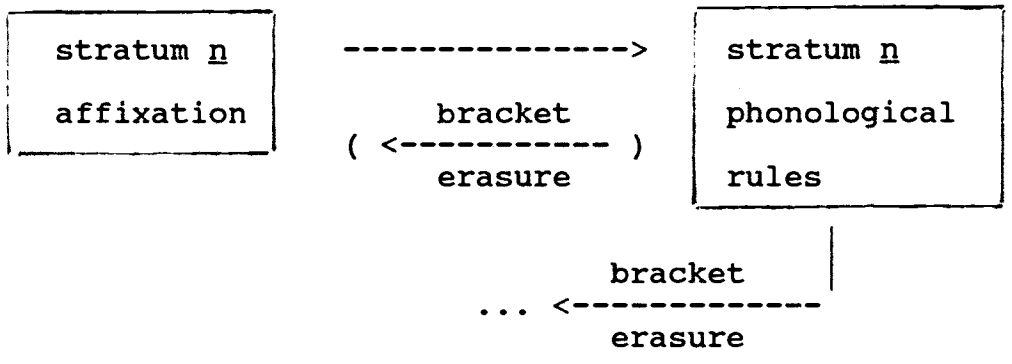
Reduplication in Lexical Phonology: Javanese Plural Reduplication

Deborah Schlindwein
USC

Lexical Strata

The theory of Lexical Phonology organizes the lexicon into multiple ordered strata, pairing distinct groups of morphological affixes with distinct sets of phonological rules (Kiparsky (1982), Mohanan (1982,1986)). Individual lexical strata are schematically represented as in figure (1), where forms output from the lefthand side box (in which morphological affixation takes place) are submitted to the righthand side box (in which phonological rule application occurs), either cyclically or noncyclically:

1)



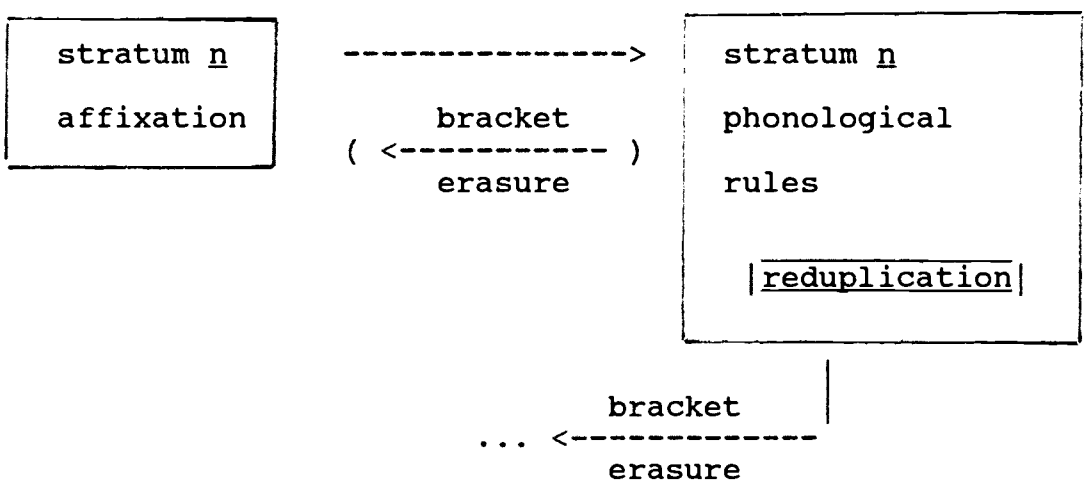
The parenthesized arrow in (1) is present for lexical strata which operate in a cyclic fashion, and absent for lexical strata which operate noncyclically. On a cyclic stratum, every affixation triggers the immediate application of a round of phonological rules, and after each round of phonological rule application, a form may return to the box on the left to pick up additional affixes, one at a time. On a noncyclic stratum, a form is sent through the phonological rules only once, after all the affixes available for attachment on that stratum are already in place. The Bracket Erasure Convention, situated at each exit from the phonology, eliminates internal morpheme boundaries from

a string. Thus whenever a form completes a round of phonological rule application, the existence and location of internal morpheme boundaries becomes inaccessible to all subsequent affixation rules as well as to all subsequent phonological rule cycles.[1]

