Chapter 6
OTHER PHENOMENA:
REDUPLICATION AND COOCCURRENCE RESTRICTIONS

In this chapter I examine two cases of nasal agreement which may at first be mistaken for
nasal spreading but I argue have properties identifying them as other kinds of
phonological phenomena. The first is a case of nasal agreement in Mbe affixation
(Bangbose 1971), which I show to be an example of reduplication. Evidence for this
conclusion is compiled both cross-linguistically and on the basis of a detailed analysis of
various morpho-phonological phenomena in the language. The second is a condition of
long-distance nasal agreement holding within and across morphemes in certain Bantu
languages (Ao 1991; Odden 1994; Hyman 1995; Piggott 1996). I claim that this should
be classified as an example of a coocurrence restriction, paralleling a set of other
languages in which cooccurrence restrictions over segments having similar but different
properties are resolved by substitution of an identical feature rather than dissimilation.
The direction for the cooccurrence analysis is sketched and the details are left for further
research.

6.1 Reduplication in Mbe

In this case study of Mbe nasal agreement, I argue that what has been (atheoretically)
termed ‘nasal harmony’ in Mbe (Bangbose 1971) is in fact a case of reduplication in
which material is copied as a nasal coda to a prefix with place features linked to the
following onset; if place linking fails, no copy occurs. I demonstrate that this account is
motivated on the basis of various other phenomena in Mbe, and it has implications
illuminating the theory of reduplication. First, the place-linked nasal status of the copied
segment is independently-motivated by conditions on Mbe syllable structure. Second,
the size restriction on the reduplicant can be simply obtained through an atempatic
alignment constraint, AllSyllableLeft, utilized in a ranking producing The Emergence of
the Unmarked (acronymically TETU; McCarthy and Prince 1994b; size-restricor ranking
after Spaelti 1997 with foundation in proposals of McCarthy and Prince 1994a; Prince
1996, 1997). This atempatic account of size-restriction does work elsewhere in the
language in limiting the size of other prefixation, both reduplicative and non-
reduplicative. Further, I show that alternative atempatic approaches to size restriction are
both insufficient and not required. TETU rankings as an analytical mechanism are
pervasive in the account, playing a role not just in the analysis of size restriction but also
in the analysis of reduplication in a second clearly reduplicative prefix.

Another issue that is addressed is the possibility of prespecification in
reduplicative affixes. Analyzing prefixes exhibiting nasal agreement in Mbe as
reduplicative would seem to require admitting prespecified segments in reduplication;
however, evidence from Mbe morphology is added to show that what appears to be
prespecified material in fact belongs to a separate prefix. The analysis thus supports the
claim that fixed segmentism in reduplication is not prespecified but is either
phonologically-determined (i.e. default, derived through TETU rankings) or
morphologically-determined (what McCarthy and Prince term ‘melodic overwriting’)
(McCarthy and Prince 1986, 1990; Urbanczyk 1995, 1996a, b; Alderete et al. 1996;
Spaelti 1997). A more general proposal is introduced to eliminate the emergence of
prespecified material in reduplicative affixes from an extension of the Root-Faith >>

The organization of this section is as follows. First, in section 6.1.1 I present the
nasal agreement data in diminutive prefixation and present arguments that it is not nasal
spreading and should instead be regarded as reduplication. The next section gives
evidence supporting this claim, showing that syllable-size imperative reduplication
exhibits a similar nasal agreement effect. An analysis of imperative reduplication is
developed, and then in section 6.1.3, this analysis is extended to diminutive prefixation.
Evidence is given to show that prefixation in diminutive nominals is complex, consisting
of a purely reduplicative affix and a separate non-reduplicative segmental affix; an
alternative single reduplicative affix with prespecified material is insufficient. It is argued
that what distinguishes the syllable-size reduplication in the imperative and coda/null
size reduplication in the diminutive is simply the ranking of morpheme realization
constraints. In 6.1.4, the analysis of diminutives is extended to nasal agreement in the
formation of inchoative verbs. Section 6.1.5 gives data from Zoque which shows that a
morpheme realization constraint is violated under similar phonological conditions in
another language. 6.1.6 examines the role of the atempatic size-restricor constraint in
other affixation in Mbe, and 6.1.7 presents arguments that templatic alternatives are
inadequate. Finally, section 6.1.8 addresses the general question of prespecification in
reduplication and develops a proposal to eliminate prespecification effects. 6.1.9 forms
an appendix, presenting a constraint hierarchy which derives the coda condition in
Mbe.

1 Building on McCarthy and Prince (1986), Alderete et al. (1996) suggest that melodic overwriting
can occur when RED competes with another morpheme for the same space. Spaelti’s (1997)
syllable recycling builds on a somewhat similar idea, while seeking to explain what enforces the
anchoring violation in the output shape of RED.
6.1.1 Nasal agreement in diminutive nouns

Mbe is a Benue-Congo language spoken in the Ogoja Province of Eastern Nigeria. Mbe exhibits a remarkable nasal agreement in diminutive formation. In Mbe, singular diminutive nominals are usually formed with a prefix of the form \[kE^\] (see second column in (1)). Vowel harmony produces a \[ka^\] variant before syllables containing \[a^\]. In their non-diminutive form, nouns occur not as a bare root but with a prefix marking number category (singular or plural; see first column in (1)). Mbe is a 'class' language with seven noun classes, and agreement also takes place in non-diminutive formation. The diminutive tonal patterns are complex and will not be analyzed here.

(1)

<table>
<thead>
<tr>
<th>Singular noun</th>
<th>Diminutive singular</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. bu$-tÉSiê</td>
<td>'head'</td>
</tr>
<tr>
<td>b. le$-bE@l</td>
<td>'breast'</td>
</tr>
<tr>
<td>c. bE$-liÊe</td>
<td>'food'</td>
</tr>
<tr>
<td>d. e$-fu@fu@</td>
<td>'sweat'</td>
</tr>
<tr>
<td>e. e$-kiôkE$l</td>
<td>'finger nail'</td>
</tr>
<tr>
<td>f. le$-ba$ro$</td>
<td>'liver'</td>
</tr>
</tbody>
</table>

(2)

<table>
<thead>
<tr>
<th>Singular noun</th>
<th>Diminutive singular</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. e$-ba$m</td>
<td>'bag'</td>
</tr>
<tr>
<td>b. bu$-mu$</td>
<td>'story'</td>
</tr>
<tr>
<td>c. ka$M-fa$N</td>
<td>'little path'</td>
</tr>
<tr>
<td>d. bu$-tE$m</td>
<td>'heart'</td>
</tr>
<tr>
<td>e. e$-re$n</td>
<td>'fruit'</td>
</tr>
<tr>
<td>f. le$-lE@m</td>
<td>'tongue'</td>
</tr>
</tbody>
</table>

It is reasonable to question what kind of phonological mechanism produces this complex effect. It may be that spreading is involved, but the question needs more study. In Mbe, the nasal prefix is homorganic with the following onset, as shown in the examples above. This nasal prefix is syllabic and is realized as \[n\] before \[s, tÉS, dÉS\] and as \[\] before \[j, \] (Bamgbose 1971: 10).

(3)

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The above data show the formation of the diminutive when the noun stem contains no nasal segmental material. If the noun contains a nasal, the diminutive is formed as above but closed with a nasal stop which is homorganic with the following onset.

(4)

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</tr>
</tbody>
</table>

In Mbe, a variety of nasal agreement also takes place in diminutive formation. The diminutive and nominative are complex and will not be analyzed here. In Mbe, the nasal prefix is homorganic with the following onset, as shown in the examples above. This nasal prefix is syllabic and is realized as \[n\] before \[s, tÉS, dÉS\] and as \[\] before \[j, \] (Bamgbose 1971: 10).

(5)

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The above data show the formation of the diminutive when the noun stem contains no nasal segmental material. If the noun contains a nasal, the diminutive is formed as above but closed with a nasal stop which is homorganic with the following onset.
harmony summarized in chapter 2, spreading of [+nasal] between segments at an unlimited distance is unattested. Given these arguments we are left with the possibility that Mbe nasal agreement is produced by reduplication. But this does not look like a typical case of reduplication. Reduplicative affixation ... as a coda or fails to be copied at all. There also is a fixed segmental component to the formation of diminutives ([kE]), which may seem to suggest that the prefixation is not reduplicative; indeed the fixed segmental component has led a previous analyst to reject the possibility of a reduplication account (Bamgbose 1971:102).

Based on the arguments against spreading and the properties consistent with segment copying, I come to the interim conclusion that the nasal agreement is an instance of reduplication, not nasal feature spreading. In the remainder of this section I will show that analyzing nasal agreement in Mbe as nasal copy is both plausible and motivated, and it has important implications for the theory of reduplication.

6.1.2 Nasal copy in imperative verbs

Independent evidence for the nasal agreement phenomenon as a case of nasal copy comes from a pattern of reduplication that I have dubbed nasal copying. Nasal copying is seen in the following.

