The Natural History of Verb-Stem Reduplication in Bantu

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ABSTRACT

In this study I present a comparative and historical analysis of "frequentative" Bantu verb-stem reduplication, many of whose variants have been described for a number of Eastern and Southern Bantu languages. While some languages have full-stem compounding, where the stem consists of the verb root plus any and all suffixes, others restrict the reduplicant to two syllables. Two questions are addressed: (i) What was the original nature of reduplication in Proto-Bantu? (ii) What diachronic processes have led to the observed variation? I first consider evidence that the frequentative began as full-stem reduplication, which then became restricted either morphologically (by excluding inflectional and ultimately derivational suffixes) and/or phonologically (by imposing a bisyllabic maximum size constraint). I then turn to the opposite hypothesis and consider evidence and motivations for a conflicting tendency to rebuild full-stem reduplication from the partial reduplicant. I end by attempting to explain why the partial reduplicant is almost always preposed to the fuller base.

1.   Introduction

As Ashton (1944:316) succinctly puts it, "REDUPLICATION is a characteristic of Bantu languages. It affects syllables, verb stems, words, and phrases." Traditional Bantu grammars thus often include sections showing that verbs, nouns, adjectives, numerals and even pronouns and demonstratives can be reduplicated with specific semantic effects. In this, as in most aspects of Bantu grammar, the story is one of theme and variations: The reduplications in question show great similarity both in structure and in meaning, but also interesting differences. Nowhere are these differences more pronounced—or more significant—than in verb reduplication. While some Bantu languages exhibit total reduplication of the stem constituent consisting of the verb root + suffixes, others place maximum size constraints on the reduplicant and/or disallow certain suffixes, e.g. inflectional endings, from appearing within it. The major goal of this paper is to attempt to make sense out of this variation to determine the nature of verb reduplication in Proto-Bantu (PB). In order to do so, I start by cataloguing the various restrictions the ca. 500 daughter languages place on the reduplicant in §2. I then consider the possible relation of total reduplication to full word repetition in §3. In §4 I consider the evidence that the direction of change was from full-stem to partial-stem reduplication. While the simplest explanation is to assume, along with other scholars, that partial reduplication derives historically from full reduplication (Eulenberg 1971, Bybee et al 1994, Niepokuj 1997), in §5 I present evidence that total verb-stem reduplication can be built up from partial reduplication. I therefore suggest in §6 that the changes have been bidirectional and conclude in §7 by addressing the question of why partial reduplicants develop on the left of the full base.

2. Pan-Bantu verb-stem reduplication

As is well known, Bantu languages have a highly agglutinative word structure. In order to appreciate the issues which arise in verb-stem reduplication, the traditional internal constituents of the verb in Proto-Bantu (PB) and most of the daughter languages are shown in (1), as reconstructed by Meeussen (1967):

(1)

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                          verb
                 pre-stem        stem
                            base        FV  (= "final vowel")
                      radical     extensions
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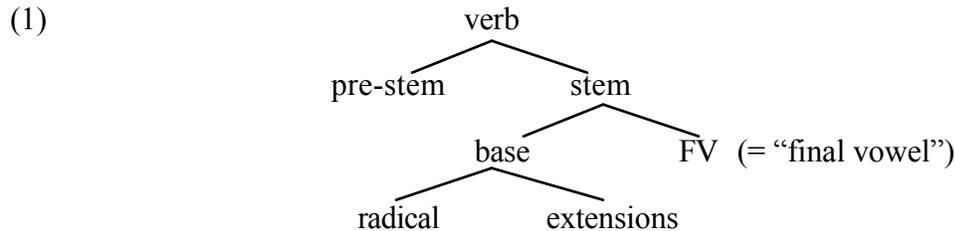
The different subconstituents are identified in (2), where some of the common PB suffixes are also indicated:

(2) a. pre-stem   subject, negative, tense, aspect, object prefixes
    b. radical   verb root (-CVC- is most common shape)
    c. extensions   derivational suffixes (causative *-ɪs-i-, applicative *-ɪd-, reciprocal *-an-, passive *-ʊ-); frozen suffixes and post-radical unanalyzable "expansions"
    d. FV   obligatory inflectional final suffix (past *-ɪ, subjunctive *-ɛ, perfective *-id-ɛ, imperfective *-ag-a; otherwise FV = default *-a)

An example from Haya (J.22) is given in (3).[1]

(3)   ti- bá- ka- ki- [kóm] -el -angan -ag -a   'they have never tied it for each other'
      NEG-SUBJ-PAST-OBJ- tie -APPL-RECIP-HAB-FV   (APPL = applicative; HAB = habitual)

As seen, a Bantu verb can be quite long and involve both multiple prefixes and suffixes.

     Given the structure of the Bantu verb in (1), three questions naturally arise. First, which morphological constituent in (4) was available for verb reduplication in PB?

(4)   a.   the whole word   (prefixes + root + extensions + FV)
      b.   the verb stem   (root + extensions + FV)
      c.   the verb base   (root + extensions)
      c.   the verb root   (perhaps with a linker vowel, e.g. CVC-a-CVC-a)

Besides the subconstituents of (1), there are other possibilities as well. As seen in the Haya example in (3), the object prefix (OBJ) occurs closest to the verb stem. In some Bantu languages

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[1] Each Bantu language cited is identified by name and "Guthrie indicator" which consists of a letter and number, e.g. Haya (J.22), which locates the language geographically (see the map in the appendix). While some of the abbreviations used in this studied are identified in the text, others are hopefully straightforward, e.g. SUBJ (subject prefix), RECIP (reciprocal extension).

the OBJ+stem is has been treated as a "macro-stem" constituent for the purpose of tone assignment or, as we shall see, reduplication.