Where does reduplication fit into this model? The template which characterizes the prosodic shape of the reduplicative portion of reduplicated forms has generally been conceived of as some incompletely specified affixational morpheme--a morpheme consisting of skeletal units or prosodic constituents that attaches to a stem and 'borrows' its phonemic melody from the stem to which it attaches (Marantz (1982), Levin (1983), McCarthy and Prince (1986)). Thus reduplication is seen as an affixational process, albeit of a very special kind. Under this view, reduplication would most naturally be grouped among the affixational rules which effect the concatenation of inflectional and derivational morphemes to stems and which feed the regular phonological rules appropriate to the lexical stratum to which they belong.

Of course, not all word-formation processes are purely concatenative operations. Some morphologically interpretable word-formation processes, such as ablaut/umlaut and tone melody deletions and substitutions, appear to be executed by subroutines that are phonological, rather than affixational, in their nature. In this brief paper I will not attempt to determine just where all such non-affixational word-formation processes fit into the derivational flowchart given us by the Lexical Phonological model. I will, however, show that reduplication--a process with undeniable morphological import--must be seen as a morphologically interpretable phonological subroutine, as opposed to an affixational rule, schematically accomodated into the framework of the Lexical Phonological model as illustrated in figure (2):

2)



To this end I present aspects of the plural forming reduplicative process in Javanese, a language whose morphological and phonological structure is discussed in extensive detail in Dudas (1976). I shall focus on a very limited portion of the lexical phonology of Javanese, for we need not go beyond an

investigation of how several well-motivated rules of Javanese phonology apply in the context of plural reduplication to discover why it must be the case that reduplication takes place on the 'phonological' side of the Lexical Phonological model.

Resyllabification, High Vowel Laxing, and Obstruent Devoicing in Javanese

Consider first the data presented in (3), where the surface realizations of nouns derived with and without the Demonstrative suffix -(n)e (which shows up in its nasal-initial form when attached to vowel-final stems and in its vowel-initial form when attached to consonant-final stems) are given:

3)

unaffixed	Demonstrative	
murIt	murid-e	'student'
buri	buri-ne	'back'
bibIt	bibit-e	'origin'
ibu	ibu-ne	'mother'
jərU?	jəru?-e	'citrus fruit'
bəḍUk	bəḍug-e	'mosque drum'

We see from these representative data that the surface laxness of high vowels is entirely predictable. High vowels are regularly laxed when they occur in a closed syllable. Thus we have evidence of a rule of High Vowel Laxing, informally stated in (4):[2]

4) High Vowel Laxing

$$V_{[+high]} \rightarrow [-tense] \; / \; \overset{\circ}{\underset{\diagdown}{|}} \_\_\_ C$$

The surface voicelessness of syllable-final obstruents is likewise entirely predictable, and can be attributed to a rule of Obstruent Devoicing, informally stated in (5):

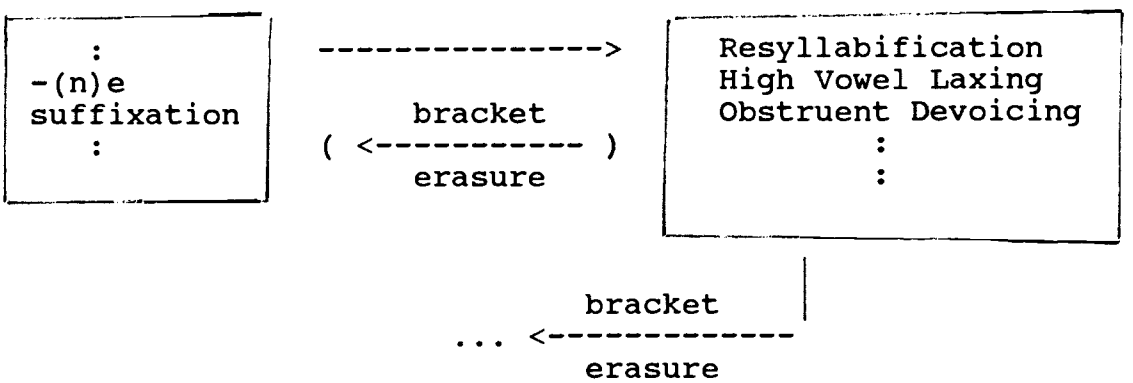
5) Obstruent Devoicing

$$C_{[-son]} \rightarrow [-voice] \; / \; \overset{\circ}{\underset{V}{|}} \_\_\_$$

