NOTES ON REDUPLICATION

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This article re-examines the data presented in Steriade (1982) on the reduplication in Greek and Sanskrit, trying to show that the autosegmental approach to morphology provides a framework in terms of which it is often possible to predict when to use the option of spreading (rather than copying) in the association of a phonemic melody and the CV slots. It is also argued in passing that Marantz's treatment of preattached phoneme in a reduplicating skeleton is wrong in light of Sanskrit intensive reduplication.

In the theory of reduplication presented in Marantz (1982), reduplication is given virtually no properties formally distinct from the normal morphological device of affixation. Following McCarthy (1981), Marantz proposes that words are decomposable into the CV skeleton and the phonemic melody. Reduplication is viewed as "a special case of affixation" in which a reduplicating affix often consists of a CV skeleton with no segmental support. The mechanism Marantz proposes for associating a phonemic melody with the underspecified affix is summarized in (1):

(1) a. Copy the entire phonemic melody of the root or stem.
b. Associate the copied phonemic melody with the CV slots (L-R or R-L). This association is "phoneme-driven" in the sense that it respects the difference between C's and V's, associating them only with compatible elements of the phonemic melody.
c. Erase all stray material from the CV skeleton and the phonemic melody.

Marantz's theory as applied in Nash (1980), Yip (1982), Steriade (1982), and other work has provided convincing accounts of quite a few problems reduplication poses for theories of phonology and morphology in the generative paradigm, although some non-trivial modifications have been suggested by Broselow and McCarthy (1983) and Kim (1984). In particular Kim (1984) speculates on some general principles governing, e.g., the association of the CV skeleton and the phonemic melody. However, little attention has to my knowledge been given to the question of whether a given reduplicative process should be represented formally by autosegmental spreading or by copying. In this article it is argued that by invoking the autosegmental theory of morphology, it is often possible to predict when reduplication is to be better accompanied by spreading than by copying, and vice versa.

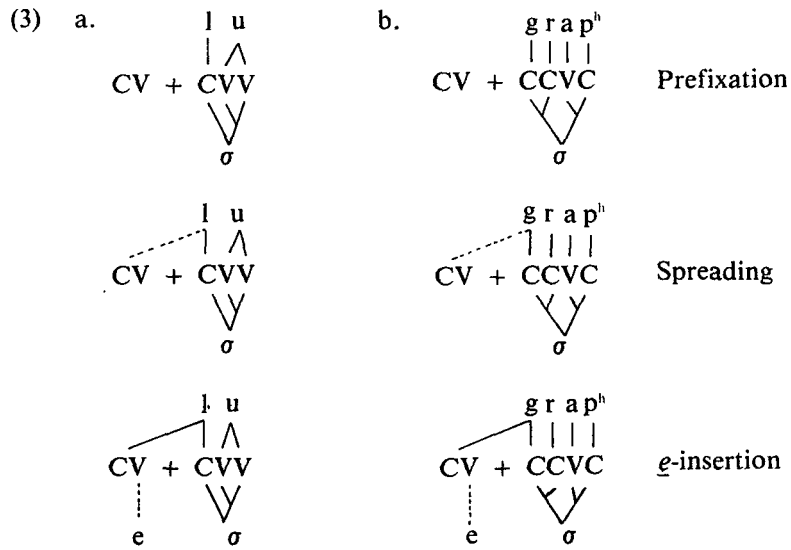
Let us consider a specific example, taken from Steriade (1982: 196-198). Greek perfect reduplication, the so-called Attic reduplication excluded, breaks up in-

to three subclasses: (a) Copy C*e* if the verb root begins with one consonant or with a voiceless stop-sonorant, voiced stop-*r* cluster; (b) Prefix *e* if the root begins with a consonant cluster other than voiceless stop-sonorant, voiced stop-*r*;(c) Lengthen the vowel in the case of vowel-initial roots.