While the question in (4) concerns the morphological constituent which served as input to reduplication in PB, i.e. which parts of the verb (prefixes, root, suffixes) could potentially be copied, a second question concerns the EXTENT of the reduplication: Could the constituent in question be fully copied, or was reduplication only partial? Not only do present-day Bantu languages differ from each other on this score, but there is even variation within the same language, as seen in the Tswana (S.31) examples in (5).

(5)   Tswana (S.31), where reduplication marks the "frequentative" (Cole 1955:217)

    rék-ɛl-a   'buy for' → a.   rék-ɛl-a + rɛk-ɛl-a   (H tone spreading not shown)
    buy-APPL-FV   → b.   rék-ɛ + rɛk-ɛl-a
                         → c.   rék-a + rɛk-ɛl-a

While the full verb stem is reduplicated in (5a), only the first two syllables appear in the preposed reduplicant (RED) in (5b). (5c) shows that RED can also consist of a -CVC- verb root plus the linker vowel -a-. There is no difference in meaning between these three variants.

The final question concerns which part is the reduplicant? Particularly when reduplication is total it may not be immediately obvious whether the structure is RED-base or base-RED. In fact, three different structures appear to be needed, as in Tswana:

(6)   a.   segmental truncation occurs on first part, suggesting RED is preposed ("prefixed") to the base: [[rék-ɛ] [rɛk-ɛl-a]].

      b.   as in the case of unreduplicated verb stems, all but the first (root) and last (FV) vowels of RED+stem are underlyingly toneless, including the second verb root, suggesting [[[rék] -ɛl-a-rɛk-ɛl] -a]

      c.   suffixes are often truncated, suggesting root reduplication: [[rék-a-rɛk] -ɛl-a]

While it remains to be determined exactly what should be reconstructed, it is reasonable to assume that some kind of verb reduplication was present in PB. Certainly this is the impression one gets from the comparative and historical Bantu manuals. Meinhof (1932:46) specifically refers to the kind of stem reduplication we are mostly concerned with here: "Complete and incomplete reduplication of the verb-stem occurs with an iterative-intensive force, e.g. Yao *lava-lava* 'go from place to place', from *-lava* 'start early in the morning', Swahili *-cekaceka* 'laugh continuously' from *ceka* 'laugh'." Meeussen (1967:88) also points out that Bantu languages often have lexicalized verb roots with CV- reduplications: "Some reconstructions... imply a type of radical with initial reduplication (-cvCVC-): *-titim-* 'be frightened', *-tetem-* 'tremble', *-pepet-* 'winnow', *-tʊtʊm-* 'tremble, quake, thunder'. The translations suggest meanings with a common element 'movement to and fro'." Lexicalized stem- or CV-reduplications are present in the ca. 10,000 Bantu Lexical Reconstructions 3 (Bastin & Schadeberg 2003), but generally fall under "Fiabilité 5" , defined as "attestations régionales ou peu nombreuses". Some examples are given in (7).

(7)   a.   *jág-a-jag-   'be restless'   *jág-   'scratch, be cramped for room'

*díng-a-ding-	'wind round several times or wrong'	*díng-	'twist, wrap up, surround'
b. *dé-demb-	'swing, hang, float'	*démb-	'be hung up, hover, swing'
*mú-mun-	'suck in mouth'	*mʊn-	'suck'

Still, the intuitive appeal of positing such a structure in PB derives from the fact that productive verb-stem reduplication is found with similar meanings in all Bantu zones (A-S). Representative examples are provided in (8).

(8) a. Duala (A.24): "etwas zwecklos wiederholt tun" (Meinhof 1912:67); "une action répétée (ou fréquente) et déraisonnable" (Ittmann 1939:195)[2]

tómb-a-tomb-anɛ	'passer et repasser sans cesse'	tómb-à	'passer'
yéng-a-yeng-anɛ	'flâner sans but'	yéng-a	'se prominer'

   b. Gunu (A.62): "une action continue ou soutenue" (Rekanga 1989:141)

bel-a-bel-a	'mentir contuellement'	bel-a	'mentir'
námb-a-namb-a	'préparer (action continue)'	námb-a	'préparer'

   c. Lingala (C.36d): "une action répétée... intensive... [ou] futile' (Guthrie 1966 [1939]:37)

bét-a-bét-a	'donner bien des coups'	bét-a	'frapper'
lob-a-lob-a	'bavarder'	lob-a	'parler'

   e. Nyanga (D.43): "une valeur intensive... faire beaucoup... à plusieurs reprises" (Mateene 1969:82)

i-kí-á-ki-a	'faire et refaire sans cesse'	i-kí-a	'faire'
i-bút-á-but-a	'enfanter un peu trop'	i-bút-a	'enfanter'

   f. Rimi (F.32): "frequency of action with... attenuation, purposelessness, errative" (Olson 1964:161)

fing-á-fing-a	'trip, close frequently'	fing-a	'trip, close'
mank-a-mank-a	'trot'	mank-a	'run'

