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Discontinuous reduplication in vernacular Malay

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Most current theories of partial reduplication depend on some model of templatic morphology. They treat partial reduplication as a process which associates segmental or "melodic" elements of the base form to positions in an autosegmental template or "skeleton" of the appropriate prosodic shape. This paper discusses a somewhat unusual pattern of partial reduplication reported in at least three distinct dialects of vernacular Malay.¹ This pattern poses two fundamental problems for the template-matching theory of reduplication. First, the process involves copying of discontinuous material, i.e. "melody skipping", of a type not previously discussed. Second, the shape of the reduplicative affix depends on the shape of the base in a way which seems to violate standard assumptions about the persistence of timing slots in templatic skeleta.

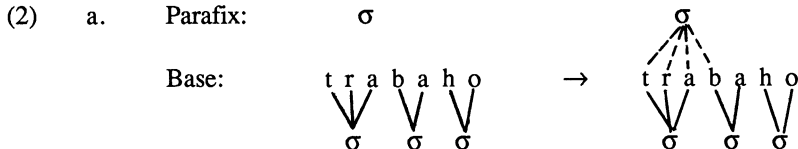
Templatic theories treat reduplication as a special type of affixation. Reduplicative affixes are special in that they lack segmental material -- they define only a prosodic structure. In the theory developed by McCarthy and Prince (1986), these bare affixes trigger a process which copies the melody of the base form, allowing the timing slots of the affix to associate with the copied melodic elements. This process of autosegmental association is assumed to proceed from Left-to-Right in prefixing reduplication, Right-to-Left in suffixing reduplication, until the template is full.

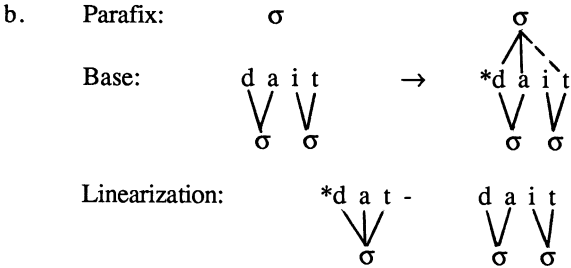
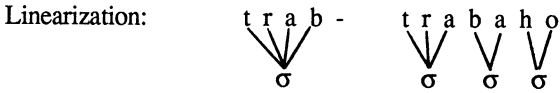
For example, to derive the well-known Ilokano forms shown in (1), a bare syllable template is prefixed to the base form. This triggers the copying of melodic material, which associates left-to-right to the slots in the template until a maximal syllable is defined. Unassociated melodic material is then deleted.

(1) Ilokano (data from McCarthy and Prince 1986:13)

a. /basa/	ag-bas+basa	<i>be reading</i>
b. /dait/	ag-da+da.it	<i>be sewing</i>
c. /adal/	ag-ad+adal	<i>be studying</i>
d. /takder/	ag-tak+takder	<i>be standing</i>
e. /trabaho/	ag-trab+trabaho	<i>be working</i>

A variation of this model, developed by Mester (1986) and Uhrbach (1987) is illustrated in (2a). In this approach, the prosodic affix is attached as a "parafix", i.e. added in parallel to the base form. After association of melodic material to the base, the result is linearized by a process analogous to tier-conflation.





The association of melodic elements to positions in the templatic affix must be subject to a continuity condition, or "no-skipping" constraint, in order to derive the form da-da.it (shown in (1-b)) rather than the incorrect form *dat-da.it. The process which would lead to the incorrect form, and which the no-skipping constraint must block, is illustrated in (2b). After association of /d/ and /a/ to the onset and nucleus positions of the template respectively, the next segment in the melody is unable to associate because /i/ is not a possible coda in Ilokano. However, the following segment (proceeding left-to-right) is /t/, which is eligible to be a coda. The no-skipping constraint stipulates that if a melodic element (in this case /i/) fails to associate, then association stops.² This prevents /t/ from appearing as the coda of the reduplicated syllable, blocking the form *dat-da.it. While this pattern is impossible in Ilokano, something very similar is attested in vernacular Malay, indicating at the very least that the continuity condition must be modified.