(2)		root	perfect stem	
	a.	lū	le-lūka	'to unite'
		tlā	tə-tlāmen	'to endure'
		pneu	pe-pneuba	'to break'
		grap^h	ge-grap^{h}a	'to write'
	b.	sper	e-sparmai	'to sow'
		zdeug	e-zdeugmai	'to yoke'
		smuk^h	e-smugmai	'to smoulder'
		psau	e-psauka	'to touch'
		kten	e-ktona	'to carve'
		gnǧ	e-gnǧka	'to know'
		blasta	e-blasteka	'to sprout'
	c.	angel	āngelka	'to announce'
		op^{h}el	ōp^{h}eleka	'to owe'

For Steriade the reduplicating prefix is CV, and the process of filling in the empty CV slots consists of the spread of the segmental melody followed by *e*-insertion. The derivations of *le-lūka* and *ge-grap^h* are given in (3):

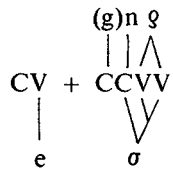
(3)



Unlike the reduplication cases in Marantz (1982), the Greek perfect reduplica-

tion pattern is not accompanied by phonemic melody copying, as one can see from the derivation of *e-gnō* in (2b) above.

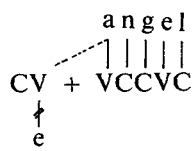
(4)



Here the C of the reduplicating prefix remains unassociated because association is required to be with the "melodic core" of the root syllable. The *g*, being extrasyllabic as Steriade argues on independent grounds, may not be linked to it. Nor can the *n* associate with it because of the general prohibition against crossing lines.

One must ask at this point if *e*-insertion is needed in the phonology of Greek. The only evidence that appears to motivate the rule lies in (2c), where the root-initial vowel is obviously linked to the V of the prefix. If it turns out to be true, however, that the *e* is nothing more than a preattached segment, which I think is the correct analysis of Greek perfect reduplication, what we need in the case at hand will be the truncation of the melody *e* (before a V) with concomitant spreading of the initial vowel.

(5)



I dare say this is quite analogous to the development of the second vowel [ɔ̄] of English *extraordinary,* for instance. In my analysis the prefix denoting the perfect tense is $\underset{e}{CV}$ and not CV as in Steriade (1982) and McCarthy (1983). Since there is only one empty slot available in the reduplicating affix, it should be filled by the first element of the phonemic melody unless forbidden by other principles. If on the other hand more than one CV slot is available, this option is out of the question because association lines must not cross (cf. Clements (1985)). This is in fact the case in Sanskrit perfect reduplication, to which we turn below.

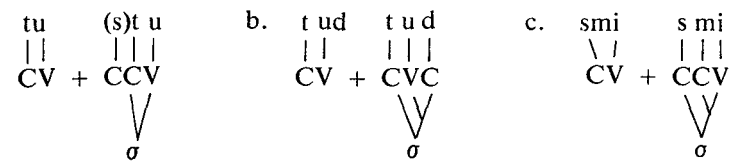
(6)	a.	ṣkand	ca-skand	'to leap'
		stu	to-ṣtu	'to praise'
		sp^hut	pu-ṣp^hut	'to burst'
		ścut	cu-ścut	'to drip'
	b.	tud	tu-tud	'to push'
		$prac^h$	pa-$prac^h$	'to ask'

dru	du-druv	'to run'
d^hmā	da-d^hmā	'to blow'
smi	si-ṣmi	'to smile'
sru	su-ṣru	'to flow'
ksam	ca-ksam	'to endure'
tsar	ta-tsar	'to approach stealthily'
psa	pa-psa	'to devour'
mnā	ma-mnā	'to note'
vyak	vi-vyak	'to extend'

Historically, the vowel *a* in the prefix was originally [e], which later merged with /a/. For some discussion of Sanskrit palatalization, see Kiparsky (1968). And we can see that Grassmann's Law is at work in examples such as *pu-ṣp^{h}ut, da-d^{h}mā* and that the well-known *ruki* rule is responsible for the occurrence of a retroflex [ṣ].