The application of High Vowel Laxing and Obstruent Devoicing is evidenced only in the unaffixed forms in (3). Notice that the final high vowels of the consonant-final stems to which the -(n)e suffix has been attached escape application of High Vowel Laxing and that the final voiced obstruents of the consonant-final stems to which -(n)e has been attached escape the application of Obstruent Devoicing. Immunity from High Vowel Laxing and Obstruent Devoicing is simply a consequence of the prior application of a rule of Resyllabification, which applies to the forms created by the concatenation of stems and the Demonstrative suffix, opens up the final syllable of the stem by transforming the coda consonant into an onset, and bleeds the application of High Vowel Laxing and Obstruent Devoicing, both of which require

that their target segment appear in the context of a closed syllable. Resyllabification, High Vowel Laxing, and Obstruent Devoicing therefore apply to the output of -(n)e suffixation, and can be assigned to the same lexical stratum, as shown in (6):

6)



Reduplication

Consider now the reduplicated plural forms given in (7):

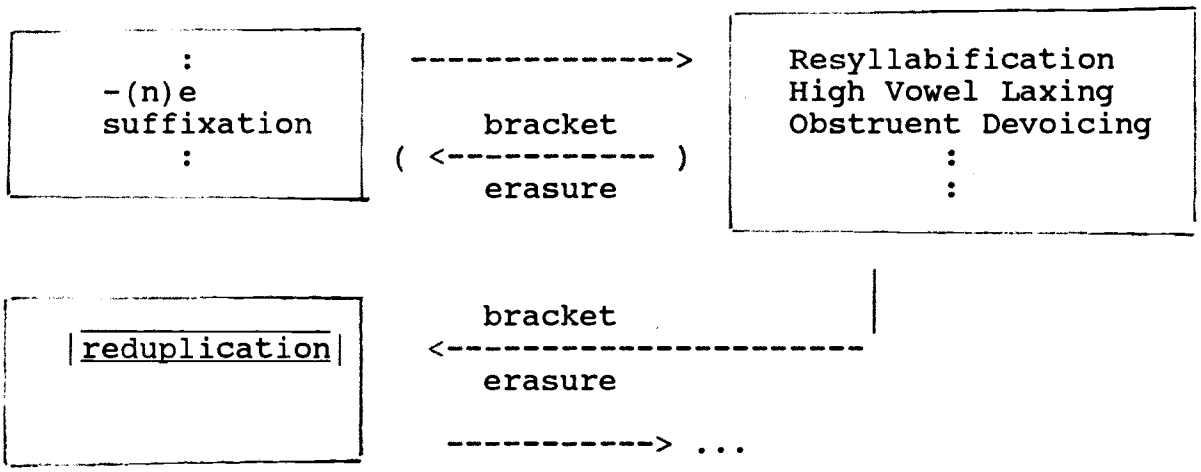
7)

unaffixed	Demonstrative	
murItmurIt	muridmurid-e	'students'
buriburi	buriburi-ne	'backs'
bibItbibIt	bibitbibit-e	'origins'
ibuibu	ibuibu-ne	'mothers'
jərU?jərU?	jəru?jəru?-e	'citrus fruits'
bəḍUkbəḍUk	bəḍugbəḍug-e	'mosque drums'

What is interesting about these forms is that High Vowel Laxing and Obstruent Devoicing fail to apply to segments in the closed syllable of the Demonstrative reduplicates. The reduplicated plural of murid-e, for example, surfaces as muridmurid-e, not *murItmurid-e.