A second assumption which is called into question by the Malay data involves the persistence of templatic slots. The standard assumption is that these must be filled if there are enough melodic units of the appropriate type to fill them, unless association to the appropriate melodic element is blocked by well-formedness constraints. McCarthy and Prince express this as the "Satisfaction Condition" (McCarthy and Prince 1986:6):

All elements in a template are obligatorily satisfied.

Violations of the continuity constraint can be handled in various ways, with varying degrees of success. But the violations of the Satisfaction Condition seem to suggest that the templatic approach is inadequate to account for the phenomenon under discussion. I will sketch out a non-templatic analysis based on a very old idea, recently revived by Steriade (1988), that partial reduplication can be derived from full reduplication.

1. The discontinuity problem

Let us first consider the following data from Johor Malay, as described by Farid Onn (1976):

(3) Johor Malay

(data from Onn 1976:104; allophonic processes (e.g. glide insertion, vowel lowering, final /k/ reduction, etc.) not indicated)

underlying intensification		
timbus	tətimbus	<i>fill in (hole)</i>
jual	jəjual	<i>sell</i>
puas	pəpuas	<i>satisfy</i>
sapu	səsapu	<i>sweep</i>
malam	məmalam	<i>night</i>
sudah	səsudah	<i>complete, finish</i>
laju	ləlaju	<i>fast</i>
tiap	təʔtiap	<i>every</i>
buat	bəʔbuat	<i>to do, to make</i>
tembak	təʔtembak	<i>to shoot</i>
berkok	bəʔberkok	<i>bend</i>
tutup	təʔtutup	<i>close</i>

This is a case of prefixing syllable reduplication, with a prespecified ə in the prefixed syllable. The presence vs. absence of a glottal stop in the reduplicated prefix depends on the features of the stem-final consonant:

Just in case the original stem ends with a stop segment, then a glottal ʔ would also be added following the inserted ə. (Onn 1976:104)

An insertion rule of this type should, on theoretical grounds, be impossible, because it involves a drastic non-locality in the conditioning environment. I will suggest that the glottal stop is not simply inserted but rather represents a reduced copy of the stem-final stop. In other words, the process of reduplication must copy elements from both edges of the base form. Under this analysis, the apparent non-locality of the rule becomes instead a problem of "melody skipping", i.e. a violation of the continuity condition.

The proposed analysis is supported by parallel data from two other dialects. In Perak Malay, as described by Zaharani (1988), stem-final nasals as well as stops are copied (in reduced form) into the reduplicated syllable. By "reduced" here I mean that the copied nasal always assimilates to a following obstruent:

(4) Perak Malay (Data from Zaharani 1988:151-155):

	Stem		Reduplicated
(a)	čəʔite	<i>story</i>	čəčəʔite <i>all kinds of stories</i>
	kəʔi	<i>study</i>	kəkəʔi <i>to study repeatedly</i>
	kəkə	<i>estimate</i>	kəkəkə <i>by my estimate</i>
	dulu	<i>long ago</i>	dədulu <i>very long ago</i>
	mələ	<i>begin</i>	məmələ <i>at the very beginning</i>
	mude	<i>young</i>	məməde <i>very young</i>
	tue	<i>old</i>	tətue <i>very old</i>

(b)	bapɔʔ budɔʔ kəʃeʔ siket gəlap	<i>many child small alittle dark</i>	bəʔbapɔʔ bəʔbudɔʔ kəʔkəʃeʔ səʔsiket gəʔgəlap	<i>very much all kinds of kids very small very little very dark</i>
(c)	bakəŋ pətəŋ jəkəŋ jaman kəkəŋ	<i>thing evening seldom time dry</i>	bəmbakəŋ pəmpətəŋ jəŋjakəŋ jəŋjaman kəkəkəŋ	<i>all kinds of things every evening very seldom for a long time very dry</i>

Observationally, the reduplicative prefix has the shape $C_1\emptyset C_F$, where C_1 is the initial consonant of the stem and C_F is defined as follows: [ʔ] if the stem-final consonant is a stop; a nasal unspecified for place of articulation if the stem-final consonant is a nasal; and \emptyset elsewhere.³ Brown (1956:86) also reports forms like those in (2a) and (2c) in Perak Malay, though he does not mention the pattern shown in (2b).

