

TONE ASSIGNMENT IN DUALA NOUN REDUPLICATION

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This paper investigates the assignment of tone in the two types of noun reduplication in Duala: the whole-word reduplication as in *be-bimbe.be-bimbe* 'by pile' and the stem reduplication as in *e-tka.lka* 'a kind of necklace', *mu-ló.lómá* 'message', *pimbi.mbi* 'furious'. It is suggested that tone is copied in the whole-word reduplication whereas it is not copied in the stem reduplication. The author also proposes that the low tone, more precisely, the [-upper] tonal feature is the default tone and that [+raised] and [+upper] are the lexical low and high tonal features respectively. The surface mid tone is shown to be a combination of [+upper -raised] or the result of the postlexical assignment of the default tonal features [-upper +raised] in a class of reduplicated forms derived from verbs as in *bo-kolí.kolí* 'increasing'.

Cet article explore la distribution du ton dans les deux types de reduplication du nom en Duala: la reduplication du mot entier comme dans le mot *be-bimbe.be-bimbe* 'par tas' et la reduplication du thème nominal comme dans les mots *e-tka.lka* 'un type de collier', *mu-ló.lómá* 'un message', *pimbi.mbi* 'furieux'. L'auteur suggère que le ton est copié dans la reduplication du mot entier et qu'il ne l'est pas dans la reduplication du thème nominal. Il est en outre proposé que le trait tonal [-upper] est le trait du ton de défaut tandis que les traits [-raised] et [+upper] sont les traits lexicaux des tons bas et haut respectivement. Le ton moyen est soit le résultat de la combinaison des traits lexicaux [+upper -raised] ou des traits de défaut [-upper +raised] dans la composante de la phonologie postlexicale dans un groupe de déverbatifs tels que *bo-kolí.kolí* 'le fait d'augmenter'.

It is generally assumed that a language with a two-tone system, high (H) and low (L) usually has low as the default tone and that one with a three-tone system using H, L, and M (mid) has mid as the default tone (Hyman and Valinande 1985, Pulleyblank 1986, Mutaka 1990). This assumption may be an oversimplification as will be demonstrated with the tones of the noun reduplication in Duala.

Duala, a language spoken in Cameroon and classified as A.24 in Guthrie (1971) has three surface tones: high, mid and low. The mid tone appears in a restricted class of items, notably in certain reduplicates where it surfaces at the penultimate or/and the final position. This paper investigates the assignment of tone in the reduplication of noun forms in Duala,¹ and proposes that the low tone, more precisely, the [-upper] tonal feature is the default tone and that [-raised] and [+upper] are the lexical low and high tonal features respectively (Pulleyblank 1986, Yip 1980). The surface mid tone will be shown to be a combination of the lexical features [-raised +upper] or, in a restricted set of reduplication data, the result of the default features [-upper] and [+raised].

The paper is organized as follows. First, the two types of reduplication found in Duala nominal forms are discussed, notably the word-level reduplication and the stem-level reduplication. Secondly, the assignment of tone in these two types of reduplication is examined.

1. TYPES OF REDUPLICATION IN DUALA NOMINAL FORMS

There are clearly two types of reduplication in Duala:² a word-level reduplication and a stem-level reduplication illustrated in (1) and (2).³

¹ According to Carl Ebobissé, reduplication also exists in verbs and conveys a pejorative meaning to the verb (Ebobissé, personal communication).

² The plosives *b* and *d* are pronounced [b] and [d] when they occur before non-high vowels. Most of the data discussed in this paper have been taken from Itman (1976, 1978). However, I would like to thank Carl Ebobissé, Solange Ebobissé, Gisèle Eyango and Nsime Clédor for their help in checking the tones in these data. My heartfelt thanks to the JWAAL anonymous referee for the pertinent remarks given on the previous version of this paper.

³ Throughout the text, PFX = prefix, high tone is indicated by an acute accent, mid tone by a macron, and absence of tone indicates a surface low tone. The specification of an underlying low tone will be marked by a grave accent where necessary. The reduplicated material is separated from the base by a dot.