   d. Mbukushu (K.33b): "frequency or intensification of an action" (Fisch 1998:123)

korw-a-korw-a	'always be sick'	korw-a	'be sick'
kwat-a-kwat-a	'touch everything'	kwat-a	'touch'

   g. Yao (P.21): "action... is realized repeatedly or frequently at large intervals" (Ngunga 2000:107)

lim-a-lim-a	'cultivate frequently'	lim-a	'cultivate'
lokot-a-lokot-a	'pick up repeatedly'	lokot-a	'pick up'

   h. Venda (S.21): "A verb root may be reduplicated to express... an action that is carried out frequently or repetitively. Sometimes... aimlessly, or indiscriminately." (Poulos 1990:195-6)

lim-a-lim-a	'plough sporadically here and there'	lim-a	'plough'
dzul-a-dzul-a	'sit here and there'	dzul-a	'sit'

By contrast, CV- reduplications are usually lexicalized, sometimes with an "intrusive" -lV, as in Yao (P.21) *gala-gaat-a* 'roll on the ground', *ŋulu-ŋuund-a* 'scrape out' *kolo-koosol-a 'shell'

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2 The reciprocal suffix -*anɛ* is required in verb-stem reduplication in Duala.

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(Ngunga 2000:114). While it is not clear whether the two reduplicative patterns are historically related, doublets do appear in some languages, e.g. in Kinyarwanda (J.61): *ku-béera-beera ~ ku-bé-beera* 'to walk aimlessly', *ku-búuta-buuta ~ ku-búu-buuta* 'to walk back bent' (Kimenyi 2002:260).[3] The shared property that can be isolated throughout Bantu is that verb reduplication primarily or only targets the stem. As we shall see, prefixal material only sporadically makes it into RED, and only when motivated by phonological constraints. Although there is some question about whether the pre-stem elements were prefixes or separate clitics or words in Proto-Bantu (see Hyman 2007, Nurse 2007), it is clear that they ARE prefixes in many Bantu languages, e.g. in Luganda (J.15) (Hyman & Katamba 2005). Thus, the general exclusion of prefixes in reduplication could have one of two diachronic explanations: First, if Meeussen's reconstruction in (1) is correct, reduplication may have originally targeted a sub-constituent of the verb in (4b-d). Alternatively, if the pre-stem markers were not prefixes at the time verb reduplication was introduced, they would have automatically been excluded. However, we would have to add that once these markers became prefixes, the question would be why they did not later become incorporated into RED. This second explanation most naturally fits the claimed universal that reduplication always begins as total copy and that changes follow the universally unidirectional process of full > partial reduplication (Niepokuj 1997). In the next section I consider the logic and evidence for full verb reduplication in PB.

3. Reduplication vs. repetition

To recapitulate, and setting aside the issue of the macro-stem for the moment, we are considering four hypotheses re the origin of verb reduplication in Bantu:

(9) a. PB reduplication targeted the whole verb (prefixes + root + extensions + FV)
    b. PB reduplication targeted the verb stem (root + extensions + FV)
    c. PB reduplication targeted the verb base (root + extensions)
    d . PB reduplication targeted the verb root only (e.g. -CVC-a-CVC-)

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[3] Cf. §4 for discussion of aspectual CV- reduplication in Lengola (D.12) and Kanyok (L.32).

There are several intuitive arguments for whole-verb reduplication, both universal and Bantu-specific. First, there is the possibility of deriving reduplication from word repetition, as in *You talk, talk, talk all the time!* Second, there is the possibility of maintaining unidirectionalitiy, i.e. *full > partial reduplication (Niepokuj 1997). Third, there is synchronic evidence that at least some cases of partial reduplication should be treated as "morphological doubling" (Inkelas & Zoll 2005; cf. Steriade 1988). As Eulenberg (1971:73) puts it, "...cases of so-called partial reduplication are simply phonological [and morphological] reductions, sometimes drastic, from cases of full reduplications."

Concerning the possible diachronic process repetition > reduplication, many Bantu languages are known for repeating full words and phrases in spontaneous discourse. Examples from Totela (K.41) are provided in (10) (Thera Crane, personal communication):

(10) a.   Abo ba-ku-tutuluka   ku-kula   ku-kula   muzi ku-kula muzi
        theythey-NARR-come.out NARR-clean NARR-clean village NARR-clean village

         ku-kula   muzi   'They came out and cleaned up the whole village.'
        NARR-clean village

    b.   Ku-mu-busa-busa   ku-mu-busa-busa   ba-ku-mu-ta
        NARR-her-greet-greet NARR-her-greet-greet they-NARR-her-tell
        'They greeted her (enthusiastically, over and over) and they told her…'

While there is an obvious semantic link between repetition, as in the above examples, and the frequentative meanings seen in the examples in (8), there are potential differences. Fortune (1982:49), for example, states that "the meaning of the reduplicated R differs from that of the R repeated," providing examples such as the following from Shona (S.10): *Róvá! Róvá!* 'Hit! Hit!'

vs. *Róv-á-róv*-a 'hit all over indiscriminately!'. In the first case each verb gets its own tonal assignment, while in the second, there is a single tone assignment over the whole verb.