<table>
<thead>
<tr>
<th>Simple verb form</th>
<th>Reduplicative verb form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ru^ ru^</td>
<td>-ru^</td>
<td>'pull'</td>
</tr>
<tr>
<td>b. tÉSiÊ tÉSiÊ</td>
<td>-tÉSiÊ</td>
<td>'help put on head'</td>
</tr>
<tr>
<td>c. ge^</td>
<td>-ge^</td>
<td>'belch'</td>
</tr>
<tr>
<td>d. lç^</td>
<td>-lç^</td>
<td>'burn'</td>
</tr>
<tr>
<td>e. kÉpa^</td>
<td>-kÉpa^</td>
<td>'hang'</td>
</tr>
<tr>
<td>f. fu^</td>
<td>-fu^</td>
<td>'blow'</td>
</tr>
<tr>
<td>g. tÉSu^e</td>
<td>-tÉSu^e</td>
<td>'bore (hole)'</td>
</tr>
<tr>
<td>h. SiÊe</td>
<td>-SiÊe</td>
<td>'sell'</td>
</tr>
<tr>
<td>i. ju@bo^</td>
<td>-ju@bo$</td>
<td>'go out'</td>
</tr>
<tr>
<td>j. gÉba@riÊ</td>
<td>-gÉba^riô</td>
<td>'embrace'</td>
</tr>
<tr>
<td>k. bç@ro^</td>
<td>-bç@ro$</td>
<td>'help'</td>
</tr>
<tr>
<td>l. ta@ro^</td>
<td>-ta@ro$</td>
<td>'throw'</td>
</tr>
<tr>
<td>m. so@ro^</td>
<td>-so@ro$</td>
<td>'descend'</td>
</tr>
<tr>
<td>n. ku@Elo^</td>
<td>-ku@Elo$</td>
<td>'nibble at'</td>
</tr>
<tr>
<td>o. pu@abriÊ</td>
<td>-pu^abriô</td>
<td>'stray'</td>
</tr>
<tr>
<td>p. SiêariÊ</td>
<td>-SiÊariô</td>
<td>'scatter'</td>
</tr>
</tbody>
</table>

The data in (4) show that if the verb contains a nasal, the reduplicative prefix is formed as above but closed with a nasal stop homorganic to the following onset.

The data in (4) show that if the verb contains a nasal, the reduplicative prefix is formed as above but closed with a nasal stop homorganic to the following onset.

6.1.2 Nasal copy in imperative verbs

Moreover, and this important information for the theory of reduplication underlies the occurrence of nasal agreement in Mbe as a nasal copy is both plausible and motivated.

The occurrence of nasal agreement in Mbe is seen as a nasal copy, as seen in the following.

<table>
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<tr>
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<tbody>
<tr>
<td>a. biÊem</td>
<td>-biÊem</td>
<td>'believe'</td>
</tr>
<tr>
<td>b. ju^en</td>
<td>-ju^en</td>
<td>'learn'</td>
</tr>
<tr>
<td>c. dÉzu^çN</td>
<td>-dÉzu^n</td>
<td>'be higher'</td>
</tr>
</tbody>
</table>

The tone pattern for a reduplicative form of a simple monosyllabic Class 2 verb is FF. If the simple verb is disyllabic, the reduplicative form has the tone pattern FHL for verbs ending in [o] and FFL for verbs ending in [i] (Bamgbose 1967a: 185).
d. gÉbe@no^ gÉb´^NÉm
  'collide'

e. ba@mo^ b´^m
  'hide'

f. pu@çniÊ pu^m
  'mix'

g. jiêçniÊ jiʯ
  'forget'

h. lu@oniÊ lu^n
  'repair'

i. kÉpo@mniÊ kÉpu^NÉm
  'congeal'

In imperative reduplication, the nasal agreement is unambiguously segmental copy. Aspects of the analysis of this reduplication phenomenon will prove to provide explanation for the similar nasal agreement phenomenon in the diminutive nominals. Accordingly, I will present an analysis of the imperative cases and then return to the diminutives.

In the analysis of Mbe reduplication, an important role will be played by rankings producing The Emergence of the Unmarked (McCarthy and Prince 1994b, 1995). The ranking schema for TETU effects in reduplication is given in (5):

(5) Faith-IO >> Phono-Constraint >> Faith-BR

Because Faith-IO dominates the Phono-Constraint (penalizing some 'marked' structure or enforcing alignment), the effect of the Phono-Constraint is not apparent in general, i.e. it will not affect the root material. Faith-BR, on the other hand, the expression of reduplication, does not make a distinction between structure preserving and copying and can induce BR correspondence violations. This produces an 'Emergence of the Unmarked' in reduplication.

The syllable-size reduplication in imperative verbs can be obtained through a TETU ranking. Spaelti (1997) observes that this can be achieved templatically using an alignment constraint: A \( L \) \( L \) \( L \) (for other applications of this constraint see Mester and Padgett 1994; Itô and Mester 1997a; Kurisu 1998; a similar approach using all-foot-alignment to obtain to foot-size reduplicants is employed by McCarthy and Prince 1994a; Prince 1996, 1997).

(6) A \( L \) \( L \) \( L \) : ALIGN

The restriction of reduplicants to one syllable is a TETU effect, that is, it is an occurrence of unmarked structure in reduplication that does not otherwise limit forms in the language. On the other hand, constraints on syllable structure and morpheme realization rule out alternatives copying less than a syllable, such as \[ j- jubo \] and \[ jubo \].

The restriction is illustrated in (8) ( tones are omitted here). Since MAX-10 dominates the Phonocomposition constraint (which of course is not present in this example), the alternation is caused by ALIGN between and syllable COPY.

(7) MAX-10 >> ATTIL >> MAX-BR

Because Faith-IO dominates the Phonocomposition constraint, the output is determined only by the ranking of the Faith constraints. This produces an emergence of the unmarked structure in reduplication that does not otherwise limit forms in the language.

Some examples of homorganic nasals outside of reduplication are given in (9) (with syllabic nasal prefix in c-e):

b. ju- jubo
  ***

c. ju- ju- b!o
  *
The TETL Indicating that vowels in stems not reduplicated are retained.

(1) TETL TWO contiguous vowels linked to distinct onsets are permitted.

Because CODACOND is respected throughout the Mbe language, it must outrank MAX-BR and Faith-IO (I assume MAX-IO). This is shown for BR faith in (11) for the imperative form of [fuel].

(11) NON-BR

CODACOND

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
</tbody>
</table>
| p in -fuel | fu- | ful-

Since a stem nasal can be copied but may end up changing its place specification in the reduplicant, MAX-BR must outrank the base-reduplicant place identity constraint. Therefore, a nasal can be copied but may not change its place specification.

(12) NON-BR

CODACOND

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>e-</td>
<td>-e</td>
<td>-e</td>
</tr>
<tr>
<td>e-</td>
<td>-e</td>
<td>-e</td>
</tr>
<tr>
<td>e-</td>
<td>-e</td>
<td>-e</td>
</tr>
</tbody>
</table>

Before going on to explore how the reduplication and syllable-size restriction can lend explanation to nasal agreement in diminutive formation, I will briefly examine two TETU effects concerning vowels in stems.

(13) NODEIPH: Two tautosyllabic moras linked to distinct vowels are prohibited.

The TETU ranking which permits diphthongs in stems but not reduplicants is given in (14). Its effect is illustrated in (15).

(14) MAX-IO >> NODEIPH >> MAX-BR

From Bamgbose's data it also appears that within the domain of [prefix + root] there are no examples of tandem consonants before a /-ni/ suffix. Exemplars of tandem consonants before a /-ni/ suffix are:

- [ka@] 'dig'
- [we@l] 'drive away'
- [Siêçr] 'sneeze'
- [tu@çm] 'send'

Examples of root-final consonants before a C-initial suffix are:

- [ju$ab] 'be washing'
- [fu$el] 'be blowing'
- [tÉsç&r] 'be carrying'
- [jiÛEm] 'be singing'

11 Examples of word-final consonants are: [ka@b] 'dig', [we@l] 'drive away', [Siêçr] 'sneeze', [tu@çm] 'send'.

12 It is conceivable that CODACOND outranks DEP-IO rather than MAX-IO, but there are no alternating forms for which this can be tested. Thanks to Kazutaka Kurisu for raising this point.
No diphthongs in reduplication

\[ \text{RED-} \]

MAX-IO NODIPH >> MAX-BR

\[ + \]

a. \[ \text{bim} \]

b. \[ \text{bim} \]

\[ *! \]

It should be noted that since imperative reduplication skips the second member of the diphthong and copies the non-contiguous nasal, \( \text{MAX-BR} \) must outrank \( \text{BASE-CONTIGUITY} \) (McCarthy and Prince 1995: 371).\(^{13}\)

The second TETU effect for vowels concerns the occurrence of \[ \text{´} \] in place of all non-high vowels in the reduplicant. This can be seen as an effect of the markedness of \[-high\] vowels in relation to \ [+high\] ones. This markedness is encapsulated in the following ranking (see Beckman 1995 for another application of this ranking):

\[ *[-high] >> *[+high] \]

(i.e. *[e], *[o] >> *[i], *[u])

While \ [+high\] vowels are less marked than \[-high\] ones, the mid-central vowel \[ \text{´} \] also has a default character. To explain this, I will assume that \[ \text{´} \] is a vowel unspecified for height features. The feature \[-high\] thus does not occur in reduplicants. This is obtained by the TETU ranking in (17a). On the other hand, \ [+high\] vowels do copy faithfully, motivating the ranking in (17b). The substitution of \[ \text{´} \] rather than \[ i \] or \[ u \] for \[-high\] vowels in reduplicants is compelled by *\[+high\]. Even though this markedness constraint is low-ranked, it is violated by high vowels but not by the heightless \[´\].