- (1) PFX-STEM.PFX-STEM
be-bímbe.be-bímbe by pile⁴
ma-béle.ma-béle by group
m-pándo.m-pándo at a constant distance (from **pánda** 'to be separated')
mi-sala.mi-sala in a parallel way (from **mi-sala** 'muscular string')
- (2) PFX-STEM.STEM
e-beké.beke a very flat plate
e-tápé.tape chattering (from **tápé** 'to chat')
e-pəndé.pənde finding (from **pənde** 'to find')
e-kemé.keme declaration of a mistake (from **kema** 'approve or refuse')
ma-díba.díba a liquid
kátá.kátá fraudulent
púkútú.pukutu small vegetable

In the word-level reduplication illustrated in (1), the prefix and the stem are both reduplicated. This type of reduplication is basically used to derive adverbs from nouns or verbs. As for the stem-level reduplication illustrated in (2), only the stem is reduplicated. Further types of reduplication fall within this category of stem reduplication. In (3), the case of stem-level reduplication is illustrated where the first root coronal consonant is replaced by l in the reduplicate.⁵

- (3) **e-təko.ləko** a kind of necklace
e-tongo.loggo the kernel of an unripe palm nut
e-tiggi.liggi stump
mu-tíggí.líggí stem of plantain cut down
tóggó.lóggó a kind of tree
e-senge.lenge sparkling eyes
e-sómbó.lómbó very high
i-sókó.lókó gull, family

In (4) and (5), I illustrate cases of single-syllable reduplication that also fall under the umbrella of stem-level reduplication.

- (4) **mu-lə.ləko** freshness (from **ləko** 'to refreshen')
mu-ló.lómá message (from **lóma** 'to send')
i-ko.kondo a fish
e-ko.kolo big animal (from **kola** 'to grow')
e-pé.pénjú cockroach
- (5) **e-sanja.nja** urinary bladder
kómbó.mbó economist (from **kómbe** 'to spare')
pimbi.mbi furious
mu-sunju.nju nose bleeding
e-yenge.nge palm branch (from **eyenge** 'palm-leaf')
jene.ne something visible (from **jene** 'mirror')
ndala.la descendent
ndóló.ló small fish

⁴ The forms in (1) are presented in Ittman's dictionary with a mid tone instead of a H tone on the penultimate vowel. However, I checked with three different native speakers of Duala and they invariably produced these words with a high tone. It is possible that certain speakers may produce a mid tone in these forms, or rather a downdrifted high tone in view of what Ittman (1939:40) observes that in a HLH pattern, the second H is realized as mid as in **mpólóló** 'rivulet', **e-suné.suné** 'stool' **búka té** 'except', **mbá na mbá** 'always'.

⁵ A few words were found where l alternates with t as in **e-kala.kata** 'ghost', **kolo.kótó** 'a kind of crab', **mu-lag.tag** 'giant', **mu-ləg.təg** 'yellow leaf of colocasia'. It is possible that these are cases of a stem-level reduplication characterized by the prefixation of the reduplicate with the prespecification of l in the reduplicate. They would thus be comparable to the words in (3) where l is prespecified in the suffixed reduplicate. However, nothing in the potential original roots of the word, that is **kata** or **kala** for **e-kala.kata**, **kolo** or **kótó** for **kolo.kótó**, **təg** or **lag** for **mu-ləg.təg**, **tag** or **lag** for **mu-lag.tag** indicates that one of them is the root from which reduplication occurs.

ndɔɔ.lɔ	a wild fruit
mu-ítí.tí	darkness

In this type of reduplication, the single syllable that reduplicates is either the first or the final syllable of the stem as in (4) and (5) respectively. Notice that the single syllable that reduplicates in (4) appears after the prefix. Assuming that the prefix is not available when the stem reduplication takes place, these forms in (4) can be interpreted as an illustration of a right to left reduplication where the reduplicate is copied on the left of the stem and those in (5) as exemplifying a left to right reduplication where the reduplicate is copied to the right of the stem. (Marantz 1982, McCarthy and Prince 1986). The word **e-yenge.ngge** 'palm branch' particularly strongly supports our assumption that the single syllable is copied to the right as it derives from **e-yenge** 'palm-leaf' which has a related meaning.