Once we leave the verb, we find that there are widespread cases of full word reduplication (or is it "repetition"?) marking certain constructions. One of these is the widespread distributive numeral construction exemplified in (11) from Kanyok (L.32), which drops final vowels (Mukash-Kalel 1982:151):

(11) a.   bà-bìdy 'two'   →   bà-bìdy bà-bìdy 'two by two, two each'
    b.   bà-sàt   'three' →   bà-sàt bà-sàt   'three by three, three each'

As seen, the class 2 plural prefix *ba-* is copied along with the numeral stem. I am unaware of any Bantu language which allows forms like *bà-bìdy-bìdy and *bà-sàt-sàt.

Even the reduplication of nouns and adjectives is more amenable to allowing a prefix to be copied into the reduplicant. In Kinande (J.42), noun reduplication assigns meanings like 'a real X' or 'a good example of an X' vs. other Bantu languages where the meaning would be pejorative (e.g. 'a lousy example of an X'). As seen in (12a), a noun prefix will not be copied if the stem is bisyllabic, which also establishes that RED is postposed to the base (Mutaka & Hyman 1990:77-80):[4]

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[4] Unlike verb reduplication, tones are copied in noun reduplication in Kinande and generally in Bantu. The Kinande forms are cited without final boundary tones.

(12) a. kʊ-gʊlʊ   'leg'   →   kʊ-gʊlʊ-gʊlʊ   'a real leg'   *<u>kʊ</u>-gʊlʊ-<u>kʊ</u>-gʊlʊ
         mú-síka   'girl'   →   mú-síka-síka   'a real girl'   *<u>mú</u>-síkà-<u>mú</u>-síkà

   b. ká-tɪ   'stick' →   ká-tí-ká-tɪ   'a real stick'
         ri-bwɛ   'stone' →   ri-bwɛ-ri-bwɛ   'a real stone'

   c. m̅-bʊlɪ   'goat'   →   m̅-bʊlí-m-bʊlɪ   'a real goat'
         ń-zoka   'snake' →   ń-zoká-n-zoka   'a real snake'

   d. mú-heruki   'bride'   →   *mú-heruki-heruki
         ki-témbekali 'tree (sp.)' →   *ki-témbekali-témbekali

In (12b), however, the prefix is copied when the stem is monosyllabic, as it is in (12c), where the nasal is non-syllabic, unless initial. The generalization is that Kinande requires a bisyllabic RED: either the stem in (12a) or the prefix + stem in (12b,c). (12d) shows that longer stems cannot be reduplicated. If the full stem were reduplicated, RED would have three or four syllables. Truncated solutions such as *mú-heruki-heru or *mú-heruki-ruki are not acceptable because of MORPHEME INTEGRITY: Kinande prohibits the mapping only part of a morpheme into RED.

The same RED = σ-σ is in force in Kinande verb reduplication, but with a crucial difference. As seen in (13a), where the verb stem is monosyllabic, the noun class 5 infinitive prefix *rɪ-* cannot be copied into RED as was possible in the case of nouns in (12b).

(13) a. rɪ-sw-a   'to grind'   →   (rɪ-) swa-swa + sw-a   '... a little here and
         rí-tw-a   'to cut'   →   (rí-) twa-twa + tw-a   there'

   b. ri-hʊm-a   'to beat'   →   (ri-) hʊm-a + hʊm-a
         rí-tʊm-a   'to send'   →   (rí-) tʊm-a + tʊm-a

   c. ri-hʊm-ɪr-a 'to beat for/at' →   (ri-) hʊm-a + hʊm-ɪr-a
         rí-tʊm-ɪr-a 'to send for/to' →   (rí-) tʊm-a + tʊm-ɪr-a

As a result, the verb stem must copy twice in order to fill out the bisyllabic RED requirement. The bisyllabic stem reduplicates as expected in (13b), whereas reduplication is possible in (13c) only because the applicative suffix *-ɪr-* can be truncated. As will be seen in the following sections, similar "complications" are observed in other Bantu languages. In §4 and §5 we consider two hypotheses: first, that PB had full verb-stem reduplication which has been subject to truncations, and second, that PB had verb-root reduplication which has been subject to augmentations.

4.   Hypothesis I: Full > partial verb-stem reduplication

Despite the semantic and structural similarities of verb reduplication across the Bantu 500, there are important formal differences in the phonological size of preposed RED and its morphological contents. First, it should be noted that some Bantu languages require full verb-stem reduplication. As seen in the Ciyao (P.21) examples in (14) (Ngunga 2000:105-107), both derivational extensions such as applicative *-il-/-el-* and final inflectional endings such as perfective *-il-e*.[5] (Reduplications are shown without prefix morphemes, since these latter do not copy.)

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[5] The perfective ending *-id-e* (> il-e) consists of two morphemes, as demonstrated by the fact that causative *-i-* and passive *-ʋ-* occur between them (Bastin 1983).