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ a \]

\[ \text{l´} \]

\[ *! \]

d. \[ \text{l´} \]

e. \[ \text{lu} \]

\[ *! \]

\[ *! \]

The tableau in (18) illustrates the outcome for stems containing a \[-high\] vowel:

\[ \text{RED-} \]

IDENT-IO >> IDENT-BR >> *-BR

\[ + \]

a. \[ \text{l´} \]

b. \[ \text{lu} \]

\[ *! \]

\[ *! \]

c. \[ \text{lç} \]

d. \[ \text{l´} \]

e. \[ \text{lu} \]

\[ *! \]

\[ *! \]

The tableau in (19) shows the faithful copying of \ [+high\] vowels:

\[ \text{RED-} \]

IDENT-IO >> IDENT-BR >> *-BR

\[ + \]

a. \[ \text{ru} \]

b. \[ \text{r´} \]

\[ *! \]

\[ *! \]

Three TETU rankings have now been established for the imperative reduplication; one producing the limitation to a syllable in size, and two producing unmarked vocalic structures. These rankings are summarized in (17).\(^{13}\)

\[ \text{RED-} \]

IDENT-IO >> IDENT-BR >> *-BR

\[ + \]

\[ * \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ a \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ b \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ c \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ d \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ e \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ f \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ g \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ h \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ i \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ j \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ k \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ l \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ m \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ n \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ o \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ p \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ q \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ r \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ s \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ t \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ u \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ v \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ w \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ x \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ y \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]

\[ z \]

\[ \text{IDENT-IO}[\pm \text{high}] >> *[-\text{high}] >> \text{IDENT-BR}[\pm \text{high}] >> *[+\text{high}] \]
In the next section I explore how aspects of the analysis of the imperative reduplication can lend insight to the nasal agreement phenomenon seen in the formation of diminutive nominals.

6.1.3 Back to diminutives: Another pattern predicted by ALLS

The previous section presented a clear case of reduplication in imperative verbs. Interestingly, the imperative and diminutive formations have in common that a coda is only added to the prefix when a nasal appears in the following syllable. However, this is not the case for the following nasal effects. In nasal prefixation, nasal constraints are paramount in reduplication. The cross-linguistic evidence in the formations of diminutive nominals shows a similar pattern. The nasal environment can determine the nasal realization constraints.

Let us review the key points of formation of diminutive nominals. Singular diminutives are formed with a prefix [-ke] ([ka] if [-a] occurs in the following syllable). If there is a nasal in the noun stem, then the prefix is closed with a nasal coda homorganic to the following onset. Tonal changes also take place in diminutive formation. Some examples from (1-2) are repeated below.

(22) a. -ke &- bE^l 'little breast'
   b. -ke$-fu@fu@ 'little sweat'
   c. -ka$m- ba$m 'little bag'
   d. -ke&n-tE@m 'little heart'
   e. -ke@N-ku$çm 'little snake skin'
   f. -ke@NÉm-gÉbe@no@ 'little upper arm'

Bamgbose (1966a: 48) notes that plural diminutive nouns are formed in the same way, but with [-ke] as the fixed portion of prefixation. If prespecification in reduplicative affixes were excluded, the limitation of fixed material to default segments would be explained.

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In the following sections, I argue that the cross-linguistic evidence for nasal effects in reduplication phenomena supports the atemporal TETU approach to size limiters in reduplication. Some examples from (1-2) are repeated below.

(22) a. -ke &- bE^l 'little breast'
   b. -ke$-fu@fu@ 'little sweat'
   c. -ka$m- ba$m 'little bag'
   d. -ke&n-tE@m 'little heart'
   e. -ke@N-ku$çm 'little snake skin'
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Bamgbose (1966a: 48) notes that plural diminutive nouns are formed in the same way, but with [-ke] as the fixed portion of prefixation. If prespecification in reduplicative affixes were excluded, the limitation of fixed material to default segments would be explained.
The next point concerns nominal classes in Mbe. Recall that Mbe has seven primary nominal classes, which determine the form of number category prefixes and syntactic agreement markers. Bamgbose ... thus match those for Class 4. To illustrate syntactic agreement, an example of a thematic concord marker \[kukue\] (sg.) for a non-diminutive Class 4 noun is given in (25).

```
(25) ke\$-tçar kükue n\$-kiêle\$
'It was a duiker that I saw'
```

Interestingly, the Class 4 nominal prefixes, \[kE\]- (singular) and \[ke\]- (plural), precisely match the fixed segmentism in the singular and plural diminutive formation; however, non-diminutive Class 4 nouns do not ... counterparts when they do not contain a nasal, although they are generally distinguished by tonal properties (26b).

```
(26) Class 4 (non-diminutive)

a. ke\$-tE$m    ke\&n -tE$m
'axe'          'little axe'

b. ke\$-ciô  ke\& -ciê
'stick'        'little stick'
```

Given that diminutives are Class 4 and have prefixal material identical to the usual Class 4 prefixes, I conclude that the \[kE\]-/\[ke\]- portion of diminutive formation is a Class 4 prefix, not part of the diminutive morpheme itself. I suggest that the phonological constituency of the diminutive ... segmental component (i.e. the coda nasal). This gives a modular view of diminutive formation, as shown in (27).

```
(27) Diminutive morpheme

\[\text{Diminutive} / \text{RED} / \text{Tonal pattern} / \text{Diminutive} \]
```

The derived diminutive nominal is Class 4 and thus takes the \[kE\]-/\[ke\]- prefixes. This complex structure analysis explains the uniformity of Class 4 and diminutive affixes and agreement markers. If the \[kE\]/\[ke\] material were a prespecified part of a reduplicative diminutive affix, this homophony would be accidental.