In the tables in (6)–(8), I give an estimate of frequency of the different types of reduplication in Duala nominal forms from the examples taken in Ittman (1978:232–38).

(6) Underived nouns

STEM REDUPLICATION	Examples
suffixation of 2 syllables	49 ex. e-sékú.sékú
suffixation of 3 syllables	1 ex. púkútú.pukutu
suffixation of 2 syllables where the first consonant of the reduplicate differs from the consonant of the stem	9 ex. e-tókɔ.lkɔ
suffixation of 2 syllables where the second consonant of the reduplicate differs from the consonant of the stem	4 ex. e-kala.kata
prefixation of 1 syllable	12 ex. esa.samba
WORD REDUPLICATION	
single word meaning	3 ex. mbidi.mbidi
(note that these words have a nasal prefix)	
adverbial meaning	17 ex. bebímbe.bebímbe

(7) Nouns derived from verbs

STEM REDUPLICATION	Examples
suffixation of 2 syllables	27 ex. mu-luma.luma
(note: in some words, tone changes in the reduplicate)	'excitation'
suffixation of 2 syllables with prefix bo-	9 ex. bo-lómá.lómá
(note: tone in the reduplicate is mid)	'message'

WORD REDUPLICATION: no examples

(8) Summary of figures

STEM REDUPLICATION	
Suffixation:	
disyllabic	98 ex. = 68.8%
monosyllabic	12 ex. = 8%
polysyllabic	1 ex. = 0.6%
Prefixation	
disyllabic	--
monosyllabic	12 ex. = 8%
polysyllabic	--
WORD REDUPLICATION	
a) with adverb meaning	
suffixation	17 ex. = 11%
prefixation	0 ex. =
b) with single word meaning	
suffixation	3 ex. = 2%
prefixation	0 ex. =
TOTAL:	143 ex. = 100%

As these tables show, the type of reduplication that occurs in Duala is mostly stem reduplication with a preference of disyllabic suffixation. As for the meaning attached to reduplication, most underived words have an idiosyncratic meaning. The whole-word reduplication of nouns expresses an adverbial meaning of 'the manner of doing something' (e.g. *bebímbebebímbe* 'by pile' (literally 'quantity by quantity')). Verb reduplication (not discussed in this paper) expresses the idea of a repeated action (Ittman 1978:195). The forms with *bo-* that derive from such verbs therefore express the quality of a repeated action e.g. *bo-pəngəp'əng'* 'the fact of making something repeatedly'.

After identifying the two types of reduplication, i.e., word and stem level reduplication, the question is to know when they take place in the phonology of Duala. Let us assume for the moment that stem level reduplication occurs at the first stratum whereas the word-level reduplication occurs at stratum 2, following the model of lexical phonology and morphology (Kiparsky 1985, Pulleyblank 1986 among others). In this model, a set of rules, called lexical, apply in the lexical component which interacts with the morphological component. It is further assumed that lexical rules apply in different levels, or strata. For Bantu languages, in particular, it is generally assumed that the lexical component consists of two lexical strata: stratum one in which the stem-level morphemes are affixed to the root and stratum two in which the word-level morphemes like the class prefix in nouns is affixed (Mutaka 1990, Hyman 1991, Goldsmith and Sabimana 1985). Further rules, called postlexical, apply in a postlexical component. The assumption of these two lexical strata will prove crucial for the account of tone assignment in reduplication.

To account for these forms, I assume the theory of reduplication as presented in McCarthy and Prince (1986). In this work, the reduplicative affix is assumed to consist of a template and various phonological processes like the copying of the melodic elements of the base on a different plane and the association of these melodic elements to the template, following a direction parameter. Suffixes are assumed to associate right to left whereas prefixes associate left to right. The template is a shape-invariant prosodic category on which melodic elements associate. The prosodic categories of which a template may be made of are for example: the prosodic word, the foot, the syllable. Given these assumptions, we can now illustrate the derivation of the single syllable reduplication in (9).

