiN ^h a-kiN ^h a-wai-t-i	tell
c. t ^h aNki	no-N-t ^h aNki-t ^h aNki-wai-t-i	hurry
d. kawosi	no-N-kawosi-kawosi-wai-ča	bathe
ii. monosyllabic verbs, consonant initial, vowel final		
e. naa	no-naa-nonaa-wai-t-i	chew
f. na	no-na-nona-wai-t-i	carry
g. t ^h o	no-N-t ^h o-noN ^h o-wai-t-i	kiss
iii. vowel initial, vowel final /VCV/ verbs		
h. asi	n-asi-nasi-wai-t-i	cover
j. aasi	n-aasi-nasii-wai-t-i	meet
k. apii	n-apii-napii-wai-t-i	repeat
iv. multisyllabic, vowel initial verbs		
l. osaNpi	n-o saNpi-saNpi-wai-t-i	ask
m. osaNkina	n-c saNkina-saNkina-wai-t-i	write

The key points to note about forms in (12) are these: 1) the reduplicant (the output of reduplication) is always minimally a CVCV template (Payne notes that reduplication is of the preferred CVCV template, 1981:144); 2) the reduplicant can be more than two CV syllables; 3) it is only in the case that the verb is not at least CVCV that the lps is reduplicated; 4) the initial vowel of forms in (12iv) do not reduplicate. Intuitively, the net result of these observations is that the reduplicant is minimally a minimal word (CVCV) but may be larger; in other words the reduplicant is a prosodic word. The lps reduplicates only when the verb does not supply the minimal requirements of the word. No foot structure (in current prosodic theory) could be the base as no foot structure accounts for the prosodic variation, two and three syllables, seen in (12i) (nor could the base be a syllable as all reduplicants are at least two syllables).

The analysis of Axininca reduplication, assuming the PW as the base, is demonstrated in (15), (16) and (17). The PW on which reduplication operates is constructed via the formalism developed in 2.3; therefore reduplication occurs after the PW is available. Prosodic constituents are built only if the obligatory elements of that constituent are available; optional components are appended cyclically, but only where the availability of obligatory units has first resulted in well-formed constituent structures. One additional assumption is required: prosodic constituents are built cyclically, within the domain of a single morpheme, the verb stem, first, and progressively syllabifying the prefixes.

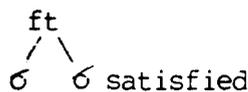
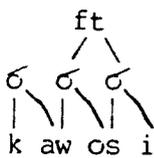
(15) Example Derivation of (12i), /kawosi/

a. SYLLABIFICATION

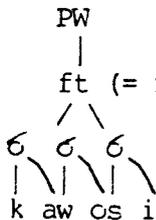


three CV syllables satisfied

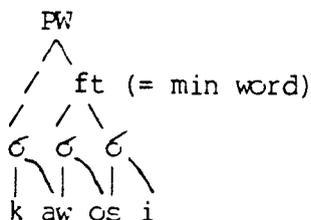
b. FOOT



c. PROSODIC WORD

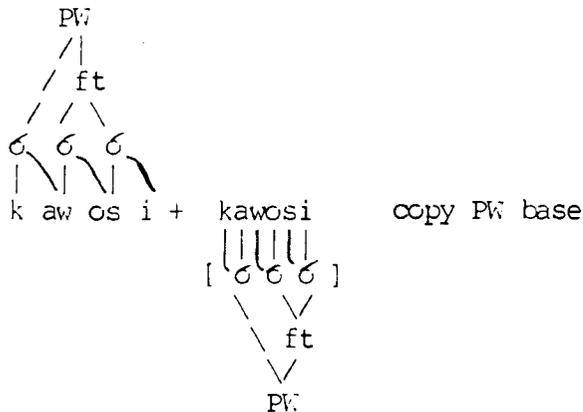


requirements of PW satisfied



Prosodic Word Adjunction

d. REDUPLICATION



e. no + kawosikawosi → [nokawosikawosiwaɪta]