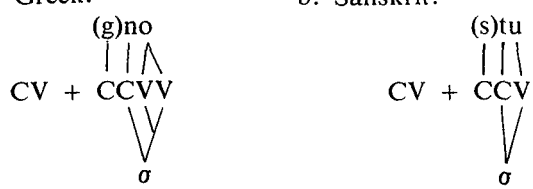
In order to account for the case (6a), Steriade declares initial *s* before a stop as extrasyllabic. The prefix is CV and association is from left to right. Her analysis here involves phonemic melody copying (as in Marantz (1982)). The results appear in (7):

(7)



I have nothing to say against (7). But notice that for Steriade the reduplicating prefix happens to be exactly the same both in Greek and in Sanskrit. What then distinguishes the two modes of reduplication? Given the following situation which arises after CV-prefixation, one should wonder which option is to be used in the first place. Copying or spreading?

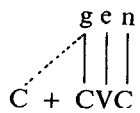
(8)



Suppose we chose to fill the C slot of (8a) by copying the root melody. Then we could in no way block unwanted forms like *nǫ-gnǭ*, and the rule of *e*-insertion would loes its chance to apply. One might try to obviate the problem by specifying "copying" or "linking" (i.e., spreading) in the grammar of an individual language. But it is more than an accident that in a fair number of languages

phonemic melody copying is unnecessary in the description of reduplication providing that the reduplicating affix has only one slot which lacks, totally or partially, an associated segmental melody. Examples follow:

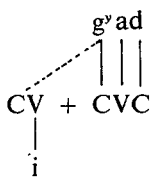
(9) Shih: *gen* 'to sleep' *ggen* 'to be sleeping' (Sapir 1921)



Marshallese: *líw* 'scold'→*líliw* (Moravcsik 1978)
Quileute: *á't'cit* 'chief' *á'á't'cit* 'chiefs'; *bi ba·a'à* 'blind man' *bí'i'ba'à* 'blind men'
Syrian Arabic: *raʔas* 'dance' *raʔʔas* 'make someone dance'
Woleaian: *bug(-a)* 'boil (it)' *bbug* 'boiled'; *tiut* 'breast' *ttiut* 'my breast'; *shal* 'water' *chechal* 'to water' (Sohn 1975)

Looked at from this point of view, the Greek case (8a) is formally not distinct from those that appear in (10).

(10) Tsimshian: *gʸad* 'person' *gʸigʸad* 'people' (Sapir 1921)



Bella Colla: *xnas* 'woman' *xixna·s-i* 'little woman'; *kʷn-* 'take' *kʷukʷn·* (cont.); *smt* 'mountain' *sasmt-i* (dimin.) (Newman 1971)
Quileute: *kwáti'* 'he tried' *kwaya'ti'* 'he tried a little'; *t'łex̣* 'stiff' *t'łeyéx̣* 'rather stiff' (Moravcsik 1978)
Pacoh: *pe* 'three' *pâmpe* 'to divide by three'
Agta: *wer* 'creek' *walawer* 'small creek'; *kwak* 'my thing' *kwalakwak* 'my small thing'
Coer D'alene: *nas* 'wet' *naʔas* 'it became wet'
Cf. Nahuatl: *pāqui* 'to be glad' *paʔ-pāqui* 'to be very glad (on various occasions)'; *tla-ma* 'to go hunting' *tlaʔ-tla-ma* 'to fish' (Andrews 1975)

The existence of one empty C slot (in the Tsimshian reduplicating prefix) invites the simple mechanism of autosegmental spreading rather than the total copying of the phonemic melody. If there is more than one empty CV slot in the skeleton (e.g., Nahuatl CVC + [ ]), copying is of course unavoidable
ʔ

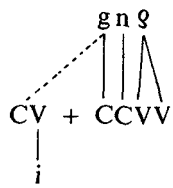
under a theory assumed here.

To recapitulate, my analysis does not require *e*-insertion. Rather *e* is a preattached segment just like the *i* in Greek present reduplication, some examples of which appear in (11).

(11)	root	present stem	
a.	dʒ̄	di-dʒ̄mi	'to give'
	gnʒ̄	gi-gnʒ̄skʒ̄	'to know'
	kʰrç̄	ki-kʰrç̄mi	'to borrow'
b.	akʰ	i-akʰʒ̄	'to cry'

After prefixing $\underset{\underset{i}{|}}{CV}$ to the root, C is straightforwardly associated to the root melody. The result appears in (12):

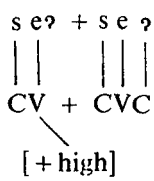
(12)



As pointed out by Steriade (1982: 201), *iakʰʒ* (11b) may also demonstrate that spreading rather than copying is the correct analysis of *gignʒ̄-*. It may, but not in the same way as she thinks. She supposes that, should we choose to fill the empty C slot by copying the root melody, we shall have no means to block **kiakʰʒ-*. However, this form will never be obtained since she follows Marantz's (1982) model.