- (9)
- | | |
|--|--|
| <p>mu-ló.lómá
'message'</p> <p>Stratum 1: affixation of stem-level morphemes</p> <p>lom-a</p> <p>Single syllable reduplication:</p> <p>σ σ σ
 σ σ
 loma</p> <p>Prefixation of 1 syllable</p> <p>loma</p> <p>σ σ σ
 σ σ
 loma</p> <p>Copy of melody onto a different tier AND
Association Left to Right</p> <p>Stratum 2: word-level affixation</p> <p>mu-lo.loma</p> <p>(After all postlexical rules)</p> <p>Output: mulólóma</p> | <p>e-sanja.nja
'urinary bladder'</p> <p>Stratum 1: affixation of stem-level morphemes</p> <p>sanja</p> <p>Single syllable reduplication:</p> <p>σ σ σ
 σ σ
 sanja</p> <p>Suffixation of 1 syllable</p> <p>sanja</p> <p>σ σ σ
 σ σ
 sanja</p> <p>Copy of melody onto a different tier AND
Association Right to Left</p> <p>Stratum 2: word-level affixation</p> <p>e-sanja.nja</p> <p>(After all postlexical rules)</p> <p>Output: esanjanja</p> |
|--|--|

As shown in these derivations, I assume that the single syllable reduplication occurs at stratum one prior to the affixation of the prefix that occurs at stratum 2.

2. TONE ASSIGNMENT IN THE REDUPLICATES

Consider first the whole-word reduplication exemplified in (10).

- (10) **mi-sala.misala** in a parallel way
be-bímbe.be-bímbe by pile
m-pándo.m-pándo at a constant distance

One striking observation of these forms is that the tone pattern in the base is similar to the one in the reduplicate. To account for these, I propose that tone is copied in the whole-word reduplication. To explain this, I assume that word reduplication takes place at stratum two where the whole word constitutes the template for the reduplicative affix and tone is consequently copied along with the melodic material as illustrated in (11) where, WD stands for 'word'.

- (11) **mi-sala.misala** **be-bímbe.be-bímbe**
 ‘in a parallel way’ ‘by pile’

Stratum 2: affixation of the prefix onto the stem

mi-sala

be-bimbe

Word reduplication:

WD WD
mi-sala mi-sala

WD WD
be-bimbe be-bimbe

Postlexically:

misala, mi-sala

bebimbe.be-bimbe

(Default L)

Output: misala.misala

bebímbe.bebímbe

Let us now look at the stem reduplication. By far the most common, the tones in the reduplicate depend upon the kind of stem used. For a number of stems, their reduplicates surface with a low tone, irrespective of the tones the original stems bear. This is illustrated in (12).

- | | | |
|------|-----------------|---|
| (12) | kútú.kata | fraudulous |
| | e-beké.beke | a very flat plate |
| | nyúkútú.nyukutu | small vegetable |
| | e-tápé.tápe | chattering (from <i>tápə</i> 'to chat') |
| | e-pòndé.ponde | finding (from <i>pòndə</i> 'to find') |
| | e-kemé.keme | declaration of a mistake (from <i>kema</i> 'approve or refuse') |
| (13) | i-bíla.bila | a small boy |
| | yóma.yoma | a small irrelevant thing |
| | mu-sóa.soan | earthquake |

The reduplicate in these forms surfaces with a low tone although in (12) the last vowel of the stem is H and in (13), it is a low tone. To account for this, I propose that tone is not copied in the reduplication as has been claimed for some languages (McCarthy and Prince 1986, Marantz 1982, Steriade 1987). The surface tone of the reduplicate can thus be either the default [-upper] or a [-raised] lexical tonal feature assigned to the vowels of the reduplicate. Before determining which tonal feature is

responsible for the surface low tones in these forms, let us look at the tones of a subset of these forms that are derived from verbs.