(14) a. root + -a   : telek-a   → telek-a + telek-a   'cook frequently'

    b. root-APPL-a : telec-el-a   → telec-el-a + telec-el-a 'cook for (s.o.) frequently'

    c. root-PERF   : dim-il-e   → dim-il-e + dim-il-e   'cultivated many times'

While languages like Ciyao and Luganda (J.15) must fully reduplicate the verb stem, truncation of suffixes in RED is quite widespread. As seen in (15), Odden (1996:130-145) has caught Kikerewe (J.24) in transition:

(15) a. ku-lim-il-an-a 'to cultivate for each other'

      i.   ku-lim-il-an-a + lim-il-an-a   (full stem reduplication)

      ii. ku-lim-il-a + lim-il-an-a   (reciprocal -an- is "truncated")

      iii. ku-lim-a + lim-il-an-a   (applicative -il- and reciprocal -an- are truncated)

      iv. *ku-lim-<u>an</u>-a + lim-<u>il</u>-an-a   (applicative -il- truncated)

    b. a-lim-íl-é 'he cultivated'

      i.   a-lim-il-e + lim-íl-é   (full stem reduplication)

      ii. a-lim-a + lim-íl-é   (inflectional -ile is "truncated", -a = default)

    c. ku-káláang-a   'to fry'

      i.   ku-kálááng-a + kalaang-a   'to fry any old way'

      ii. *ku-kálá + kalaang-a   (full root must reduplicate)

Full verb stem reduplication is shown in the (i) examples. In (15a.ii) the first of the two derivational extensions has been truncated, while (15a.iii) has truncated both. The ungrammatical form in (15a.iv) shows that it is not possible to truncate the second extension (reciprocal *-an-*) without truncating the first, i.e. once an input suffix has failed to be copied in RED, no suffixes to its right can be further considered. The relevant constraint is that "the reduplicant must correspond to a contiguous substring of the derivational [i.e. base] stem" (Odden 1996:137). (15b.i.) again shows full reduplication, this time including the perfective ending *-il-e*, which however can be truncated, as in (15b.ii), where RED appears with the default FV *-a*. (15c.i.) exemplifies the full reduplication of a long verb root, while (15c.ii) shows that truncation is not possible if the result is a violation of morpheme integrity: "partial copying of morphemes is blocked" (Odden 1996:138).

    Thus far we have established two tendencies that contribute to RED being less than total reduplication: the tendency for RED to consist of two syllables and the tendency for RED to exclude suffixal material (other than the default FV *-a*). Concerning the first, there actually are three different situations, depending on whether the two-syllable RED is (i) a minimum, (ii) a maximum, or (iii) both. As seen in (20), which shows reflexes of stems containing the PB roots *-gʊ-* 'fall' and *-dɪm-* 'cultivate', all three situations are attested:

(20) (i) RED ≥ σ-σ   (ii) RED ≤ σ-σ   (iii) RED = σ-σ

      e.g. Sukuma   e.g. Kinyarwanda e.g. Ndebele

      gw-a-gw-a + gw-a   gw-aa + gw-aan-a   w-a-yi + w-a   'fall here & there'

      lɪm-ɪl-a + lɪm-ɪl-a rim-aa + rim-ir-a   lim-a + lim-el-a   'cultivate for here & there'

(i) In Sukuma, RED "is not maximally disyllabic although minimally it must be at least disyllabic" (Matondo 2003:133). As seen, RED may doubly reduplicate a monosyllabic stem in order to fill out the two-syllable minimum. An alternative is to copy a preceding prefix, e.g. *(gʊ-) gw-a-gw-a + gw-a ~ gʊ-gw-a + gʊ-gw-a* 'to fall here & there' (Matondo 2003:122). There is no upper limit on the size of RED, e.g. *leembeel-el-nij-iw-a + leembeel-el-nij-iw-a* ('be calm' + APPLICATIVE + SIMULTANEOUS + PASSIVE). However, when a verb stem contains only one productive suffix, it may optionally be truncated, e.g. *lɪm-ɪl-a + lɪm-ɪl-a ~ lɪm-a + lɪm-ɪl-a* 'cultivate for here & there' (Matondo 2003:129-130, 154).

(ii) Kinyarwanda is unusual both in limiting RED to root material only and in its treatment of subminimal -CV- roots. While Kimenyi (2002) shows that /gu-a/ *gw-a* 'fall' cannot reduplicate as **gw-aa + gwa*, Fidèle Mpiranya (personal communication) points out that it is possible for *gw-a* to reduplicate as *gw-aa + gw-aan-a*, where the base has been augmented by what looks like the reciprocal extension -*an*- (cf. /pfu-a/ *pf-a* 'die' → *pf-aa + pf-aan-a* 'waste away', i.e. 'die a little bit here and there').[6] As a result, RED can be either monosyllabic or bisyllabic in Kinyarwanda.[7] Although I expect that they exist, I have not located any Bantu languages which are like Kinyarwanda, but have *gw-aa + gwa*.[8]

(iii) The third situation is the most common and is represented by Ndebele (S.44), which has an absolute requirement that RED consist of two syllables. When the stem is monosyllabic, a dummy second syllable -*yi* thus fills out the bisyllabic template.

While the tendency towards a bisyllabic RED is a phonological condition, it sometimes goes hand in hand with the second tendency to exclude both extensions and inflectional endings other than default -*a*. The additional examples in (21) show that Ndebele's bisyllabic RED does not respect morpheme integrity (Hyman, Inkelas & Sibanda 1998):

(21) a. lim-a 'cultivate' → lim-a + lim-a '... a little here and
   thum-a 'send'   → thum-a + thum-a   there'

 b. nambith-a 'taste'   → nambi + nambith-a
   thembuz-a 'go from wife to wife' → thembu + thembuz-a

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[6] One is reminded of the obligatory suffixation of reciprocal -anɛ in Duala reduplication seen in (8a), as well as the fact that reciprocal -*an*- is sometimes added to convert a monosyllabic stem into a bisyllabic word, as in the singular affirmative imperative in Ndebele (S.44): /m-a/ 'stand' → m-an-a (Sibanda 2004) with the variant yi-ma (Downing 2001:36).