In (15a) syllabification applies across the verb melody to result in 3 well-formed syllables; in (15b) a disyllabic foot is built. In (15c) the PW is built; subsequently PW Adjunction appends all additional syllables to the PW. In (15d) reduplication copies the PW (and all elements dominated by the PW). (15e) shows the surface form resulting from the concatenation of all additional morphemes.¹³ The reduplicant is assumed to surface preceding the base of reduplication (forms studied in this paper could as easily be formalized with the reduplicant following the base. Other evidence however suggests that the "linearization" assumed here is correct. For example, in dialects where the long reduplication forms have been lost, the continuative is realized in reduplication as prefixation of a syllable constituent).

(16) Example derivation of (12ii) and (12iii), /asi/

a. SYLLABIFICATION



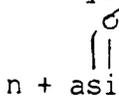
One CV syllable satisfied -- initial [a] lacks onset therefore no syllable built

b. FOOT, N/A

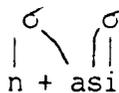
c. PROSODIC WORD, N/A

d. REDUPLICATION, N/A

e. 2nd Cycle

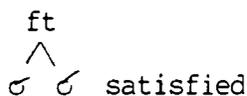


f. SYLLABIFICATION

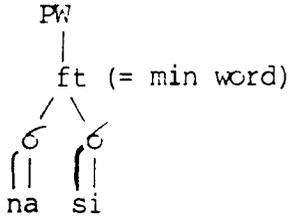


Two CV syllables satisfied

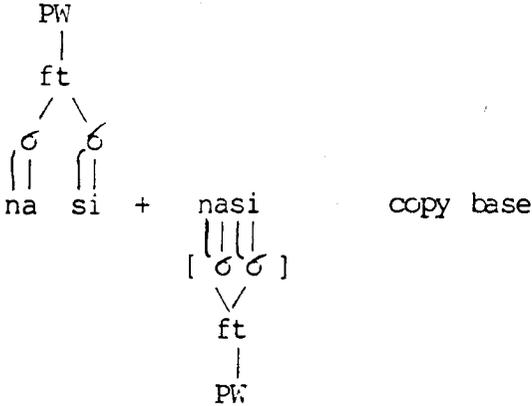
g. FOOT



h. PROSODIC WORD



i. REDUPLICATION



j. [nasinasiwaiti]

In (16a) syllabification of /asi/ results in just one well-formed syllable as the initial [a] lacks an onset and is therefore not syllabifiable. Therefore a disyllabic foot cannot be built, no PW results and reduplication cannot apply. On the second cycle, (16e), the lps is appended; syllabification across the sequence provides two well formed syllables in (16f). A disyllabic foot is built, (16g), the PW then results, (16h), and in (16i) reduplication applies and after further morphology surface form, [nasinasiwaiti], results.

(17) provides examples of vowel initial "longer" forms. In (17a) syllabification of /osaŋpi/ results in two well formed syllables; initial [o] cannot syllabify as this segment lacks an onset. As two well-formed syllables result, a disyllabic foot is constructed in (17b). In (17c) a PW is built; as the initial [o] is not a syllable, it is not appended to the PW via PW Adjunction. Reduplication applies in (17d) and in (17e) concatenation of additional morphemes results in correct surface forms.

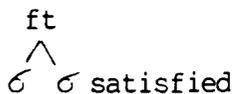
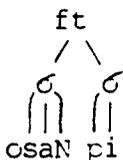
(17) Example Derivation of (12iv), /osaŋpi/

a. SYLLABIFICATION

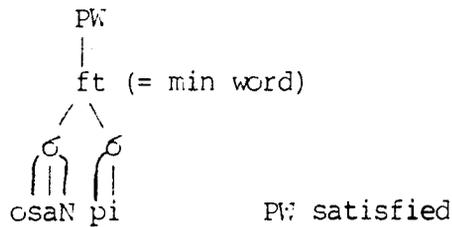


Two CV syllables satisfied -- initial [o] lacks onset.