- (14) **mu-ló.lómá** message (from **lóma** 'to send')
kómbó.mbó economist (from **kómbé** 'to spare')
- (15) **e-ko.kolo** big animal (from **kola** 'to grow')
mu-ló.lókó freshness (from **lókó** 'to refreshen')

The forms in (14) derive from a H tone verb whereas those in (15) derive from a toneless verb.⁶

Since the reduplicate in (15) surface with a low tone unlike the one in (14), we may simply conclude that this must be the result of the default tone. As for the surface H tone in (14), it originates with an unassociated H that spreads onto the final vowel by the rule in (16).

- (16) High Tone Spread (HTS)



This rule says that a high tone spreads onto a following toneless vowel. Since no H tone surfaces on the final vowel of a word like **lóma** 'to send', this rule is restricted to nouns and it applies at the second stratum as will be illustrated in the derivation in (17).

The question now is whether the spreading originates from the root vowel or from the vowel of the single syllable reduplicate? If we assume that the underlying H of a H tone verb associates at the first stratum prior to the stem reduplication, in this case we must conclude that this H spreads from the root vowel. However, the other alternative that I support in this paper is to assume that tonological rules apply after the morphological processes in stratum one have applied. In this case, the underlying H tone will then first associate to the vowel of the reduplicate before spreading onto the toneless vowels. This is illustrated in (17).

- (17) **mu-ló.lómá** **e-ko.kolo**
 'message' 'big animal'

Stratum 1: stem-level processes

Stem: **lom-a** **kolo**

 H
 Reduplication 1 **lo.lom-a** **ko.kola**

 |
 H
 H Tone linking **lo.lom-a** **ko.kola**

 |
 H

Stratum 2: word-level processes

mu-lo.loma **e-ko.kolo**

 |
 H
 H tone spreading

⁶ As demonstrated in Mutaka (1993), although there is evidence for the existence of the lexical low tones in the monosyllabic stems, the disyllabic stems are either H toned or toneless underlyingly.

Postlexically:

e-pònde.pònde

H

Default tone

Output:

e-pòndé.pònde

To get the correct result, I have assumed that HTS occurs prior to H Tone Assignment. This rule assigns a H on the final vowel of a noun derived from a verb at the second stratum. This rule is discussed later in (34). Let us now look at the non-derived nouns.

- | | | |
|------|-----------------------|----------------------------------|
| (20) | e-tàkà.bkà | a kind of necklace |
| | e-tòggo.loggo | the kernel of an unripe palm nut |
| (21) | e-sanja.nja | urinary bladder |
| | pimbi.mbi | furious |
| | mu-sunju.nju | nose bleeding |
| (22) | mu-tíggí.líggí | stem of plantain cut down |
| | tóggó.lóggó | a kind of tree |
| | ma-dífbá.dífbá | a liquid |
| | e-dífbé.dífbé | kind of plant |
| | e-lósó.lósó | loud noise of joy |
| (23) | e-pé.pénjú | cockroach |

The surface low tone in (20) and (21) can be interpreted as the result of a default tone whereas the surface high tone in (22) and (23) can be interpreted as the result of HTS originating from a H prelinked to the first root vowel. Consider also the following underived nouns.

- | | | |
|------|----------------------|--------------------------|
| (24) | kátá.kàta | fraudulous |
| | e-beké.bèke | a very flat plate |
| | júkútú.pùkutu | small vegetable |
| (25) | i-bfà.bila | a small boy |
| | yómà.yoma | a small irrelevant thing |
| | mu-sòà.soan | earthquake |

Unlike the forms in (20)–(23), the reduplicate in the forms in (24) and (25) surface with a L. In all these cases, we can still posit a prelinked H on the first vowel of the root that surfaces with H. However, to prevent HTS, prespecification of L is proposed on the first vowel of the reduplicate in (24) and L on the last vowel of the base in (25).⁸ The reduplicates thus surface with a default tone in (25) and the first vowel of the reduplicate is a lexical L in (24). This is illustrated in (26).