With the structure of diminutive formation now established, I turn to deriving the size of the reduplicative component of the diminutive morpheme. The diminutive reduplicant is restricted to filling a ... morpheme realization constraints from Samek-Lodovici 1992, 1993; Gnanadesikan 1996; Rose 1997; cf. also Hendricks 1998).

```
(28) REALIZEMORPH:

i. A morpheme must have some phonological exponent in the output. For morphemes composed of modular components in the input, each modular component must have some phonological exponent in the output.

(29) RE/MORPH:

Follows from (28) [with foundation in monomorphic realization constraints from Samek-Lodovici 1996, Rose 1997, cf. also Hendricks 1998].

In order to understand how these two extension conditions are invoked, we need to call on our understanding of the structure of the diminutive form. The diminutive is derived from the thematic concord marker of the diminutive morpheme. The diminutive with the thematic of diminutive concord now exponents I aim to deriving the diminutive whose thematic concord form would be accentual.

The diminutive, the thematic concord form is Class 4. If the [\(\text{RED}\)] material were a prespecified part of a reduplicative diminutive affix, this homophony would be accidental. If the [\(\text{RED}\)] material were a prespecified part of a reduplicative diminutive affix, this homophony would be accidental. If the [\(\text{RED}\)] material were a prespecified part of a reduplicative diminutive affix, this homophony would be accidental.
one violation will be incurred for each component for which there is no phonological exponent in the output, i.e. in diminutive or imperative formation, there will be one violation if a syllable fails to be realized; if neither copy or the tone pattern appears in the output, two violations will be accrued.

In imperative reduplication, both the reduplicative and tonal components of the morpheme always have some phonological exponence in the output. In the case of the reduplicative component, this takes place at the cost of $\text{ALL}\text{L}$, since the reduplicative material adds a syllable to the word. This motivates the ranking in (29) (I assume that morpheme realization constraints may be specific to particular morphemes).

(29) $\text{REALIZEMORPH}_{\text{imp}} \gg \text{ALL}\text{L}$

In contrast to the imperative, realization demands for the diminutive morpheme cannot compel the addition of a syllable. Reduplication occurs in diminutive formation only when material can be copied without adding a syllable (i.e. material is copied as a coda or not at all). $\text{ALL}\text{L}$ must thus outrank the diminutive realization constraint:

(30) $\text{ALL}\text{L} \gg \text{REALIZEMORPH}_{\text{dim}}$

Copy of a nasal along with tonal changes in the diminutive is illustrated in (31). The constraint hierarchy in this tableau combines the morpheme realization ranking in (30) with the TETU size-restriction ranking established earlier ($\text{MAX-IO} \gg \text{ALL}\text{L} \gg \text{MAX-BR}$). In the input, the complex constituency of the diminutive nominal is shown in the tableau.

Candidate (d) in (31) shows that the ranking of $\text{MAX-IO}$ over $\text{ALL}\text{L}$ compels retention of input segments in the output, even though this produces an output containing more than one syllable. However, as apparent from candidate (e), the ranking of $\text{ALL}\text{L}$ over $\text{MAX-BR}$ in this case precludes copied material from producing more than the two syllables required to accommodate input segments. The winning candidate in (a) is one of two possible TETU size restrictions that can emerge from $\text{ALL}\text{L}$: here reduplication is restricted in size to adding at most two syllables to the word. This motivates the tableau (31).

Candidate (a) over candidate (d) by holding the necessary tonal pattern. Candidate (e) loses because it fails to copy any material and realizing the necessary tonal pattern. Candidate (c) loses because it fails to realize the necessary tonal pattern.

The tableau in (32) illustrates a case where reduplication fails in the diminutive. For this input, there is no nasal to copy as a coda. Since the coda condition prohibits nasal copies and the constraint hierarchy in (31) prevents any infinitive tonal changes, the winning candidate in (32) is the one that satisfies $\text{REALIZEMORPH}$ through copying segments on the noun stem.

(32) $\text{REALIZEMORPH} \gg \text{ATTCL}$

The tableau in (33) shows that the ranking of $\text{REALIZEMORPH}$ over $\text{ATTCL}$ compels realization of the whole morpheme.

(33) $\text{REALIZEMORPH} \gg \text{ATTCL}$
null copy fails on the independent demand of CODACOND. Second, the TETU approach to the size restriction on imperative reduplications can also explain the size-restriction seen in the diminutive.

The tableau in (33) shows how the different rankings of REALIZEMORPH allow the diminutive to impose the TETU size-restriction, while the imperative does not.

The motivation for the analysis of reduplicative imperatives is now fold. First, we were secure that the changes in the diminutive can result from applying the TETU size-restriction on imperative reduplications. Now we can apply the TETU size restriction to the diminutive reduplications as well.

The constraint hierarchy obtaining this result is given in (34).

(34) Size-restriction ranking summary

MAX-IO, REALIZEMORPHimp >> ALLs >> MAX-BR, REALIZEMORPHdim

The motivation from the analysis of reduplicative imperatives for the reduplication account of the diminutive is now two-fold. First, we have seen that the limitation on nasal copy falls out from the independent demand of CODACOND. Second, the TETU approach to the size-restriction on imperative reduplications can also explain the size-restriction seen in the diminutive.

The motivation for the analysis of reduplicative imperatives is now fold. First, we were secure that the changes in the diminutive can result from applying the TETU size-restriction on imperative reduplications. Now we can apply the TETU size restriction to the diminutive reduplications as well.

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would be an example of the marked' reduplication described in [1].

He obtains this single consonant copy pattern by ranking ALL $\begin{array}{c} 
\end{array}$o
over a constraint requiring that the left edge of the reduplicant be aligned to the left edge of some syllable, $\begin{array}{c} L \text{ALIGN} \text{(RED, L, } s, \text{ L).} \end{array}$ The tableau in (36) illustrates the analysis (from Spaelti 1997: 165). (For a full analysis of the details of reduplication in Rebi, see Spaelti 1997.)

(36) Syllable recycling in Rebi West Tarangan

RED - $\begin{array}{c}
\text{tapuran}
\end{array}$

ALL $\begin{array}{c}
\text{s}
\end{array}$

$L \text{ALIGN} \text{(RED, L, } s, \text{ L)}$

+a.

$\begin{array}{c}
ta \text{pur} \text{»puran}
\end{array}$

b.

$\begin{array}{c}
ta \text{pur} \text{puran}
\end{array}$

The analysis of nasal copy in Mbe diminutive formation draws on Spaelti's idea of using minimization of the number of syllables in the word to achieve reduplication that does not add a syllable. In Rebi, single consonant copy is prevented when the preceding syllable is not a complex coda. Mbe diminutive reduplication thus violates morpheme realization rather than add a syllable to the word ($\begin{array}{c} \text{REALIZEMORPH} \gg \text{ALL } \text{s} \text{L}. \end{array}$) The case of CVC copy in Rebi is illustrated in (37).

(37) CVC copy driven by morpheme realization

RED - $\begin{array}{c}
pajlawa
\end{array}$

REALIZEMORPH

ALL $\begin{array}{c}
\text{s}
\end{array}$

$L$

+a.

$\begin{array}{c}
pajlaw»lawan
\end{array}$

b.

$\begin{array}{c}
paj»lawan
\end{array}$

In addition to always realizing a reduplicant, Rebi West Tarangan is distinct from Mbe in always choosing the segment following the stressed vowel to copy rather than the leftmost base segment (demanded by $\begin{array}{c} \text{LEFT-ANCHOR-BR}; \text{ McCarthy and Prince 1995}. \end{array}$) Drawing on a proposal of Moore (1996), Spaelti (1997) notes that this can be explained by the ban on geminates in West Tarangan.19 The tableau in (38) illustrates the approach (from Spaelti 1997: 30).

(38) Copy of second consonant after site of reduplicant

Unlike Rebi, Mbe diminutive reduplication copies the first eligible segment (a nasal) in the base, even if this produces adjacent identical nasal segments (e.g. $\begin{array}{c}
\text{[kEm$\text{m$]} \text{ 'little story', [kEm$m$]} \text{ 'little neck', [kEn$\text{n$]} \text{ 'little bird', [kE$n$]} \text{ 'little thing}; \text{ Bamgbose 1971: 48}. \end{array}$) Since Bamgbose notes that coda nasals are always homorganic with a following onset consonant, these nasals could reasonably be treated as geminates, in which case $\begin{array}{c} \text{ANCHOR-L dominates NOGEMINATE}. \end{array}$20 However, as noted earlier (in relation to tableau (31)), left anchoring is violable when the only nasal occurs elsewhere in the base. $\begin{array}{c} \text{ANCHOR-L must thus be dominated by either MAX-BR or}
\end{array}$

To review, the 'syllable recycling' phenomenon in Rebi West Tarangan reduplication has in common with Mbe diminutive reduplication the copy of a single consonant to form a syllable coda, and in both languages this can be handled with the templatic size-restrictor constraint, $\begin{array}{c} \text{ALL } \text{s} \text{L}. \end{array}$
6.1.4 Nasal agreement in inchoative verbs

An important claim underlying the account of the diminutive is its complex formation, consisting of a componential + RED material and the nasal agreement of diminutive nouns. First, (39) shows that inchoative verbs are usually formed with a prefix [re-]:

<table>
<thead>
<tr>
<th>Simple verb form</th>
<th>Gloss</th>
<th>Inchoative form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ta$</td>
<td>'touch'</td>
<td>re^ta$</td>
<td>'has started to touch'</td>
</tr>
<tr>
<td>kE@l</td>
<td>'look'</td>
<td>re^kE@l</td>
<td>'has started to look'</td>
</tr>
<tr>
<td>ka@b</td>
<td>'dig'</td>
<td>re^ka@b</td>
<td>'has started to dig'</td>
</tr>
</tbody>
</table>

In (40) we see that if the verb contains a nasal, it is copied as a coda to the [re-] prefix (note that [e] reduces to [ʼ] in a closed syllable).