[7] The long vowel of the RED in *gw-aa + gw-aan-a* and *pf-aa + pf-aan-a* indicates that bimoraic *gw-aa* escapes final vowel shortening, as it also does in Luganda (J.15) (Hyman & Katamba 1990). A bisyllabic RED sometimes also ends in a long vowel, e.g. *rim-aa-*.

[8] Another indication that Kinyarwanda allows RED to be monosyllabic is seen from how it treats vowel-initial verbs. The infinitive /ku-ón-a/ → kw-óon-a 'to graze on crops' reduplicates as /ku-ón-a + ón-a/ → *kw-óon-oon-a*, which is only one syllable longer than the input. This contrasts with Kinande *e-ry-es-a* 'to play', which double reduplicates as *e-ry-es-es-es-a*, since its RED must be bisyllabic (Mutaka & Hyman 1990).

Long roots therefore can be truncated, as in (21b). When the verb root occurs with a productive derivational extension, RED occurs in two forms, as in (22).

(22) a.　lim-el-a　→　lim-e + lim-el-a　　'cultivate for/at'　(applicative -el-)
　　　　　　　　→　lim-a + lim-el-a
　　　b.　lim-is-a　→　lim-i + lim-is-a　　'make cultivate'　(causative -is-)
　　　　　　　　→　lim-a + lim-is-a

Either the first vowel of the -VC- extension is copied, or the extension is truncated and default -*a* appears instead. However, although (21b) and the first variants of (22a,b) show that Ndebele does not respect morpheme integrity, monomorphemic verb bases of 3+ syllables still cannot reduplicate with -*a*: *namb-a + nambith-a, *themb-a + thembuz-a*. The generalization is that replacement by default -*a* is possible only if all of the root material has been exhaustively mapped into RED.

　　　While the first variants of (22a,b) show that the vowel of a derivational suffix can be copied into RED, (23) shows that RED cannot contain inflectional material from the base:

(23) a.　lim-e　→　lim-a + lim-e　　*lim-e + lim-e　(subjunctive -e)
　　　b.　lim-i　→　lim-a + lim-i　　*lim-i + lim-i　(negative -i)
　　　c.　lim-ile　→　lim-a + lim-ile　*lim-i + lim-ile　(perfective -ile)

As observed, default -*a* is required to fill out the bisyllabic RED in such cases.

　　　In (24) I summarize the properties of Ndebele RED in terms of the Bantu verb stem according to Downing (1999, 2003):

(24)　　　　　　　　　　　　　　　　　　　I-stem

　　　　　　　Extended Derivational-stem　　　　　Inflectional final suffix (IFS)

　　　Minimal D-stem [=root]　　Extensions

e.g.　　　lim-　　　　　　　-el-, -is-　　　　-e, -i, -ile, -a
　　　　Must copy　　　　　*May copy*　　　　*Cannot copy*

　　　What these examples show is that there are TWO scales for paring down the reduplicant, starting with the full (inflected) verb stem, as in (25).

(25) a.　Phonological scale:　　full > foot (σ-σ) > syllable　　　(> mora > tone > Ø)
　　　b.　Morphological scale:　I-stem > Extended D-stem > root

Concerning the morphological scale, Ndebele nicely captures the three-way distinction: All root material for which there is room is obligatory in RED, derivational material is optional, and inflectional material is prohibited. A logical extension of this is to restrict reduplication to CVC-roots, as is nearly the case in Kinyarwanda (J.61). Since Kimenyi's (2002) study mostly

concerns lexicalized verb-stem reduplication, in (26) I have replaced his examples with relatively productive ones provided by Fidèle Mpiranyi (personal communication) to show that non-syllabic extensions such as passive /-u-/ -w- and causative /-i-/ -y- do not occur in RED even if there is room for them:[9]

(26) a.   rim-w-a   'be cultivated' → rim-aa + rim-w-a   'be cultivated several times'
                                     (*rim-w-aa + rim-w-a)

      b.   kwiiz-a   'spread (tr.)' → kwíir-a + kwiiz-a   'spread (tr.) all over'
            /kwiir-i-a/   (*kwiiz-a + kwiiz-a)

       cf. kwiir-a 'spread (intr.)   → kwiir-a + kwiir-a   'spread (intr.) all over'

It does, however, seem at least marginally acceptable for a productive -VC- extension to appear with a CV- root in RED, e.g. *gw-iir-a* 'fall for/at' → *gw-iir-a + gw-iir-a, gu-ush-a* 'cause to fall' → *gu-ush-a + gu-ush-a.* While Kinyarwanda does not allow reduplication of unanalyzable stems of three or more syllables, or those whose morphology is frozen or unproductive, Kikuyu (E.51) has imposed Downing's canonical CVC-a stem in defiance of morpheme integrity (Peng 1991, Mugane 1997:12):