- | | | |
|---------|---|---|
| (26) | kátá.kàta | i-bfà.bila |
| | 'fraudulous' | 'a small boy' |
| UR | kata.kata | i-bila.bila |
| | <div style="display: flex; justify-content: center; align-items: center;"> <div style="text-align: center;"> H </div> <div style="text-align: center;"> L </div> </div> | <div style="display: flex; justify-content: center; align-items: center;"> <div style="text-align: center;"> H </div> <div style="text-align: center;"> L </div> </div> |
| | HTS | |
| | (Other rules: Default L) | |
| Output: | kátá.kàta | i-bfà.bila |

⁸ This is a most plausible analysis that awaits further investigation for confirmation. Among these words, only **yoma** has been reconstructed in Proto Bantu (Guthrie 1971) as **yùma**, that is, with a low tone on the last vowel. This lends credence to this analysis of positing a low tone on the second vowel of the stem.

The following examples also call for a prespecification of L on the last vowel of these underived nouns.

- (27) **e-sékú.sékù** hiccup
 e-yéngé.yéngè ghost

In these forms, the author proposes that the H tone is associated to the first stem root vowel and [-raised], i.e., a lexical low tone is pre-associated to the final vowel. Although HTS applies in these forms, it does not affect the last vowel that is associated to a L. Consider also the forms in (28).

- (28) **e-bwéé.bwéē** awkward (from **bwéa** 'to kill')
 e-bwé.bwē massacre (from **bwā** 'to slaughter')
 e-bwélé.bwélé something breakable

The situation is somewhat similar to the previous cases where a H is associated to the first stem vowel. However, since the last vowel of these forms surfaces with a mid tone, it is not possible to say that the last vowel is associated to a L. Otherwise, we would expect a L on the last vowel. What is proposed is a floating [-raised] associated to the reduplicate morpheme. This [-raised] associates by rule on the final vowel after HTS has spread onto the entire word at stratum two. [-raised] thus lowers the H on the final vowel to the level of a mid tone.

Consider also the reduplication forms in (29).

- (29) **e-kum.kúm** vegetable
 kelen.kélén kind of vegetable

These forms are unusual in that the tones surface in what appears to be the reduplicate, if indeed reduplication is a copy of the stem material onto the right. We could then account for them by assuming that a [+upper] is assigned onto the first vowel of the reduplicate and that the last vowel acquires its tone through the application of the HTS discussed earlier. A second alternative is to interpret these forms as cases of right to left reduplication: this gives a type of infixation of the reduplicate for the word **e-kum.kúm**. (For similar cases of infixation of the reduplicate, see Broselow and McCarthy 1984.) Supporting evidence for this kind of reduplication in Duala was seen in single syllable reduplication with words like **mu-ló.lómá** 'message' (from **lóma** 'to send'), **e-ko.kolo** 'big animal' (from **kola** 'to grow'). One could then say that the low tone in the reduplicate is the result of the [-upper] default tone and that this must be stem-level reduplication, that is, the stem is copied to the left before the prefix is joined to the stem. Although this alternative is plausible, if we maintain that the default mode of reduplication in Duala is a left to right reduplication, this explanation does not hold water.

A better alternative is to propose that the last vowel of the base is pre-associated with a L followed by a floating H. This H associates to the vowels of the reduplicate and undergoes HTS in case the word has available TBUs on which the H tone can spread. Support for this analysis comes from the words **ekumf-ngando** 'the bringer of joy' and **ekumf-ngongo** 'by-name of God: he who calms, quiets' where the first member of the compound word is **ekumf** with a H tone on the last vowel. If we assume that **ekum** derives from **ekumf**, then we can plausibly conclude that H is the floating tone that was originally linked to the deleted *i*.

Finally, consider the data in (30) and (31) using the mid tone in the reduplicate.

- (30) **bo-nangá.nāngā** the fact of being spread out (from **nangá** 'to lie down')
 bo-pəngǝ.p'ngǝ the fact of making things (from **pəngǝ** 'to manufacture')
 bo-kolá.kōlā increasing (from **kola** 'to increase')
 bo-bupé.bupē running after (from **bupé** 'to chase away')

- (31) **bo-lóma.lómā** the fact of sending at random (from **lóma** 'to dispatch')
bo-téme.tēmē the standing up position (from **téme** 'to stand up')
bo-dókwa.dōkwā rolling, moving away (from **dókwa** 'to roll')
bo-kóla.kōlā cutting into small pieces (from **kóla** 'to cut')
bo-óla.ōlā maturation (from **óla** 'to mature')
bo-ślɔ.ʔlɔ the habit of warming oneself (from **ślɔ** 'to warm oneself')

Two phenomena are interesting in these forms: the tones in the base and the mid tone in the reduplicates.