<table>
<thead>
<tr>
<th>Simple verb form</th>
<th>Gloss</th>
<th>Inchoative form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>tu@çm</td>
<td>'send'</td>
<td>rʼ^tu@çm</td>
<td>'has started to send'</td>
</tr>
<tr>
<td>kE$n</td>
<td>'walk'</td>
<td>rʼ^kE$n</td>
<td>'has started to walk'</td>
</tr>
<tr>
<td>jiêçniÈ</td>
<td>'forget'</td>
<td>rʼ^-jiêçniô</td>
<td>'has started to forget'</td>
</tr>
</tbody>
</table>

Given the arguments against prespecification in reduplicative affixes and the complex structure proposed for diminutive formation, it is reasonable to posit a complex structure for inchoative verb formation as well:

(41) Inchoative verbs:  
re + RED + verb stem

As in the case of diminutives, there is evidence from the morphology of Mbe supporting the analysis of the nasal agreement in inchoative formation as a separate prefix.

(42) a. Remote Past (sg.)  
Gloss | re²ta@ | 'had touched' |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>re²jiêEm</td>
<td>'had sung'</td>
<td></td>
</tr>
</tbody>
</table>

b. Past Continuous (sg.)  
Gloss | re²ke@-ta | 'was touching' |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>re²ke@-jiôEmo@</td>
<td>'was singing'</td>
<td></td>
</tr>
</tbody>
</table>

c. Future (sg.)  
Gloss | re²ke@-ta$ | 'will touch' |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>re²ke@-jiêEm</td>
<td>'will sing'</td>
<td></td>
</tr>
</tbody>
</table>

d. Future Continuous (sg.)  
Gloss | re²ke@-ta@ | 'will be touching' |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>re²ke@-jiôEmo@</td>
<td>'will be singing'</td>
<td></td>
</tr>
</tbody>
</table>

Since the [re] segmentism occurs in the formation of a variety of verbal tense/aspect forms, I hypothesize that it is not segmental material specific to the inchoative morpheme, but rather it has some more general function across these verbal forms (although the precise nature of the function and meaning of [re] requires further research). This leaves an inchoative morpheme consisting of just RED and tonal information, matching the structure proposed in (41) above.

Reduplication in inchoative formation takes place only when material can be copied without adding a syllable, as established in the analysis of diminutives.

Reduplication in inchoative formation is thus limited to the following verbs:

- [re$-ta$]
- [re$-jiêEm]
- [re$ke@-ta$]
- [re$ke@-jiêEm]

Reduplication in inchoative formation takes place only when material can be copied without adding a syllable. As established in the analysis of diminutives, this pattern is obtained when the size-restricting constraint ALLL outranks morpheme-realization. This motivates the following ranking:

(43) ALLL >> REALIZEMORPHInc

The inchoative data thus strengthens the reduplication analysis of nasal agreement by presenting independent support for a separate prefix with fixed material to which a nasal reduplicative affix may form a complex structure composed of a componential diminutive morpheme and a separate nominal class consisting of a componential diminutive morpheme and a separate nominal class containing the nominal material.

An important claim underlying the account of the diminutive is its complex formation.
6.1.5 Independent evidence for REALIZEMORPH: Zoque

Violable morpheme realization constraints play an important role in achieving coda/null-copy in diminutive and inchoative in synthetic languages. In this section I show that prefixation in Zoque (Zoquean; Southern Mexico) provides cross-linguistic support for a violable REALIZEMORPH constraint.

In Zoque, morpheme realization fails when a nasal pronominal prefix fails to undergo place assimilation to a following consonant. Data and description are from Wonderly (1951), and for previous phonological work on this language see Padgett (1994, 1995c).

The nasal prefix also deletes before /r/ (e.g., /tÉsima/ ‘my calabash’, /tÉSo/ngoja ‘my rabbit’, /kaju/ ‘my horse’). See Padgett (1995c: 64-5) for analysis of the latter cases as place assimilation with gliding.

It is reasonable to posit that the nasal prefix deletes before a continuant consonant because place assimilation has failed to take place (see, for example, Padgett 1994, 1995c). Note, however, that non-homorganic nasals are prohibited before a continuant consonant

In the data in (45), show that the nasal prefix fails to surface before a continuant consonant.


23 The nasal prefix also deletes before /r/ (Wonderly 1951: 121). See Padgett (1994, 1995c) for discussion of place assimilation with gliding.

22 The nasal prefix also deletes before /r/ (e.g., /tÉsima/ ‘my calabash’, /tÉSo/ngoja ‘my rabbit’).

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1-C-PLACE: Onsets license only one C-Place feature.

Both the constraints \( \textit{N}\text{ÉZ} \) and 1-C-PLACE are undominated in Zoque. When they cannot be satisfied in a nasal + continuant consonant cluster, they compel a violation of REALIZEMORPH, that is, the nasal pronominal prefix fails to have a phonological exponent in the output. This is illustrated in (49).

(49) Nasal prefix loss before a continuant

\[
\begin{array}{ccc}
\text{a.} & \text{fa.ha.} & * \\
\text{b.} & \text{nfa.ha.} & ! \\
\text{c.} & \text{MEfa.ha.} & ! \\
\end{array}
\]

In the case of nasal + noncontinuant-obstruent initial clusters, the nasal prefix will undergo place assimilation at the cost of any input place specification to satisfy REALIZEMORPH. REALIZEMORPH must thus outrank IDENT-IO[Place]. Given the richness of the base (Prince and Smolensky 1993: 191), this ranking is needed to derive the correct outcome no matter what the input place of the pronominal prefix.

(50) Nasal prefix place assimilation to following stop

\[
\begin{array}{ccc}
\text{a.} & \text{NÉga.ju.} & * \\
\text{b.} & \text{nga.ju.} & ! \\
\text{c.} & \text{ga.ju.} & ! \\
\end{array}
\]

Finally, because nasal NC clusters syllabify the nasal into a coda, 1-C-PLACE will not come into play in these structures, and nasal place identity will be respected.

(51) No nasal place assimilation word-medially

\[
\begin{array}{ccc}
\text{a.} & \text{maN.ba.} & * \\
\text{b.} & \text{mamÉ.ba.} & ! \\
\end{array}
\]

The constraint hierarchy established for Zoque nasal place assimilation and prefixation is summarized in (52):

(52) \( \textit{N}\text{ÉZ}, \textit{1-C-PLACE} \gg \text{REALIZEMORPH} \gg \text{IDENT-IO[Place]} \)

The significance of this hierarchy for the analysis of Mbe nasal agreement is that it offers independent evidence from another language for a violable REALIZEMORPH constraint.

In addition, the Zoque pronominal prefix parallels the diminutive and inchoative formation in permitting the occurrence of a nasal prefix in a non-diminutive nominal. In this section, I will briefly outline how ALL applies to a size-restricting constraint in nominal morphology.

6.1.6 Extending explanation to other affixation

In the analysis of nasal copy across the imperative and inchoative verbs and diminutive nouns, an important role is played by the atemplatic size-restricting constraint, ALL. Another affixation phenomenon in Mbe also exhibits a restriction which may be attributed to the force of this constraint. In this section, I will briefly outline how ALL applies to a size-restricting constraint in class prefixation in nominal morphology.

We have already seen that nouns take nominal class prefix exponents marking number. We have also seen that nouns take nominal class prefix exponents marking number.

\[
\begin{array}{ccc}
\text{a.} & \text{maN.ba.} & * \\
\text{b.} & \text{mamÉ.ba.} & ! \\
\end{array}
\]

\[
\begin{array}{ccc}
\text{a.} & \text{fa.ha.} & * \\
\text{b.} & \text{nfa.ha.} & ! \\
\text{c.} & \text{MEfa.ha.} & ! \\
\end{array}
\]

\[
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\end{array}
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\end{array}
\]

\[
\begin{array}{ccc}
\text{a.} & \text{maN.ba.} & * \\
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\end{array}
\]
A similar cumulative affixation effect appears in diminutive formation. Nouns which take C or N prefixes in their non-diminutive form construct their diminutive counterpart by prefixing \[ kE \] and \[ ke \] to singular and plural non-diminutive noun material, respectively (54a-b). Nouns with a V or CV prefix in their non-diminutive form replace this with \[ kE / \] in their diminutive counterpart (54c-d).

Non-diminutive

Diminutive

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>[ liê ] kE&amp;</td>
</tr>
<tr>
<td>b.</td>
<td>[ ku^el ] kE&amp;N</td>
</tr>
<tr>
<td>c.</td>
<td>[ tÉsiÊ ] kE&amp;$</td>
</tr>
<tr>
<td>d.</td>
<td>[ be^ ]</td>
</tr>
</tbody>
</table>

Why are purely consonantal prefixes retained but V or CV ones replaced? A phonological generalization underlies this phenomenon: cumulative prefixation takes place only when the combined prefixal material forms a syllable or none at all. However, in an additional set of CA prefixes appearing before them, natural prefixes are word-initial position prefixes, and some are syllable and morphic units. In particular, when we consider the nature of prefixation material in these prefixes and how material is added, we see a different pattern. We need to consider the nature of prefixation material in these prefixes and how material is added.

A similar cumulative affixation effect appears in diminutive formation. Nouns which take C or N prefixes in their non-diminutive form construct their diminutive counterpart by prefixing \[ kE \] and \[ ke \] to singular and plural non-diminutive noun material, respectively (54a-b). Nouns which take a V or CV prefix in their non-diminutive form replace this with \[ kE / \] in their diminutive counterpart (54c-d). The analysis involves calling on a separation between root and nominal prefix material to no more than a syllable can be explained by a familiar constraint in our analysis of Mbe: A LL s L. Here the size-restrictor constraint limits the total size of combined prefixes (whether reduplicative or non-reduplicative). The analysis involves calling on a separation between root and nominal prefix material to no more than a syllable can be explained by a familiar constraint in our analysis of Mbe: A LL s L. Here the size-restrictor constraint limits the total size of combined prefixes (whether reduplicative or non-reduplicative). The analysis involves calling on a separation between root and nominal prefix material to no more than a syllable can be explained by a familiar constraint in our analysis of Mbe: A LL s L. Here the size-restrictor constraint limits the total size of combined prefixes (whether reduplicative or non-reduplicative). The analysis involves calling on a separation between root and nominal prefix material to no more than a syllable can be explained by a familiar constraint in our analysis of Mbe: A LL s L. Here the size-restrictor constraint limits the total size of combined prefixes (whether reduplicative or non-reduplicative).