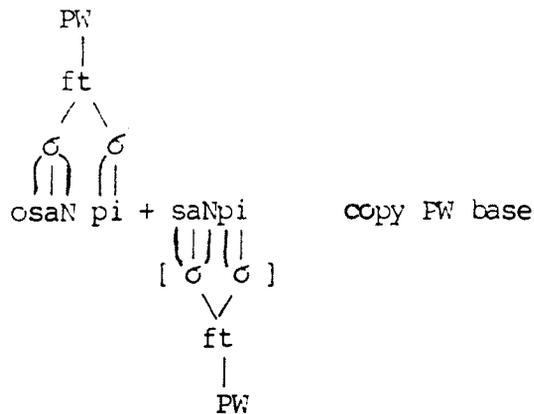
b. FOOT



c. PROSODIC WORD



d. REDUPLICATION



e. [nosampisampiwaiti]

In sum, the minimal structure of prosodic words in Axininca is a CVCV sequence, but may contain more syllables and more segments. This sequence is derived by stating well-formedness conditions on syllables (CV) and on foot structures (disyllabic). A PW in Axininca requires a disyllabic foot component to be a well-formed word. Assuming this formalization of the PW, and that the base of reduplication is a PW, accounts for the variable surface forms found in reduplication. The lps reduplicates when the verb alone is not a CVCV. Two or more syllables reduplicate because an Axininca PW consists of two or more syllables; all segments available on a given cycle which can syllabify do syllabify, thus resulting in PWs of two or more syllables. Although no such forms are given in the data, the prediction of this theory is that consonant initial verbs with four, five, six syllables will reduplicate all the syllables of the base. Alternatively, if maximally three syllables reduplicate, we will have evidence for the privileged status of ternary feet.

We have accounted for the phonological and morphological variability of Axininca reduplication as was the empirical objective of this paper. And the formalism assumed trivially explains why /koma/ does not reduplicate as *[noNkomanokomawiti] even though three syllables and two morphemes can reduplicate: the verb alone, /koma/, satisfies the prosodic word constituent and thus reduplication applies before the lps, /no-/ (and -N-) is appended. Finally, identifying the base alone, with no specified affix, results in the correct surface forms. Reduplication consists solely of copying the base, the PW, and all its subordinate structure.

3.3 The Redundancy of the Affix in Axininca

The base of reduplication in Axininca has been identified as the PW; specifying the base plus copy with no overt affix accounts for the forms in (12). Previous accounts of reduplication have generally assumed that reduplication requires the specification of an overt affix. In Axininca an affix could be identified. If we posited a syllable affix, reduplicants of precisely one syllable would result, a problematic result indeed. A disyllabic affix would account for all disyllabic forms but trisyllabic reduplicants like /kawosi/ would be a problem. Thus the only viable affix for Axininca reduplication is a PW, a constituent which consists of two or more syllables in Axininca.

But note that even if the affix is specified as a PW, the base must continue to also be identified as the PW. If the PW affix alone were identified, the problem would be to exclude the lps from reduplicating in forms like (12a), [noNkomakomawaiti], but to include it in forms like (12b), [nasinasiwaiti]. Stipulating only the affix predicts that since the lps can reduplicate, and since three syllables can reduplicate, forms like (12a) should reduplicate with three syllables, as *[noNkomanonkomawaiti] rather than as the actual form, [noNkomakomawaiti]. Thus even if the affix is taken to be a PW, in order to reduplicate the lps only in the event that the verb does not constitute a PW, the base must continue to be specified as a PW. Alternatively, as demonstrated, if only the base is specified, and subsequent copy of this base applies, all the correct forms also result. Specification of the affix then is entirely redundant. This fact is explained if reduplication is formalized as copy, rather than affixation.