Starting with the tones in the base, notice that the forms in (30) all derive from a toneless verb whereas those in (31) derive from a H tone verb. The final vowel of the base in the reduplicated form derived from a toneless verb surfaces with a H tone whereas the final vowel of the forms deriving from a H tone verb surfaces with a L. Notice that a comparable situation is observed in the perfect tense of Duala verbs whose final vowel is -i as shown in (32) and (33).⁹

- (32) SM-RT-FV
na-nəŋg-i I took (from **nəŋg** 'to take')
na-timb-i I returned (from **timb-a** 'to return')
na-lak-i I lent (from **lak-a** 'to lend')
- (33) **na-búk-i** I surpassed (from **búk-a** 'to surpass')
na-sís-i I rubbed (from **sís-a** 'to rub')

In the toneless forms of (32), the final vowel surfaces with a H whereas in the H tone verb in (33), the final vowel surfaces with a low, just like the base of the reduplicated forms in (30) and (31).

Supposing that the reduplicate in the forms in (30) and (31) is rendered extrametrical, i.e., invisible to phonological processes (see footnote 13), at the second stratum, where the derivation of the noun from the verb occurs, we can capture the similarity of the tones in the base of the reduplicated forms and the H on the final vowel of the perfect tense by saying that a tonal rule, call it Perfect H Assignment, inserts a H on the final vowel of these forms. This rule is formulated in (34).

- (34) Perfect H Assignment

V]

H

Condition: V is the -i of the perfect tense or
the final vowel of a noun derived from a verb.

This rule says: insert a H tone onto the last vowel of a verb in the perfect tense with the suffix -i or the final vowel of a noun derived from a verb.

As for the low tone on the final vowel of the forms in (31) and (32), it can be explained as a result of what Goldsmith (1984a,b) called Meeussen's Rule formulated in (35).

⁹ One could also compare the H tone on the final vowel of the forms in (30) and (31) with a postlexical H tone assigned to the final vowel of a verb followed by a noun as illustrated in the following forms.

- pəŋgɔ bred** to make bread (from **pəŋgɔ** 'to manufacture')
bola muto to give the woman (from **bola** 'to give')
wunja muto to untie the woman (from **wunja** 'to untie')
- lóma muto** send a person (from **lóma** 'to send')
kóla tina cut the tree (from **kóla** 'to cut')
sáwa muto to pay the woman (from **sáwa** 'to pay')

The H tone on the final vowel of the forms in the second group shows that this H on the final vowel of the base in (30) and (31) cannot be the result of such a postlexical H as this H does not undergo Meeussen's Rule that presumably applies lexically.

(35) Meeussen's Rule



This rule says: a H becomes L after another H.

Let us now look at the second interesting phenomenon in these reduplicated forms, namely, the fact that the reduplicate surfaces with a mid tone irrespective of the kind of tone that surfaces on the last vowel of the stem. In the reduplicates surfacing with L or ending in a L, we argued that a [-raised] was assigned to a specific tone bearing unit in the reduplicate. Here we cannot possibly say that either the [-raised] or the [+upper] is assigned to the first vowel of the reduplicate. In the case of the (H.MM) pattern in (30), a [-raised] on the first vowel of the reduplicate would yield (H.LL) whereas a [+upper] would give (H.HH). Lack of assignment of any tone could also lead to the application of the HTS and give (H.HH). In the case of the (L.MM) pattern in (31), a [-raised] on the first vowel would give (L.LL) and a [+upper] would give [L.HH]. None of these possibilities works here.¹⁰