Such 'underapplication' of phonological rules should, it seems, be easily accounted for by fixing reduplication on a lexical stratum ordered after the stratum to which High Vowel Laxing and Obstruent Devoicing are assigned. If we expand the diagram shown in (6) to include one more lexical stratum, for reduplication, we have the partial derivational flowchart depicted in (8):

8)

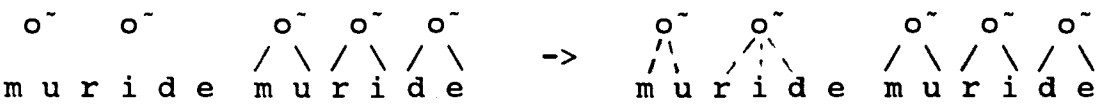


Where there has been no -(n)e suffixation, consonant-final stems undergo High Vowel Laxing and Obstruent Devoicing prior to entering the reduplication stratum. The effects of these rules' application is then unsurprisingly mirrored in the reduplicated portion of forms like murItmurIt. Where -(n)e suffixation has occurred, forms are saved from undergoing High Vowel Laxing and Obstruent Devoicing by Resyllabification, and when reduplication occurs, the reduplicated portion of forms like muridmurid-e is no longer eligible to undergo the application of phonological rules assigned to a prior lexical stratum.

The untenability of such a clean solution to the problem of underapplication of phonological rules to these reduplicated forms nevertheless becomes apparent upon examination of the reduplication algorithm needed to derive the Demonstrative Plurals from their unreduplicated Demonstrative counterparts.

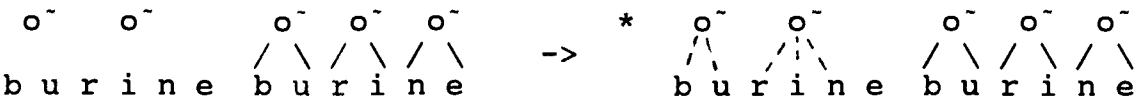
Reduplication of the Demonstrative forms created by the attachment of -(n)e to consonant-final stems results in Demonstrative Plurals like muridmurid-e. If the reduplication algorithm specifies a bisyllabic template to which the segmental melody of murid-e must map, the appropriate Demonstrative Plural is easily derived, as illustrated in (9):

9)



However, if the same procedure is employed to derive the Demonstrative Plural buriburi-ne from buri-ne, a Demonstrative form created by the attachment of -(n)e to a vowel-final stem, the algorithm fails, as illustrated in (10):

10)

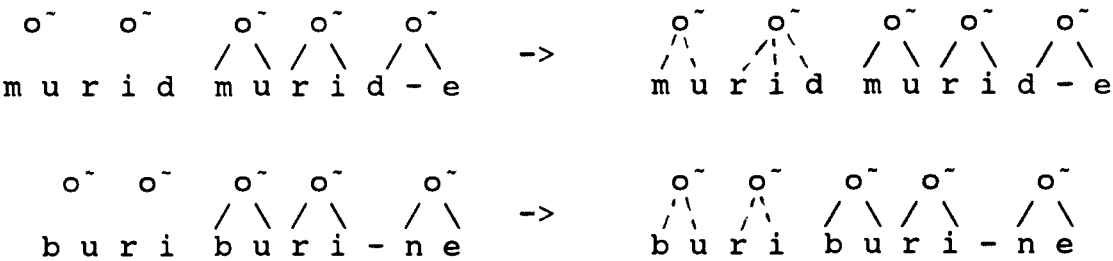


In (10), the nasal segment originating in the Demonstrative suffix has been incorrectly allowed to map to the reduplicative template. In (9) we saw that the template must allow the copies

of consonantal segments that function as onsets in the base to map as codas in the reduplicate. But the misderivation in (10) shows that for Demonstrative forms created by the attachment of -(n)e to vowel-final stems, only the segmental string of the simple stem should be available for copying.