No cumulative prefixation when combined material would exceed a syllable

(58) No cumulative prefixation when combined material would exceed a syllable
incorrect outcome is signalled by the reverse-pointing hand beside candidate (c).

Candidate (a), which is the actual outcome, is not selected by this tableau. 

(60) Afx

£s

gives wrong outcome for diminutive kE

- RED -
tEm

CODACONDMAX-IOAfx

£s

MAX-BR

+ a.
kEnÉ

tEm t

E

b.
kE

tEm t

Em

c.
kEtEnÉ

tEm

E

The fact that reduplication for the diminutive and inchoative morphemes takes place only when it will not add a syllable to the word requires independent explanation. A

LL is what achieves this explanation; yet it is also capable of capturing the size-restriction on its own. It thus obviates the need for a generalized templatic constraint. A similar problem arises with reduplication for inchoative morphemes. The morphology of Mbe provides empirical evidence that this is a necessary step to take. Finally, there is an argument concerning theoretical overgeneration against the use of templatic constraints. This argument, discussed by Prince (1996, 1997) and Spaelti (1997), is known as the Philip-Prince-Spaelti point. It is argued that using a templatic alignment constraint to produce size restrictions is not faced with this problem. We have seen that the alternatives to size restriction are insufficient to obtain reduplicant size limits and are also not required. In addition, they are not capable of providing explanation for the range of size-restriction phenomena that A

LL covers. I conclude that TETU rankings with a templatic alignment constraint, which minimize structure over the entire word, are necessary here.

6.1.8 Ruling out prespecification in reduplication

I conclude the discussion of Mbe by returning to the issue of prespecification in reduplication. The formation of reduplication has been described in Section 6.3 (the 'Full Model' includes Stem-to-RED identity or IR-Faith, but this will not concern us here). The basic model of McCarthy and Prince (1995: 273) is given in (61) (the 'Full Model' includes Stem-to-RED identity or IR-Faith, but this will not concern us here).

<table>
<thead>
<tr>
<th>TETU Placement</th>
<th>Full Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Token</td>
<td>TETU</td>
</tr>
<tr>
<td>RED</td>
<td>TETU</td>
</tr>
<tr>
<td>Stem</td>
<td>TETU</td>
</tr>
</tbody>
</table>

McCarthy and Prince (1996) argue that reduplication can be derived from an extraction of the Root-RED > Affix-RED ranking. This ranking is not a constraint on the possible distribution of reduplication maximization in the grammar. However, this ranking is not a constraint on the possible distribution of reduplication maximization in the grammar. In order to achieve reduplication in reduplication, the reduplication must be minimal with respect to the underlying constraints. This model is thus capable of capturing the size-restriction on its own. It thus obviates the need for a generalized templatic constraint. The formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. The formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. The formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint. This formulation of McCarthy and Prince (1996) can be extended to a formulation of the root-RED constraint.
The Basic Model of reduplicative identity:

Input: /Af\RED + Stem/

Input: /Af\RED + Stem/

Output: R

B -R Identity

The model in (61) posits a correspondence relation between (i) the input and output forms of the stem, and (ii) between the output form of the stem (the base) and the output form of the reduplicative affix. This model does not account for correspondence with additional input material, which is captured by the elaborated model shown in (62).

Elaborated Basic Model of reduplicative identity:

Input: /Af\RED + Stem/

Input: /Af\RED + Stem/

Output: R

B -R Identity

Affix-IO Faithfulness

Stem-IO Faithfulness

In the case of reduplicative affixes, Affix-IO faithfulness has the potential to conflict with BR Identity. Constraint ranking gives the two possible outcomes in (63).

(63) a. Faith\textsubscript{i}-BR >> Affix-Faith\textsubscript{j}-IO

b. Affix-Faith\textsubscript{i}-IO >> Faith\textsubscript{j}-BR

The ranking in (63a), which places BR-Faith over Affix-Faith, yields a pattern in which maximal reduplication takes place (within the limits of any size-restriction) and wins over prespecified material. This is illustrated in (64) for a hypothetical language with a RED containing [-RED Bam]. Here the prespecified material is preserved and reduplication takes place to fill up the remainder of the size restriction.

(64) A ranking yielding combination of prespecified material with reduplication

RED - Bam

\textbf{RES}: Bam

+ \textbf{AFFIX-MAX-IO}

\textbf{S}: Bam

\textbf{MAX/-BR}

\textbf{FAITH}: Bam

\textbf{FAIR-IO: Faithfulness}

Another problematic kind of fixed segmentism arises under a combination of DEP and MAX constraints. The tableau in (65) shows how this can produce full copy of the base in combination with fixed material.

(65) Prespecified material plus full copy

RED - Bam

\textbf{RES}: Bam

+ \textbf{AFFIX-MAX-IO DEP-BR}

\textbf{S}: Bam

\textbf{MAX/-BR}

\textbf{FAITH}: Bam

\textbf{FAIR-IO: Faithfulness}

Note that Faith-BR and Affix-Faith-IO only have the potential to conflict when correspondence holds for a given affix to both input material and base material, i.e. when correspondence between the input and output forms of the stem is required. This is illustrated in (66) for a hypothetical language with a RED containing [-RED Bam]. Here correspondence between the input and output forms of the stem is required. However, if the prespecified material were not subject to the influence of the affix, then the prespecified material could be preserved and the reduplicative affix could be maximized. This is illustrated in (67) for a hypothetical language with a RED containing [-RED Bam]. Here correspondence between the input and output forms of the stem is required, and the prespecified material is preserved.

(66) Prespecified material plus full copy

RED - Bam

\textbf{RES}: Bam

+ \textbf{AFFIX-MAX-IO MAX/-BR}

\textbf{S}: Bam

\textbf{MAX/-BR}

\textbf{FAITH}: Bam

\textbf{FAIR-IO: Faithfulness}

The model in (66) poses a correspondence relation between (i) the input and output forms of the stem, and (ii) between the output form of the stem (the base) and the output form of the reduplicative affix. This model does not account for correspondence with additional input material, which is captured by the elaborated model shown in (62).
The first argument is the one that is relevant, since the root-based constituent always forms the first argument in any root-to-affix correspondence relation (i.e. Faith-BR, following McCarthy and Prince 1995). The revised metaconstraint is given in (66):

(66) Revised Root-Affix Faith metaconstraint:
Faith\text{\textunderscore i-Root\textunderscore X} \gg Faith\text{\textunderscore j-Affix\textunderscore Y}

The metaconstraint in (66) admits the rankings Root-Faith\text{\textunderscore i-IO} \gg Affix-Faith\text{\textunderscore j-IO} and Faith\text{\textunderscore i-BR} \gg Affix-Faith\text{\textunderscore j-IO} and rules out their reverse counterparts *Affix-Faith\text{\textunderscore i-IO} \gg Root-Faith\text{\textunderscore j-IO} and *Affix-Faith\text{\textunderscore i-IO} \gg Faith\text{\textunderscore j-BR}. We may thus eliminate the ranking in (63b), and consequently the emergence of prespecified material in a reduplicative affix, on the basis of the more general principle of Root over Affix Faith.

6.1.9 Appendix: Deriving CodaCond in Mbe

In section 6.1.2 I made use of a descriptive constraint, C\textunderscore CODACOND, noting that the effect of this constraint could be derived through the interaction of other more basic constraints. In this appendix, I provide evidence that this constraint is indeed derived, through its interaction with other more basic constraints, and that it can thus be eliminated. The descriptive properties of the coda condition in Mbe are repeated in (67):

(67) Coda condition in Mbe
(i) Place features of a coda consonant must be linked to a following onset.
(ii) Coda consonants are limited to nasals.
(iii) The coda restrictions of (i) and (ii) are exempted in root-final position.

First, place features of a coda consonant must be linked to a following onset. Alderete et al. (1996) suggest that this may be driven by the interaction of markedness and faith constraints.

The constraints driving multiple linking are place feature markedness constraints, which I refer to here as *C\textunderscore PL/X (collapsing the hierarchy *PL/DORS, *PL/LAB >> *PL/COR; after Prince and Smolensky 1993; Smolensky 1993; for applications see Padgett 1995a; Alderete et al. 1996; among others). Importantly,

* C\textunderscore PL/X violations of *C\textunderscore PL/X are reckoned on an autosegmental basis rather than a segmental one, so that one occurrence of a place feature linked to two segments incurs one violation rather than a sequential violation of *C\textunderscore PL/X.

If *C\textunderscore PL/X outranks consonantal place feature identity constraints (both IO and BR), then place-linked structures for consonant clusters in roots and reduplicants will be selected over structures with two separate places. MAX constraints must also outrank place-identity constraints to prevent segments from deleting rather than undergoing place assimilation. This is shown in (69), restricting attention to candidates preserving onset place features. High-ranked O\textunderscore NSET is shown to prevent deletion of onset consonants. This tableau also includes an undominated constraint, HAVEPLACE, which requires that every consonant have some place feature specification (Itô and Mester 1993; Lombardi 1995b; Padgett 1995b). [T] represents a placeless consonant.