4. Reduplication Specifies the Affix or the Base

Prior literature argues for specification of just the affix in reduplication (Marantz, 1982; Levin, 1983; M&P, 1986, etc), or for prosodic specification of both the affix and the base (Broselow and McCarthy, 1984; M&P, 1986, etc.). Axininca reduplication is consistent with an analysis prosodically specifying both base and affix or an analysis specifying only the base. The question is whether the redundancy of the affix is coincidental to Axininca, or whether, whenever the base is specified in reduplication, the affix is redundant. If the affix is always redundant when a prosodic base is crucially specified then the current account of reduplication as specification of an affix (in some cases also a prosodic base) misses an important generalization. This section argues that the redundancy of the affix in Campa is not peculiar to this language family, rather that in all cases where a base is prosodically specified the affix is redundant.

Recall the facts of Yidiny (figure (9)) where, to account for base transfer effects in this language, M&P (1988, 1989) specify a disyllabic foot affix and a disyllabic foot base. In Yidiny then, as with Axininca specifying the base is crucial and the form of the affix follows, i.e. is redundant. In Yidiny a disyllabic foot base is crucial to explain base transfer effects and the affix is identical to the base. A preliminary overview of M&P's reduplication corpus (1986) as well as research on prosodic bases in reduplication reported by others shows that these cases are consistent with an analysis specifying only a prosodic base with subsequent copy; an affix is never needed.

M&P (1988, 1989) stipulate that only the minimal word can be the prosodic base of reduplication, a claim which cannot stand in the face of the

Axininca data. While most cases of prosodic bases are indeed a minimal word (i.e. foot) or prosodic word, it is not inconceivable that other prosodic bases will be identified by future research.

5. Conclusion

The empirical goal of this paper has been realized: the variability of forms in (1) has been explained. The empirical analysis resulted in the claim that in reduplication, either the base or the affix is specified, but both are not, a claim which leads to a serious reformulation of reduplication rules. Whereas Steriade (1988) claims that reduplication is always copy and M&P (1986, etc) and others assume that reduplication is always affixational, this paper takes an intermediate stand: a prosodic base or a prosodic affix is identified, but both are not.¹⁴

This model seems well-suited to the larger view of morphology where we see both simple affixation, for example regular English plural suffixation, and also identification of a base alone (plus what are conceivably phonological rules), for example Germanic umlaut processes.

The current theory, as a trivial effect, predicts that base transfer will occur when the prosodic base is identified and will not when the affix is identified. It remains to be seen what exactly the limitations on prosodic bases are. At a first pass, we might assume that like prosodic affixes, prosodic bases can consist of any prosodic category, if M&P are correct, any one of the constituents in (2). This paper presents empirical motivation for the prosodic word from Axininca; M&P provide evidence for feet (minimal words). Instantiation of the remaining categories pends future research.

Footnotes

1. Thanks to Tom Bourgeois, Megan Crowhurst, Ken Drozd, Mike Hammond, Kelly Sloan, Wendy Wiswall, and especially Diana Archangeli and David Payne.
2. The gloss in (1) is simplified; detailed glosses are given in figure (11). The lps has stem-dependent allomorphs: vowel initial bases take [n-], consonant initial bases take [no-].
3. The skeletal notation, "C", "V", and "X" in this paper is not to be interpreted as a formal use of the skeleton, rather should be viewed as a notational expedient. Also as the issues here do not focus on moraic theory, and in an attempt to make representations less notationally complex, a moraic tier is not included in the representations of this paper, excluding figure (2), even though such a tier is assumed.
4. Payne (1981:62) argues that the coda N is unmarked for any feature except nasal as a) it deletes before all segments -- including vowels -- except for stops (thus it does not occur syllable initially); b) it always takes the place of articulation of the following stop; and c) it "lacks the full consonantal quality and length of the syllable initial nasals" (Payne, 1981:62). Payne also cites psycholinguistic evidence that /N/ is perceived as a single phoneme (Payne, 1981:164).
5. The "CV" representations given in Table 1 abstract away from the surface forms of words. In these representations only the obligatory components are given. "CVCV" forms in A, for example, could actually be CWCV, CVNCW, or

any other disyllabic, sequence containing any logically possible set of segments in each syllable -- but necessarily including an onset, C, and a nucleus, V, in each syllable. The same convention holds of all the "CV" representations given in this paper, that is the obligatory portions of syllables are given.