If only those segments to the left of the morpheme boundary are subject to copying, then a unified account of the reduplication process needed to derive all the Demonstrative Plurals is right at hand:

11)

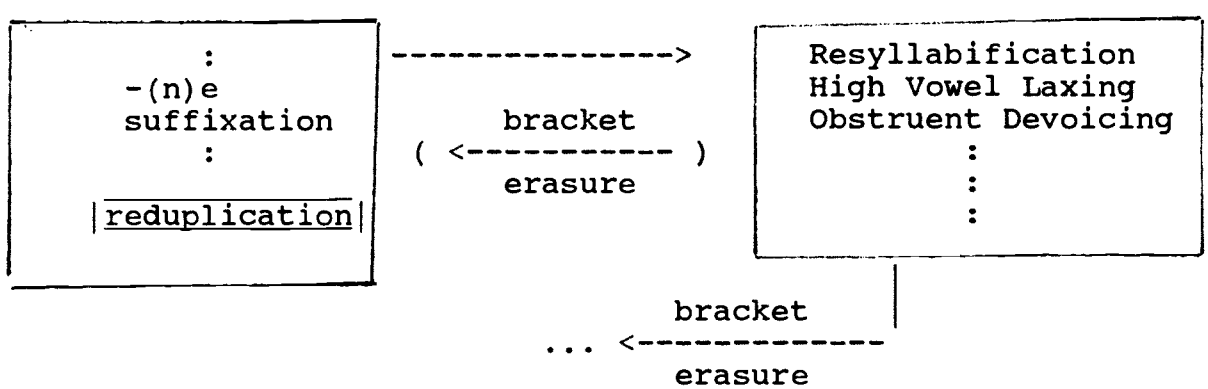


The correct results are achieved by permitting the reduplication algorithm to reference the morpheme boundary separating the segments contributed by the simple stem from the segments contributed by the Demonstrative suffix.

It is precisely here that we run into difficulty with the derivational flowchart proposed above in figure (8). Recall that the Bracket Erasure Convention regularly operates to eliminate access to internal morpheme boundaries at the conclusion of each round of phonological rule application. As reduplication must reference the location of the morpheme boundary that separates the simple stem from the -(n)e suffix in order to determine the extent of its base material, it cannot be the case that reduplication belongs to a lexical stratum ordered any later than the stratum at which -(n)e suffixation takes place.

Figure (12) therefore shows reduplication moved into the same lexical stratum as -(n)e suffixation:

12)

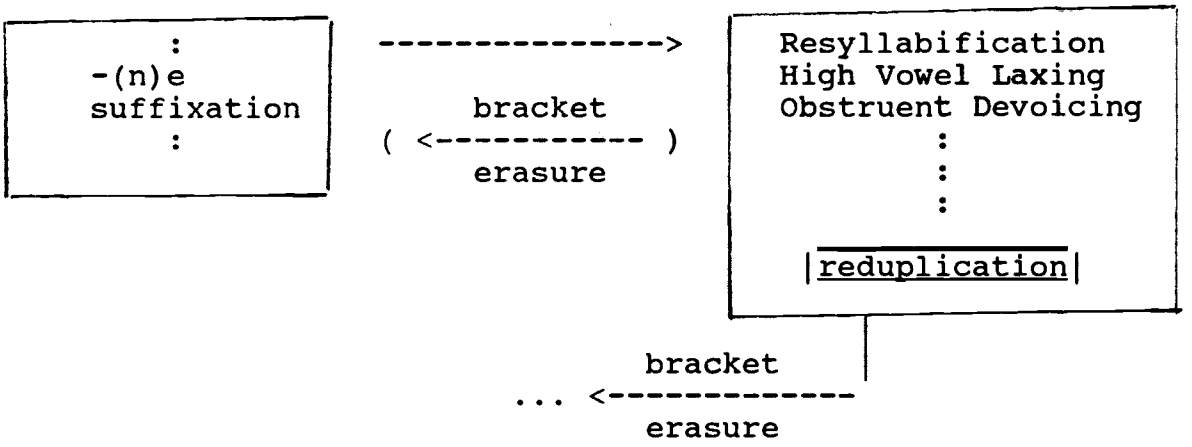


If this stratum is cyclic, then we are no better off than we were when we tried fixing reduplication on a distinct later lexical stratum, as the Bracket Erasure Convention once again makes unavailable to the reduplication algorithm any analysis of the morphological complexity of -(n)e suffixed forms.