(69) Copied codas are place-linked

\[
\begin{array}{c|c|c}
\text{RED-} & \text{HAVEPLACE} & \text{IDENT-IO} \text{- [Place]} \\
\text{jiçni} & \text{MAX-IO} & \text{MAX-BR} \\
\text{jini} & \text{MAX-BR} & \text{MAX-IO} \\
\text{ji} & \text{MAX-IO} & \text{MAX-BR} \\
\text{T} & \text{MAX-BR} & \text{MAX-IO} \\
\end{array}
\]

A second property of the place assimilation must yet be explained: coda place features take on the place features of a neighboring onset but not the reverse. In his discussion of nasal place...

The coda restrictions of (i) and (ii) are exempted in root-final position.

\[
\begin{array}{c|c|c|c|c|c}
\text{C\textunderscore CODACOND} & \text{CODACOND} & \text{CODACOND} & \text{CODACOND} & \text{CODACOND} & \text{CODACOND} \\
\text{CODACOND} & \text{CODACOND} & \text{CODACOND} & \text{CODACOND} & \text{CODACOND} & \text{CODACOND} \\
\end{array}
\]

The revised constraint is given in (66).

28 Faith constraints specific to the perceptually-salient position of release are capable of preventing *C-PL/X from threatening the preservation of place features in onset position. The positional faith constraint that will be required is given in (70) (after Padgett 1995b: 19):

I
DENTREL-IO[Place]  
Let S be a [+release] segment in the output. Then every place feature in the input correspondent of S has an output correspondent in S.

This ranking will produce spreading of place features from onsets to codas in consonant clusters, as illustrated in (72). Only candidates respecting HAVEPLACE and ONSET are considered here and in subsequent tableau.

(72) Place features spread from onset to coda

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HAVEPLACE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAX-IO[Place]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P, m, n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P, n, p</td>
<td>*(BR)</td>
<td></td>
<td></td>
<td>*(IO)</td>
<td></td>
</tr>
</tbody>
</table>

Next we must explain why consonants are limited to nasals (except in root-final position, which I will return to presently). In dealing with the failure of coda obstruents to assimilate in place, Padgett (1995b: 18) notes that a ranking of HAVEPLACE and ONSET are crucial for the maintenance of nasals in reduplicants. This ranking will produce spreading of place features from onsets to codas in consonant clusters, as illustrated in (72)

(71) IDENT-IO[Place] >> *C-PL/X >> IDENT-IO[Place]

I propose to add that nasal identity for place features occurring in approximants also outranks nasal place identity:

I
DENT-IO[BR/Plants-Place], IDENT-IO[BR/APR-Place] >> IDENT-IO[BR/Nasal-Place]

If faith for place features occurring in onsets and approximants is high-ranked in Mbe, then obstruents and approximants will never occur in codas (except in root-final position). Thus place assimilation is restricted (in consonant clusters) only to nasals (except in root-final position, which I will return to presently). To this I propose to add that nasal identity for place features occurring in approximants also outranks nasal place identity:

(75) I
DENT-IO/BR[OBS-Place], IDENT-IO/BR[APR-Place] >> IDENT-IO/BR[NAS-Place]

Next we must explain why obstruents and approximants are limited to nasals (except in root-final position). The constraint *C-P/X/LAB and *C-P/X/CORID-IO[Place] may force nasal assimilation over *C-P/X/LAB and *C-P/X/CORID-IO[Place].

The ranking needed for nasal assimilation to occur is:

I
IDENT-IO[BR/COR-Place] >> IDENT-IO[BR/LAB-Place]

I propose to add that nasal identity for place features occurring in approximants also outranks nasal place identity:

(71) IDENT-IO[Place] >> *C-PL/X >> IDENT-IO[Place]

This ranking will produce spreading of place features from onsets to codas in consonant clusters, as illustrated in (72).

The ranking needed for nasal assimilation to occur is:

I
IDENT-IO[BR/COR-Place] >> IDENT-IO[BR/LAB-Place]

I propose to add that nasal identity for place features occurring in approximants also outranks nasal place identity:

(71) IDENT-IO[Place] >> *C-PL/X >> IDENT-IO[Place]
nasal (i.e., [fun-fuel, [fun-fuen]), and for the moment I consider only candidates preserving onset place identity (as in (72), (74)) and maintaining root-final consonants. \[V\] represents a labio-dental approximant.

(76) Non-nasal codas are prohibited

In contrast to oral consonants, nasals are retained in codas, although they must be place-linked. To achieve this outcome, IDENT[NAS-Place] must be outranked by MAX, as shown in (77). The difference between nasal versus oral consonants is thus that nasals in codas will be retained rather than violate place-identity, whereas oral consonants in codas will be lost rather than violate place-identity through assimilation.

(77) Nasal codas occur (place-linked)

The final aspect of the Mbe CodaCond to be explained is the failure of coda restrictions to apply in root-final position. Recall that coda restrictions are lifted only when root-final consonants are not deleted in the deletion of MBP. If it were that coda root-final consonants are not deleted in the deletion of MBP, then IDENT-IO/BR[OBS-Pl] over MAX-IO would be expected to delete (or non-phonetically release) MBP. However, the presence of root-final consonants in Mbe suggests that such constraints as (77) are not relevant in root-final position. Hence, root-final consonants are retained even when root-final consonants are not deleted in the deletion of MBP. This is an instance of positional faith constraints, in this case specific to root-final position. Recall that faith constraints are another consequence of positional faith constraints. If they are retained in the case of nasals, then they are also retained in the case of other segments, as shown in (78).

(78) a. RIGHT-ANCHOR-MAXROOT:
Any segment at the right edge of the root in the input has a correspondent at the right edge of the root in the output.

b. RIGHT-ANCHOR-IDENTROOT[Place]:
Let \( a \) be a segment at the right edge of the root in the input and \( b \) be a correspondent at the right edge of the root in the output. If \( a \) is [Place \( g \)], then \( b \) is [Place \( g \)].

Since MAX and IDENT place-anchoring constraints save consonants and their place features in root-final position, they must outrank IDENT-IO/BR[OBS-Pl]. This is illustrated in (79-80) for suffixed forms [ju$ab-kiÈ] 'be washing' and [jiûEm-kiô] 'be singing'.

29 Note that even though nasal consonants are retained in root-final position, they would be expected to delete (or non-phonetically release) MBP if they were not deleted. However, the presence of root-final consonants in Mbe suggests that such constraints as (77) are not relevant in root-final position.

Despite this, the difference between nasal versus oral consonants is thus that nasals in codas will be retained rather than violate place-identity, whereas oral consonants in codas will be lost rather than violate place-identity through assimilation.

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The analysis draws on the ... constraints already ... to offer explanation for an independent restriction in perfective nasal copy. Perfective verbs are formed with a prefix [me-] (82).

30 Transcription of [e] in roots in the Mbe data given earlier follows Bamgbose's phonemic transcription and does not reflect this reduction. 31 Spaelti (1997: 85) observes that the kind of ranking configuration needed is something like the following: X >> *i/uCS >> MAX-IO >> MAX-BR, where the constraint 'X' achieves the effect of 'do not delete the high vowel'. I will not pursue the details...

We now have completed the rankings which obtain the Mbe CodaCond, which holds within roots and prefixes, including the reduplicative prefix in imperative verbs. The analysis draws on the identity constraint for nasals (after Padgett 1995b). The rankings for the coda restrictions are summarized in (81).

(81) Summary of rankings for CodaCond:

I

DENTREL-IO/BR[Place], IDENT-IO/BR[OBS-Place], IDENT-IO/BR[APR-Place] | ONSET, HAVEPLACE, R-ANCHOR-MAXROOT, R-ANCHOR-IDENTROOT[Place] | *C-PLACE/X | MAX-IO, MAX-BR | *C-PLACE/X

Before concluding this appendix, I briefly examine nasal copy in the formation of perfective verbs. This discussion is included for completeness, but the analysis should be considered as only tentative. The goal of this last segment is to outline how placemarkedness constraints already in play in the root, subordinating to other constraints, in effect transform the coda nasal into a syllabic segment bearing a tone

30 It is particularly interesting to contrast the consistently full vowel of [Me-] with the reduced quality of the vowel in [re-] in inchoative formation, where the nasal does not produce reduction of /e/ to [ê] in closed syllables throughout the language.

31 In discussing the coda status of copied nasals, Bamgbose (1971: 104-5) also raises the interesting and rather unexpected point that in imperative reduplicants closed by a nasal, the high vowels [i] and [u] occur in a position normally occupied by a low vowel in Mbe. He observes that the nasal does not produce reduction of /e/ to [ê] in closed syllables throughout the language. If the nasal formed a syllable coda, this absence of reduction would be unexpected, since /e/ allophonically reduces to [ê] in closed syllables. Spaelti (1997: 85) observes that the kind of ranking configuration needed is something like the following: X >> *i/uCS >> MAX-IO >> MAX-BR, where the constraint 'X' achieves the effect of 'do not delete the high vowel'. I will not pursue the details...
The copied nasal that occurs in perfective formation is also exceptional in a second respect: it can copy a nasal in the verb stem in the usual way or it can copy an asyllabic nasal pronoun to its left. Correspondence to a nasal pronoun is not possible in the other cases of nasal agreement (compare inchoative forms below).

<table>
<thead>
<tr>
<th>Perfective verb form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. n$ me@n$-ta@</td>