6. In Payne's texts few nouns occur, as is consistent with Payne's statement that AA is a "verbal" language (Payne 1981:9). The nouns which do occur are usually prefixed with possessive markers. Therefore a prosodic word is typically at least three syllables. However in the text disyllables do occur; in "Beetle" we find (line 3) haʒi 'he went'; (line 4) koŋki 'uncle-vocative'; (line 36) t^hami 'let's go'; (line 46) haki '3pm + answer + nonfuture'; (line 58) pihi '2p + see + future'; (line 81) haŋto 'there', etc.

7. "VCV" refers to forms with no initial consonant and exactly one syllable following the vowel initial syllable. This representation abstracts away from surface forms as, in actuality, the "VCV" may be realized with a geminate vowel or with a coda in either syllable eg. WCV, VNCV, WCV etc. The crucial aspects of this representation are 1) that the initial syllable has no onset, and 2) that the second syllable minimally has an onset and a nucleus.

8. The assumption here is that prosodic constituents contain obligatory and optional components; it is the obligatory elements which form the core of well-formed prosodic constituents. Optional elements are appended. This view is basically an interpretation of the Template Satisfaction Condition (TSC) of M&P (1986; 1988; 1989).

9. As an alternative to the formalization in (8), odd numbered syllables could map the foot, rather than the PW constituent. Here I the representation in (8) is assumed to be correct, based on 1) the assumption of the prosodic theory that feet are maximally binary (M&P, 1986:9); and 2) on the analysis of Asheninca (which includes the Axininca dialect) stress given by Judith Payne (1987), where purely binary feet are motivated in the stress system. In fact though, a ternary foot may well be motivated in Asheninca stress and morphology (see Spring, 1989a), an analysis whose merit lies not only in language particular considerations but also in a satisfactory theory of 'universal' foot typology.

10. lps forms are studied in this paper but the facts to be discussed hold whenever the person prefix has the form CV-, i.e. also for the second person /pi-/ (Payne, p.c.). The behavior of reduplication when the person prefix is not CV-, rather is V or Ø, is the subject of work in progress.

11. While Payne does not give explicit morphological glosses, earlier in the text [no-]/[n-] is identified as 1st person (:34), [-N-] as the future marker (:62), [-wai-] is identified as the continuative (:42), [-i] is identified as a non/future marker (:30). [t] is epenthetic as is consistent with the context for this epenthetic consonant, intervocally in a word formation processes. The optional epenthetic vowel, [a], occurs where the reduplicating constituent is consonant final before the [w] of the continuative, in keeping with the environment for this epenthetic vowel.

12. The reduplicated form for /kawosi/ has an exceptional ending which is a result of a morphophonemic process tangential to the current issues.

13. It is not crucial here whether morphemes are cyclically appended or come underlyingly strung together. The crucial point is that prosodic structures are built cyclically.

14. McCarthy and Prince (1988) argue that the morpheme is generally the domain of application for morphological (and phonological) processes -- including reduplication. They claim,

"Morphological processes are usually operations on a purely morphological entity: suffix plural /z/ to a noun...Phonological processes in the lexicon also typically take morphological units as their domain of operation, as with cyclic and edge dependent rules"
(MP:1988:13)

Following MCP's purview then, I will assume that the morpheme is the default domain of application of morphological rules; as such, this base need not be specified as part of a rule, rather is a redundant part of the morphology when a prosodic base is not specified.

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