Notice that, by maintaining that the tone is not copied in the reduplication we can obtain the correct tone on the reduplicate by assuming that, in addition to the [-upper] default tone, the default [+raised] feature is also assigned in the reduplicate of these words. The question would be: why is the assignment of [+raised] possible here and not in all the previous cases where there was a mid tone? One could of course imagine a number of ways in which this could be realized. For example, one could propose that, in the lexicon, the root morphemes of such words could be marked with the features [+redup +raised]. As the feature [+raised] is never active in the phonology, this feature will be assigned after all the phonological rules have applied. The disadvantage for such a move would be that, in assigning the feature [+raised] in the lexicon, one would be claiming that lexical words can in fact select redundant values in certain contexts, a situation totally unheard of. The position adopted in this paper is that, the reduplicate in these words constitutes a foot (2 syllables)¹¹ which is rendered extrametrical by a morphological rule.¹²

It should be pointed out that internal evidence for this extrametricality was proposed earlier with the insertion of the H tone onto the final vowel of a derived noun in (34). That is, this H is able to dock onto the final vowel of a noun derived from a verb if the reduplicate is invisible.

In a later stratum, presumably postlexical, when the extrametricality ceases its effects, the default [-upper] feature will have been assigned in the previous cases. We

¹⁰ Some evidence that the mid tone is not underlying in Duala can be deduced from Itman's observation that the surface tones found on monosyllabic roots are L, H, HL, and LH. He cites the following examples:

L: pɔ 'to come', mba 'cloud', ba 'to cut meat' ka 'manner'
 H: pɔ 'one', mbá 'me', ká 'pangolin'
 HL: pɔ́ 'machete', bá 'to marry', bô 'to be finished'
 LH: bá 'two'

If the mid tone was underlying, it would presumably contrast with L and H.

¹¹ A consideration of the majority of the stem-level reduplication cases reveals that the reduplicative template in Duala consists of two syllables. In metrical structure, these constitute a prosodic unit, namely, a foot. My contention is that this foot is the one that undergoes extrametricality. The recognition of metrical structure in Bantu languages, which is manifested in the assignment of penultimate stress in Swahili, Kinande, Chichewa (Sam Muchombo, personal communication), can thus be extended to Duala. Here, instead of penultimate stress, metrical structure is manifested in the assignment of mid tone on the final foot of the reduplicated word.

¹² Note also the following examples with monosyllabic stems and prefix *bo-* whose reduplicate also surfaces with a mid tone:

bo-dá.dá gluttony (from <i>dá</i>)	bo-bwá.bwá murder (from <i>bwá</i>)
bo-sá.sá grumbling about something (from <i>sa</i>)	bo-tó.tó noisy (from <i>tó</i>)

The reduplicate in these words can also be analysed as undergoing the extrametricality rule just as the disyllabic forms. In this case, the foot that is rendered extrametrical is degenerate in that it consists of one single syllable.

will then have a situation where only these forms have a reduplicate devoid of any tone. I propose that it is at this level that [+raised] is introduced as a default feature by the following default rule:

(36) Raising Default Rule

[] → [+raised]

This rule says: a tone bearing unit with no tonal feature becomes [+raised]. The [-upper] default feature which was the only default feature assigned in the previous cases will also apply in these reduplicate forms, thus rendering their TBUs [-upper +raised], i.e., making them surface with a mid tone. This amounts to saying that although Duala actively uses [-upper] as its default tone feature, the default [+raised] feature is nonetheless available in its later strata. In this way, Duala is in certain respects similar to a language like Yoruba where the mid tone is the combination of [+raised -upper] default features (Pulleyblank 1986).

CONCLUSION

To conclude, the process of tone assignment in the reduplication of Duala nouns is varied, depending upon the noun stems. In the whole word reduplication, the word is copied with the underlying tones. In the stem reduplication which constitutes the majority of cases, the stem is copied without the underlying tones. Often times, either the first vowel or the last vowel of the reduplicate is prespecified with a [-raised] feature or the last vowel is assigned a floating [-raised] feature. A few reduplicates in the nouns derived from verbs surface with a mid tone as a result of the default features [-upper +raised], although [+raised] is not activated elsewhere in the phonology of Duala.

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