The pattern described by Hendon (1966) for the Ulu Muar dialect is quite similar to that observed in the Perak data, with two significant exceptions: (i) the reduplicated syllable contains a copy of the stem-initial vowel, rather than a default or prespecified [ə]; and (ii) stem-final /-h/ is copied as /-h/.⁴

(5) Ulu Muar Malay (data from Hendon 1966:59)
(nasality, laxness etc. of vowels not shown)

sieʔ tariʔ budaʔ bueʔ (/buat/?) kueʔ (/kuat/?) larjɪt sikit galap cakap	siʔ+sieʔ taʔ+tariʔ buʔ+budaʔ di-buʔ-bueʔ kuʔ-kueʔ laʔ+larjɪt siʔ+sikit gaʔ+galap caʔ+cakap kaciʔ	<i>is torn repeatedly accordion children pretended vigorously, loudly, etc. palate various small quantities is repeatedly dark talks in a low tone</i>
kawan s-oran siaŋ dayaŋ diam tanam taraŋ	kaŋ+kawan/krɪ+kawan ⁵ soŋ+soraŋ siŋ+siaŋ dan+dayaŋ din+diam bo-tan+tanam tn+taraŋ lareh	<i>friend all alone during the daytime hand-maidens remains silent gardens regularly just light enough to see vaguely</i>
paraŋ jariŋ	pɪm+paraŋ jɪn+jariŋ	<i>sword-like decoration latticework</i>
pueh (/puas/?)	so-puh+pueh e	<i>to their complete satisfaction</i>

Hendon describes the process as follows:

Reduplication of this type is found only with stems (i) which end in a stop, /h/, or /l/, and begin with a consonant, or (ii) which end in a nasal and begin with a stop or /s/.⁶ The shape of the reduplication may be represented by this formula: C₁VC₂. C₁ is the same phoneme as the initial consonant of the stem. [V is a copy of the initial stem vowel, which may be laxed or lowered under certain conditions -- PRK] C₂ depends on the final consonant of the stem. If that is a stop or /l/, C₂ is /l/ ... If the stem ends in a nasal, C₂ is a nasal homorganic with the initial stop or /s/ of the stem ... If the stem-final consonant is /h/, C₂ is /h/ ...⁷
(Hendon 1966:59)

Several interesting questions arise concerning the melodic content and feature geometry of the copied stem-final consonant. It appears that either (a) no place of articulation features are copied for the final consonant, or (b) the place features are deleted in the copy. The loss of place features is seen most clearly in the assimilation of copied nasals to a following obstruent. Aside from the reduplicated forms shown here, nasal assimilation in Malay only applies to prefix nasals which are unspecified for place of articulation. Thus, the fact that nasal assimilation applies in the forms shown in (4) and (5) strongly suggests that the copied nasal is unspecified for place of articulation. Similarly the segments /l/ and /h/ can be assumed to have no place features.

It seems likely that these changes in melodic content are related to syllable structure requirements, since the preferred coda in all Malay dialects is a nasal homorganic to a following stop. It may well be that all syllable-final non-continuants lose their features for place of articulation through a rule of Coda Neutralization.