(27) a.   kor-a   'grow'   →   kor-a + kor-a
             cin-a   'burn'   →   cin-a + cin-a
      b.   koor-a   'pull out'   →   koor-a + koor-a
             ßuut-a   'depose'   →   ßuut-a + ßuut-a
      c.   ßocor-a   'be indented' →   ßoc-a + ßocor-a
             hɔɔrɛr-a   'be quiet'   →   hɔɔr-a + hɔɔrɛr-a
      d.   ciɣerer-a   'encircle'   →   ciɣ-a + ciɣerer-a
             hwɛrɛrɛk-a 'tilt'   →   hwɛr-a + hwɛrɛrɛk-a

Neither Kinyarwanda nor Kikuyu allow inflectional endings in RED.
     Concerning the phonological scale in (25a), we have yet to illustrate the reduction to a syllable. A seen in (28), Lengola (D.12) expresses the habitual by means of verb-stem reduplication (Stappers 1971:268):

(28) a.   i-kul-a   'acheter'   i-kul-a + kul-a   (CVC-a → CVC-a reduplication)
           i-ɓon-a   'regarder'   i-ɓon-a + ɓon-a
           i-túm-a   'envoyer'   i-túm-a + tum-a
           i-límb-a 'chanter'   i-límb-a + limb-a

      b.   i-ɓí-a   'manger'   i-ɓ-â + ɓi-a   (CV-a → Ca- reduplication)
           i-ßî-a   'parler'   i-ß-â + ßi-a
           i-ki-a   'faire'   i-k-a + ki-a

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[9] In (26b), *r* → *z* before causative -*i*-. Mpiranya points out that there are lexicalized exceptions where the causative is copied: *rwáar-a* 'be sick' → /rwaar-i-a/ *rwáaz-a* 'take care of a sick person' → *rwáaz-a + rwáaz-a* 'take care of a sick person or situation with a lot of effort'.

  c. i-kpet-a 'couper'   i-kp-a + kpet-a   (CVC-a → C-a- reduplication)
      i-gbok-a 'trouver'   i-gb-a + gbok-a
      i-ɸám-a   'crier'   i-ɸ-â + ɸam-a

As seen, the -CVC- verb roots in (28a) fully reduplicate along with the FV -*a*. In (28b), where the root has the shape -Ci-, the vowel is truncated in RED. The forms in (28c) show that the RED of some -CVC- roots has also been truncated to *C-a-*.

A similar story comes from Kanyok (L.32), which contrasts stem- and CV- reduplication (Stappers 1986a:17; Mukash-Kalel 1982:151-2, personal communication):

(29) a. frequentative: 'tout le temps et de manière désordonnée"

          dim   'cultiver' → dim + dim   ow   'se laver' → ow + ow
          tum   'envoyer'   → tum + tum   and 'creuser'   → and + and

      b. imperfective aspect (progressive, durative)

          dim   'cultiver' → dii + dim   ow   'se laver' → ow + ow
          tum   'envoyer'   → tuu + tum   and 'creuser'   → and + and

Since Kanyok has lost most final vowels, the frequentative forms *dim-dim* and *tum-tum* in (29a) are equivalent to *dim-a + dim-a* and *tum-a + tum-a* in other Bantu languages. In (29b), we see that CVC roots have a CVV- RED in the imperfective aspect. Both Lengola and Kanyok thus exploit stem reduplication for marking aspect. While the two RED patterns may at first seem unrelated, there is, in turn, an obvious semantic relation between frequentative 'all the time, here and there' and imperfective aspect. I hypothesize, therefore, that both constructions in (29) have the same source. This is confirmed in the case of -VC- roots. As seen in the right column of (29a,b), the frequentative and imperfective have the same reduplicated root—and there is no vowel lengthening in the imperfective (i.e. **oow-ow*). We might hypothesize that the frequentative originally imposed a two-syllable minimum on RED. This constraint was subsequently relaxed in the semantic split that gave rise to the reduplicated imperfective aspect (which is clearly an innovation). Further evidence is seen from the ways in which subminimal -CV- roots reduplicate in (30).

(30) a. /tu/ tw 'piler' → tw-aa-tw-aa-tw (frequentative)
      b.   → tw-aa-tw   (frequentative or imperfective)

As seen, the historical FV -*a* appears (lengthened) in RED, which in the frequentative can optionally produce a triplicated structure. Both the total reduplication of -VC- roots and the presence of -*aa*- suggests that the RED of imperfective CVV- reduplication was originally *CVC-a.

The change of *CVC-a to CV- reduplication is also seen in Boma (B.74a) nominalized habituals, which Stappers (1986b:40) describes as "...partielle Verdoppelung gebildet, wobei der Vokal der Teilreduplikation immer geschlossen ist und einen steigenden Ton aufweist. Ein pejorative Sinn ist impliziert." Thus, when habitual/repetitive verb forms such as in (31a) are nominalized, RED develops into a consonant + high vowel, as in (31b).