If this stratum is noncyclic, then reduplication will have the access it needs to the internal morpheme boundary separating the simple stem from the -(n)e suffix, and will therefore correctly be able to limit its copying domain to just those segments contributed by the simple stem. Note however that the output of the reduplication algorithm will then incorrectly go on to feed the application of phonological rules assigned to this stratum, yielding inappropriate surface forms like *murItmurid-e, where High Vowel Laxing and Obstruent Devoicing have affected segments contained within the closed syllable of the reduplicate.[3]

In short, while the reduplication algorithm's access to the internal morpheme boundary separating the simple stem from the -(n)e suffix must not be sacrificed, reduplication must follow, not precede, the application of the phonological rules assigned to the stratum at which -(n)e suffixation takes place. We are thus left with no other choice but to move reduplication over into the box on the righthand side of the Lexical Phonological diagram of this stratum, as shown in figure (13):

13)



Only if reduplication is situated among the phonological rules of this stratum, as opposed to being ordered among the affixational rules, can the necessary access to morpheme boundary locations be maintained for reduplication while allowing forms to undergo Resyllabification, where applicable, or to undergo High Vowel Laxing and Obstruent Devoicing, where applicable, before being submitted to the reduplication algorithm.

Endnotes

1. Mohanan (1986) points out that the arguments presented in Kiparsky (1982) and in Mohanan (1982) in favor of allowing internal boundary brackets to remain accessible through multiple phonological cycles on a single stratum are upon closer inspection without force, since the affixation rules which appeared to be sensitive to the presence of internal boundary brackets all belong to lexical strata that are now recognized to be noncyclic.

2. Dudas (1976) considers the possibility that the distribution of tense and lax high vowels might be accounted for by assuming that high vowels are underlyingly lax and that they are regularly tensed by a rule of High Vowel Tensing when they occur in open syllables. She ultimately rejects such an analysis in favor of the analysis assumed here. It can be noted that in a very closely related dialect, Eastern Javanese, an additional rule of High Vowel Laxness Harmony applies to spread the feature [-tense] (or, more likely, [-ATR]) leftward, resulting in surface mUrIt, bIbIt, etc. The harmonic agreement of high vowels in Eastern Javanese could only clumsily be accounted for under an analysis which assumed that underlying lax vowels were tensed in open syllables. I am indebted to Mrs. Mien Tjahjono for much helpful discussion of the Eastern Javanese dialect.

3. A potential remedy to this problem might involve the reformulation of High Vowel Laxing and Obstruent Devoicing such that they be restricted to apply only in the context of a word-final closed syllable. If these rules are restricted in this way, then segments in the reduplicated portion of muridmurid-e will not be subject to High Vowel Laxing and Obstruent Devoicing because the closed syllable in which they are found is not word-final. But then the vowel laxing and obstruent devoicing observed in non-Demonstrative Plurals like murItmurIt would be left unaccounted for.

References

Dudas, K. (1976) The Phonology and Morphology of Modern Javanese, Doctoral dissertation, University of Illinois.

Kiparsky, P. (1982) 'Lexical Morphology and Phonology,' in the Linguistic Society of Korea (ed.) Linguistics in the Morning Calm, Seoul, Hanshin.

Levin, J. (1983) 'Reduplication and Prosodic Structure,' ms., MIT.

Marantz, A. (1982) 'Re Reduplication,' Linguistic Inquiry 13.3.

McCarthy, J. and A. Prince (1986) 'Prosodic Morphology,' ms., University of Massachusetts, Amherst, and Brandeis University.

Mohanan, K. P. (1982) Lexical Phonology, Doctoral dissertation, MIT.

Mohanan, K. P. (1986) The Theory of Lexical Phonology, Reidel, Dordrecht.

Schlindwein, D. (1988) The Phonological Geometry of Morpheme Concatenation, Doctoral dissertation, USC.