Apparent exceptions to this rule, i.e. consonantal codas fully specified for place of articulation, occur only at the end of a phonological word. Phonological word boundaries occur not only at the end of morphological words but also between halves of compound and fully reduplicated forms. Thus nasal assimilation never applies across compound boundaries, nor across root-reduplication or word-reduplication boundaries. In word- or root-reduplication, fully specified word-final nasals remain intact in the copy, i.e. retain their place features and thus do not assimilate:

(6) Perak Malay (Data from Zaharani 1988:150 ff.):

Stem	Reduplicated
tikam <i>stab</i>	tikam-tikam <i>stab repeatedly</i>
jaʒaŋ <i>seldom</i>	jaʒaŋ-jaʒaŋ <i>very seldom</i>
baŋonan <i>building</i>	baŋonan-baŋonan <i>various buildings</i>

Cross-linguistically it is very common to find segments or clusters occurring in word-final position which are otherwise impossible as codas of a syllable. This pattern is generally explained in terms of the possible extra-prosodicity of edge segments.⁸ In this case the claim would be that consonants in phonological word-final position are extra-prosodic, and thus invisible to the rule

which would otherwise delete the place features of non-continuants in coda position.

In the East Coast dialects of vernacular Malay, however, Coda Neutralization applies equally to word-final segments. Ismail Hussein (1973) reports that in the Kelantan and Trengganu dialects, all final stops reduce to [ʔ]. (In the West Coast dialects discussed in the present paper, as in Standard Malay, only final /k/ regularly undergoes this process.) Similarly, in the Kelantan and Trengganu dialects all final nasals reduce to [ŋ]. This difference between the two clusters of dialects can be expressed by assuming that the East Coast dialects do not allow final segments to be extra-prosodic, and thus Coda Neutralization applies equally to all coda positions.

2. Templatic solutions and the problem of non-persistence.

In the following discussion I will focus almost entirely on the Ulu Muar dialect; any analysis of the Ulu Muar data would account for the data from the other two dialects as well with minimal modifications.

In considering this data, the most glaring problem is the discontinuity of the copying. In one sense, this is the easiest problem to fix. After all, the continuity constraint is merely a stipulation anyway -- nothing in the templatic formalism makes melody skipping inherently impossible. As McCarthy and Prince (1986) state:

... The skipping phenomenon is limited to [core syllable, i.e. CV, reduplication], as in Sanskrit du-druy; we have no suggestion except to stipulate it. We take cold comfort in the fact that there is no known theory that does any better. (p. 94)

However, given the general goal of developing a constrained theory of reduplication, it would be a terrible setback if we had to abandon the continuity condition entirely, allowing reduplicative processes to skip over arbitrary amounts of material in the base when copying melodic features into the reduplicative affix.

Of course, the phenomenon described here clearly does not involve arbitrary gaps or leaps in the copying process. Copying in these examples is strikingly and crucially edge-governed. For example, in Perak Malay (example (4)), the reduplicated syllable contains the onset of the first syllable and the coda of the final syllable. What remains unattested, and is presumably impossible, is a rule which copies non-edge constituents, for example, the coda of the first syllable and the onset of the final syllable.

What we need is a way of relaxing the continuity constraint in just the right way. One possibility is to apply the rule of of Edge-In (E-I) association, as proposed by Yip (1987):

E-I association will associate the initial and final melodic elements with the initial and final free slots, anchoring the two ends. Remaining slots and melodic elements will then be associated in the same way, moving inwards, until all slots are associated. (p. 7)

Given such a principle, the derivation of the Ulu Muar forms would be as shown in (7). The initial and final consonants of the base would be linked to the onset and coda positions of the template respectively. The nucleus slot would be

Various other templatic solutions to the discontinuity problem can be suggested. However, all such solutions face the same problem: they predict incorrect results for vowel-final stems. For example, given the (Ulu Muar Malay) base form suko like , E-I association might produce either *so-suko or *suk-suko, depending on whether the association is assumed to be melody-driven or template driven; the actual form is su-suko.¹⁰

Similarly, under the second approach, the "coda-anchoring" rule would fail and the left-to-right convention would be expected to produce *suk-suko.¹¹ In order to make this analysis work, we would need to stipulate that the final C-slot of the template is deleted whenever it cannot be anchored to a stem-final consonant. But this violates a fundamental assumption of templatic morphology, i.e. the persistence of skeletal slots. These slots must always be filled if there is an eligible melodic element available. There is no general principle which would prevent forms like *suk-suko, given a CVC (i.e. maximal syllable) template.