Now we are ready to compare two different positions concerning the treatment of preattached material. There seems to be a consensus that preattached features win, as the following example (Marantz (1982) shows:

(13) Akan



= sise ʔ 'say' (multiple activity)

However, Marantz takes the case of a preattached phoneme in a reduplicating skeleton to be "simply a limiting case of preattached features" (p. 449). Not surprisingly, he analyzes Yoruba nominal reduplication like this:

(14)
```
dùn     d ù n
 | |     | | |
 CV  +   CVC     = dídùn 'to be tasty, sweet' (nominalized)
  |
  i
```

Marantz argues that although a vowel from the stem melody links to the V slot in the reduplicating prefix in Yoruba, all of its features are overridden by preattached *i*. He further gives a hypothetical example which he hopes tests the prediction his theory makes against McCarthy's (1981) prohibition against many-to-one associations.

(15)
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tasidu        tasidu
 |||\           |||\\\
 CVCCV  +      CVCVCV   = tanitasidu
   |
   n
```

This is too tricky a question to be answered without a concrete example from a natural language. On this occasion I will show a case that clearly favors McCarthy's position. The data are again from the Sanskrit pattern of intensive reduplication (Steridade (1982: 332)). For the ease of argument, I give crucial examples only.

(16)	a.	vad	vā-vad	'to speak'
		stāb^h	ta-stāb^h	'to prop'
		tij	te-tij (<tai-tij)	'to be sharp'
		sku	co-sku (<cau-sku)	'to tear'
	b.	car	car-car	'to move'
		kram	can-kram	'to stride'
		stan	tan-stan	'to thunder'
		bād^h	bad-bād^h	'to oppress'

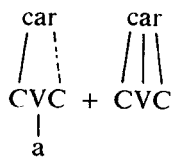
Steriade proposes CVC for the intensive prefix covering (16a) and (16b), and
```
      |
      a
```
gives the following derivations:

(17) a.
```
vad     vad
 | \     /|||
 CVC + CVC
   |
   a
```

b.
```
tij     tij
 | \     /||\
 CVC + CVC
   |
   a
```

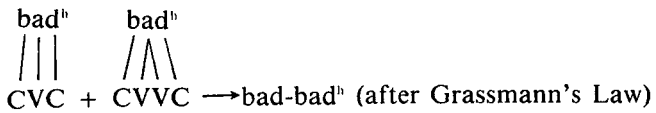
Compare:

(18)



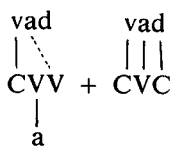
By stipulating that "an obstruent may not be linked to a preconsonantal C" (p. 324), Steriade wants to say that the two patterns in (16) have the prefix CVC (a) in common. But it is clear that this stipulation alone does not warrant the unexpected association of a vowel and the C slot even in view of Halle and Vergnaud's (1980) argument summarized by Marantz under Condition A: "Unless overridden by a special proviso, feature complexes containing the feture [—syllabic] can be linked only to C slots in the skeleton, and feature complexes containing the feature [+syllabic] can be linked only to V slots in the skeleton. In addition, it is not immediately clear that the *a* is preassociated in (18). If we follow Whitney (1885), the reduplicating prefix will be simply CVC. In that case *bad-bād*ʰ need not be an exception as it was in the above analysis:

(19)

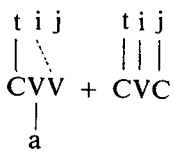


In any event, the most appealing analysis of (16a), I think, is to say that the intensive prefix is CVV (a). After prefixation and copying, the copied melody is associated left to right to the existing CV slots. The result of this association is quite straightforward:

(20) a.



b.



Indeed this association is in accord with McCarthy's prohibition against many-to-one associations, but it is unthinkable under Marantz's hypothesis.

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