<td>'I have touched'</td>
</tr>
<tr>
<td>o$ me^-ta@</td>
<td>'you have touched'</td>
</tr>
<tr>
<td>b. n$ me@m$-bç@ro$</td>
<td>'I have helped'</td>
</tr>
<tr>
<td>E$ me^-bç@ro$</td>
<td>'he has helped'</td>
</tr>
<tr>
<td>c. n$ me@n$-la@</td>
<td>'I have slept'</td>
</tr>
<tr>
<td>e@ me^-la@</td>
<td>'it has slept'</td>
</tr>
</tbody>
</table>

Inchoative verb form

<table>
<thead>
<tr>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. n$ re^lç^e$tÉsiê</td>
</tr>
<tr>
<td>*re$n@-lç^e$tÉsiê</td>
</tr>
<tr>
<td>e. n$$ re^-bç@ro$</td>
</tr>
<tr>
<td>*re$m@-bç@ro$</td>
</tr>
</tbody>
</table>

Although fascinating, the availability of copy of material in a preceding pronoun will not be analyzed here. I will simply note that it is possible that the syllabic status of the copied nasal in perfective forms may contribute to the availability of this alternative.

On the strength of the evidence from diminutive and inchoative prefixations for a separate RED affix in nasal segment/null copy, I assume that affixation in perfective verbs is also complex, consisting of a prefix [me-] and a separate purely reduplicative prefix. I hypothesize that the syllabic status of the copied nasal in perfective prefixation is driven by a requirement that reduplicated perfective prefix material coincide with a tone. I will refer to this requirement as PERF/TONE, noting that this could perhaps be captured with an affix-to-tone alignment constraint. Because perfective reduplication adds a syllable in order to satisfy this constraint, PERF/TONE and REALIZEMORPH must outrank the size-restrictor ALLs:

\[ \text{PERF/TONE, REALIZEMORPH} \gg \text{ALLs} \]

Of this case further here and leave a deeper investigation of the emergence of the marked for future research.

The question is, if the perfective reduplicant can constitute a syllable, why is it not realized as \( V(N) \), which would better satisfy syllable peak markedness and MAXBR? I suggest that the answer may be found in place markedness constraints. These prohibit the occurrence of place features, ... its satisfaction of this constraint: it does not add a place feature to the word. We have already established that \( C\text{-PL/X} \) outranks MAXBR. If it also outranked the demand of the morpheme realization for the perfective, copy would take place only when it did not add a place feature. Up until now, I have made use only of \( C\text{-PL/X} \), which prohibits consonantal place features. Perfective reduplication can also not add vowel place features (recall from 6.1.2 that linking of vowel features across syllables is disallowed). The ban on C-Place and V-Place features being introduced by the perfective morpheme is expressed by the ranking in (85).

\[ *(\text{C-PL/X, V-PL/X}) \gg \text{REALIZEMORPH} \]

The following tableaux illustrate the effect of these rankings. First, (86) shows a case where a nasal is copied from the verb stem. Here morpheme realization and the requirement that the perfective prefix coincide with a tone compel the addition of a syllable.

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![Tableau](image)

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<table>
<thead>
<tr>
<th>Perfective</th>
<th>Inchoative</th>
</tr>
</thead>
<tbody>
<tr>
<td>me^- RED - bamo</td>
<td>me^- RED - bamo</td>
</tr>
<tr>
<td>*C-PL/X</td>
<td>*C-PL/X</td>
</tr>
<tr>
<td>PERF/TONE, REALIZEMORPH</td>
<td>PERF/TONE, REALIZEMORPH</td>
</tr>
<tr>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>a. <a href="mailto:me@.m">me@.m</a>$É<a href="mailto:.ba@.mo">.ba@.mo</a>$</td>
<td><a href="mailto:me@.m">me@.m</a>$É<a href="mailto:.ba@.mo">.ba@.mo</a>$</td>
</tr>
<tr>
<td>b. me^mÉ<a href="mailto:.ba@.mo">.ba@.mo</a>$</td>
<td>me^mÉ<a href="mailto:.ba@.mo">.ba@.mo</a>$</td>
</tr>
<tr>
<td>c. me^<a href="mailto:.ba@.mo">.ba@.mo</a>$</td>
<td>me^<a href="mailto:.ba@.mo">.ba@.mo</a>$</td>
</tr>
<tr>
<td>d. <a href="mailto:me@.ba">me@.ba</a>$m.É<a href="mailto:ba@.mo">ba@.mo</a>$</td>
<td><a href="mailto:me@.ba">me@.ba</a>$m.É<a href="mailto:ba@.mo">ba@.mo</a>$</td>
</tr>
</tbody>
</table>

It should be noted that this treatment of syllabic nasals as syllables containing a nasal consonant in the nucleus is only tentative. Some analysts have argued that so-called syllabic nasals must correspond to a VN representation. If the VN representation were required, then this could provide further evidence for schwa as a placeless vowel in Mbe.
The tableau in (87) shows an example where morpheme realization fails because there is no available nasal to copy and copying other material would necessitate adding a place feature:

(87) Copy fails when no nasal in stem

a. \[C-PL/X\]

b. \[V-PL/X\]

PERF/TONEREALIZEMORPHperfALL

The above rankings have shown that place markedness constraints outrank ALLsL. Earlier it was established that ALLsL dominated realization constraints for the diminutive and inchoative morphemes. This ranking is consistent with the position of *C-PL/L/X, since realization of the diminutive and inchoative morphemes does not compel violations of place markedness constraints. It also has been determined that the realization constraint for the imperative dominates ALLsL. Since imperative reduplication does introduce additional place features, the imperative realization constraint must also outrank *C-PL/L/X and *V-PL/X. The domination of MAX-BR by ALLsL will keep reduplicant size down to a syllable.33 Similarly, in nominal affixation, whatever constraint forces some nominal class affix to appear will have to outrank place markedness constraints.

6.2 Cooccurrence effects in Bantu

In this section I examine a nasal agreement phenomenon occurring in certain Bantu languages (Johnson 1972; Howard 1973; Ao ... properties. The motivation for a cooccurrence analysis is sketched here and the details are left for further research.

33 Something further will be required to explain why the imperative reduplicant does not simply consist of a syllabic nasal when there is a nasal in the base to copy (which is predicted by C-PL/L/X >> MAX-BR if no more is said). This could be attributed to a prosodic constraint on the imperative reduplicant requiring that it match the canonical form of a verb root (unmarked C-V; Bamgbose 1967a).

I exemplify the nasal agreement pattern with data from Kikongo, spoken in southwestern Zaire. In Kikongo suffixes, a voiced oral segment realized as either [l] or [d], becomes a nasal [n] when a nasal stop occurs anywhere in the root. This is shown in (88) for Kikongo.

(88) Kikongo

a. Perfective passive: \[\text{ulu}/\text{unu}\]

b. Perfective active: \[\text{il}/\text{in}\]

c. Applicative: \[\text{il}/\text{in}\]

Interestingly, there is no limitation on the distance between the alternating suffix and the nasal in the stem.

The above findings have shown that place markedness constraints outrank
Ao (1991) gives the following examples from Kikongo to show that a nasal-obstruent sequence does not cause the suffix segment to become nasalized, nor does it prevent a preceding nasal from becoming oral.

Another way in which the Bantu nasal agreement contrasts with consonant cooccurrence restrictions is similar to that in some languages within some domain marked by nasal agreement. This contrasts with the nasal agreement in suffix consonants. Nasal agreement does not induce oral/nasal alternations in root segments; however, as noted by Ao (1991: 195-96, n. 3) and Piggott (1996) for Kikongo, nasal agreement is non-local in the sense that the nasal agreement affects consonant clusters from the root.

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The first question for an analysis of this distribution is what phonological mechanism brings about the nasal distribution in (90)? In previous work, this nasal agreement phenomenon has been analyzed as a result of spreading from the nasal consonant to any adjacent consonant (Piggott 1996). In contrast, this work proposes a different and qualitative approach. This approach involves the cooccurrence restrictions that govern nasal consonant distribution in Kikongo. Within a stem, a voiced consonant to the right of a nasal consonant is a nasal. The first question for an analysis of this distribution is what phonological mechanism brings about the nasal distribution in (90)? In previous work, this nasal agreement phenomenon has been analyzed as a result of spreading from the nasal consonant to any adjacent consonant (Piggott 1996). In contrast, this work proposes a different and qualitative approach. This approach involves the cooccurrence restrictions that govern nasal consonant distribution in Kikongo. Within a stem, a voiced consonant to the right of a nasal consonant is a nasal.
An example of the latter kind comes from Ngbaka, a Niger-Congo language, reported by Thomas (1963) and discussed by Mester (1986) and Sagey (1986). According to proposals that in many of broad and general stutter studies this appears to be a completely different type of nasal harmony (with [+nasal] feature spreading); the consonant distribution patterns of Nyagba and Kera indicate that consonant distribution patterns of Nyagba and Kera are strikingly similar to the nasal agreement phenomenon in Kikongo: two similar but different nasal harmony phenomena are observed with segments matching in nasality or voicing in Kikongo; the similarity threshold in Nyagba is somewhat less permissive. To review, although the Kikongo pattern of nasal agreement may at first appear

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Kera (Chadic) exhibits a similar restriction banning a mix of voiced and voiceless stops/affricates within the word (Ebert 1979; Odden 1994). This restriction induces voicing in affix stops when the stem contains a voiced obstruent (e.g. /ki-dÉZir-ki/ [gi-dÉZir-gi] 'colorful' (masc.); cf. /ki-sar-ki/ [gi-sar-gi] 'black' (masc.)). The cooccurrence restrictions in Ngbaka and Kera are strikingly similar to the nasal agreement phenomenon in Kikongo: two similar but different nasal harmony phenomena are observed with segments matching in nasality or voicing in Kikongo; the similarity threshold in Ngbaka is somewhat less permissive. To review, although the Kikongo pattern of nasal agreement may at first appear
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