The basic process at work in the Malay data presented above is easy to express in prose: copy the first CV- (or mora) of the stem, together with the stem-final consonant, if any. But the "if any" qualification is very difficult to formalize in terms of template matching because of the discontinuous nature of the association. The fundamental problem is that the reduplicative template must be CVC (or bi-moraic) with consonant-final stems and CV (or mono-moraic) with vowel-final stems.

This dilemma suggests that a template-and-association model of reduplication cannot provide an adequate analysis for these facts. We must look for a non-templatic solution.

3. A non-templatic analysis:

Partial reduplication as full reduplication

Steriade (1988) argues that all reduplication begins with full reduplication, and that partial reduplication is achieved by the deletion of unlicensed material from the copy. The shape of the output form is defined not in terms of templates but in terms of markedness parameters.

Under Steriade's approach, the prohibition against "skipping" melodic elements is not merely stipulated; it follows from the requirement that reduplicated syllables constitute a possible syllable of the base form. In the Ilokano example (1-b), the form *-dat+da.it would be blocked because no combination of resyllabification and matching operations can make /dat/ a syllable in the original stem, /da.it/.

While this approach yields the correct results for Ilokano, it is incapable of accounting for the data in (3)-(5). As noted above, what is impossible in Ilokano (and most other languages) is attested in vernacular Malay. However, while the details of Steriade's proposal are inconsistent with the data under discussion, I will adopt her basic strategy.

Basically, I will propose that the partial reduplication observed in these dialects results from full reduplication followed by a kind of truncation process applied to the copy. Truncation has frequently been proposed as a source of partial reduplicative patterns which appear to violate the universal conventions governing the direction of association, e.g. prefixing reduplication of the final syllable, which seems to imply right-to-left association. Some dialects of Malay have such a rule.¹²

Abdullah Hassan (1974) cites the following examples:

(8) Malay (data from Abdullah Hassan 1974:45)

budak <i>child</i>	dak-budak <i>children</i>
rumah <i>house</i>	mah-rumah <i>houses</i>
kata <i>speak</i>	ta-kata <i>speak repeatedly</i>
hitam <i>black</i>	tam-hitam <i>very black</i>

In order to formalize the rule of truncation needed to produce such forms, I will make use of concepts developed by McCarthy and Prince (to appear) in their work on Arabic broken plurals. While morphological constituents (e.g. stems, words, etc.) are the normal domains to which morphological processes apply, McCarthy and Prince point out that some morphological processes are instead defined over a prosodic domain. They cite numerous examples of morphological processes in various languages which apply to a prosodically defined subset of some morphological base.

Essentially, a parsing mechanism is assumed which constructs a prosodic constituent of the specified size, beginning at one edge of the base form. A particular rule may apply either to the specified constituent or to the rest of the word (the "residue"). Three parameters are identified which determine how such rules will apply: (i) the size of the prosodic unit to be constructed; (ii) which edge the parsing begins at; (iii) whether the process applies to the prosodic constituent itself or to the residue. In the latter case, the specified prosodic constituent appears to be "invisible" to that particular rule.

For example, infixation (e.g. Tagalog -um-) can be defined as a morphological operation (prefixation) applied to a prosodically-defined base. The size of the constituent to be parsed is a single consonant, parsing begins at the left edge of the stem, and prefixation applies to the residue:

(9) -um- + [b] ili → b-um-ili

The truncation rule which would need to apply after full reduplication to produce the forms in (8) could be formalized in these terms as follows: the morphological process in question is deletion. (i) Construct a (maximal) syllable, (ii) beginning at the right edge, and (iii) apply the operation to the residue. This rule would have the effect of deleting everything but a prosodically specified subset of the copy (the final syllable) or, equivalently, of licensing only the material inside that prosodic constituent. Notice that the identical rule would account for the Ilokano data in (1) merely by changing the specification of "right edge" to "left edge" in (ii).¹³

If partial reduplication can be viewed as truncated full reduplication in the way outlined here, we would have an explanation for the otherwise inexplicable parallelism between partial reduplication and extra-metricity (at least in the core cases of each phenomenon). First, extrametrical material must always constitute a single constituent, typically a single prosodic constituent. Second, that constituent must be peripheral in the relevant domain. Similarly, as McCarthy and Prince have argued, partial reduplication in general copies a single prosodic constituent which must be peripheral in the base. Under the view outlined above, both truncation and

extra-metricity are the result of applying an operation to the "residue"; that is why both phenomena seem to isolate a single, peripheral prosodic constituent.

Under this view of partial reduplication, the only unusual feature of the vernacular Malay pattern exemplified in (3) - (5) is that it requires simultaneous "licensing" of material on both edges: a single mora on the left edge and a single consonant on the right. This is analogous to allowing extra-metricity on both edges, as must be the case in forms that contain impossible tauto-syllabic consonant clusters in both word-initial and word-final positions. Since it is impossible to parse a discontinuous constituent, the rule must allow two separate parses to apply to the same base: (a) parse a light syllable (CV) on the left edge; and (b) parse a single consonant on the right edge. Then apply the deletion operation to the residue. In the case of a vowel-final stem, the second part of the parse would simply fail and nothing would be licensed on the right edge of the copy. The derivation of the Ulu Muar forms would be as follows:

(10)

a. galap	diam	pueh	suko
b. galap-galap	diam-diam	pueh-pueh	suko-suko
c. [ga]la[p]-galap	[di]a[m]-diam	[pu]e[h]-pueh	[su]ko[]-suko
d. [ga][p]-galap	[di][m]-diam	[pu][h]-pueh	[su]-suko
e. ga?-galap	din-diam	puh-pueh	su-suko

- a. Base
- b. Full reduplication
- c. Parsing (left edge: one mora; right edge: one consonant)
- d. Deletion of residue (i.e. unlicensed material) in copy
- e. Syllabification, neutralization, assimilation

We have seen that the data in (3) - (5) pose two major problems for templatic theories of reduplication: (i) the discontinuity of the copied material, and (ii) the non-persistence of the coda slot. The non-templatic approach suggested here accounts for both of these facts in a straightforward way as resulting from full reduplication followed by truncation. The edge-boundedness of discontinuous constituents is a necessary consequence of the fact that parsing of prosodic constituents must begin from an edge.

Notes

¹In this paper, the term "vernacular Malay" refers to any dialect of Malay spoken primarily as a first language; this definition would exclude the standard languages, i.e. Bahasa Malaysia and Bahasa Indonesia, literary Malay, and the various forms of pidgin (Bazaar) Malay.

¹¹Viewing the initial anchoring as a constraint on possible associations rather than as an extrinsically ordered rule of association might save this line of analysis. The constraint would act as a filter, blocking any form in which the coda of the syllabic template was associated with a non-edge segment, or with a [+ cont] segment. The coda timing slot would be deleted by convention if it could not associate with a melody element. However, introducing filters or constraints of this type only adds to the complexity of an already complex and powerful formalism. Moreover, it appears that a disjunctive constraint would be needed in this case -- allow the final C slot to associate anywhere, then block forms in which it associated either to a vowel or to a non-final consonant.

¹²A similar pattern exists in Ulu Muar Malay, but is described by Hendon as being very rare.

¹³As this volume was going to press, a very interesting modification of this analysis was suggested to me by Sharon Inkelas: assume that full reduplication copies only the melodic material of the base. The specified parsing operations would then construct prosodic structure on a subset of this copied material: a syllable on the right edge in (8), a syllable on the left edge for the Ilokano forms in (1), and a single mora on each edge for (3) - (5). Melodic material without any prosodic structure would be deleted by the general rule of stray erasure, rather than by a stipulated morphological operation of deletion. This approach looks very promising, though the details have yet to be worked out.

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