(31) a. laʁ-á   →   laʁ-a-laʁ-á   'gewöhnlich/immer wieder spazieren gehen'

     b.   sáʁ-a   →   i-sǐ-sáʁ-a   'Gewohnheit zu tun'

        za:ʁ-ɛ   →   i-zi-za:ʁ-ɛ   'gewohnheitsmässig essen'

        cûm-a   →   i-cǔ-cûm-a   'Gewohnheit zu kaufen'

        kwâŋ-a   →   i-kǔ-kwâŋ-a   'Gewohnheit zu lieben'

        kɔ́b-a   →   i-kǔ-kɔ́b-a   'gewohnheitsmässig weben'

While attested only in Northwest Bantu, Ci-/Cu- reduplication is of course well-known from West Africa.[10] Further reduction of a single-syllable RED is seen in (32) from Bafia (A.53), another Northwest Bantu language (Aroga Bessong & Melcuk 1983:500):

(32)   infinitive   3sg + durative reduplication   RED → Ø, with V length

       rɨ-kàn   'écrire'   á-kàŋ-kàn   â:-ŋkàn

       rɨ-sòo   'laver'   á-sòo-sòo   â:-sòo

       rɨ-kálɨ̀   'dire'   á-ꜜká-kálɨ̀   â:-kálɨ̀

       rɨ-làn-ɨ̀   'se fendre's   á-là-lànɨ̀   â:-lànɨ̀

As seen, durative reduplication is marked by a monosyllabic RED. As an alternative, RED may undergo segmental deletion, which Aroga Bessong & Melcuk term "contraction". In the last column of (32) we see that the subject acquires the low tone of the RED to become a high-low falling tone on a long vowel. If this contraction replaced the earlier construction, there would be no synchronic evidence that the durative had originally involved reduplication rather than the loss of an aspectual (C)V prefix with low tone. The last steps in the phonological evolution of reduplication are, thus, reanalysis and loss.

5.   Hypothesis II: Partial > full verb-stem reduplication

In the previous section we saw that some Bantu languages have full-stem verb reduplication, while others reduplicate less than the full stem. In some cases the truncations or "contraction" are clear innovations and look rather recent. The simplest hypothesis is that PB reduplicated the full verb stem, which was later pared down to morphologically and phonologically simpler structures. Hypothesis I thus claims a unidirectionality from a bigger to a smaller RED. The full story is, however, a bit more complex. There are counter-tendencies which can have the effect of ENLARGING the reduplicant, i.e. in going from a smaller to a bigger RED. If correct, this would mean that there has been bidirectional change, which naturally could complicate the task of determining what the PB situation in fact was.

     As I shall now document, these counter-tendancies take the following shapes:

(33) a.   RED may include affixes (which are otherwise barred) to make RED bisyllabic

     b.   RED may include affixes (which are otherwise barred) because they syllabify with the root

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[10] Stappers doesn't give enough examples to be certain, but except for *i-kǔ-kâŋ-a* 'Gewohnheit zu pflanzen', the Cu- RED occurs when the root either has a round vowel or begins with Cw. On the other hand, the roots with a Ci- RED have both an initial coronal consonant and either the vowel /a/ or /ɛ/.

c. RED may include affixes (which are otherwise barred) when base-reduplicant featural non-identity would otherwise result

As we shall see, the result is that RED may be enlarged in one of two ways: First, more stem material, specifically suffixes, may become incorporated into RED. Second, material outside the stem, specifically prefixes, may become incorporated into RED. Whereas the first has to do with how much of the verb stem is copied in reduplication, the second has to do with the scope of reduplication and whether it can "see" prefixal material lying to the left of the stem. In the following subsections we will focus first on the issue of prefix-incorporation into RED and then consider cases where inflectional suffixes are exceptionally copied.

5.1. Prefix-incorporation

The first situation to be considered is when a prefix is exceptionally copied when it is needed to make RED bisyllabic. This happens only in the case of sub-minimal verb roots, which are either /-CV-/ or /-C-/, depending on the language. In (34) we see how the subminimal root -dl- 'eat' is reduplicated in Ndebele:

(34) a. (úku-) dl-a   'to eat'   →   (ú-ku-)   dla-yi + dla
    b. (úku-) zi-dl-a   'to eat them'   →   (ú-ku-zi-) dla-yi + dla
    c. (úku-) zi-dl-a   'to eat them'   →   (ú-ku-)   zi-dla + zi-dla
    d. (úku-) zi-bón-a 'to see them'   →   (ú-ku-zi-) bón-a + bon-a
                                            *(ú-ku-)   zi-bó(n-a) + zi-bon-a

In (34a), the verb stem *dl-a* 'eat' is monosyllabic. Recall that Ndebele (S.44) requires a bisyllabic RED. In order to fill out the template, a dummy syllable -*yi* is added to the monosyllabic stem. Since the class 15 augment + prefix sequence /ú-ku-/ is not available, (34a) represents the only way that subminimal *dl-a* can be reduplicated. The same *dla-yi* RED is observed in (34b), where the class 10 object prefix *zi-* 'them' has been added. However, (34c) shows that zi- may alternatively be itself reduplicated. What this means is that when another syllable is required, Ndebele speakers can "go up" to the macro-stem level, the constituent which consists of the object prefix + stem. As seen in (34d), this strategy is not available if the root is any longer, i.e. if it is -CVC-. If *zi-* is included, the resulting RED will violate one of two otherwise inviolable constraints: (i) *zi-bón-a + zi-bon-a* has a trisyllabic RED; (ii) *zi-bó + zi-bon-a* has a RED which fails to parse as much of the root as possible, specifically the /n/ of /-bón-/ 'see'.

    As we saw with respect to suffixal material, an object prefix can appear in RED only if the root material is exhausted. The five equally acceptable outputs in (35), all of which derive from *ú-ku-zi-dl-el-a* 'to eat them for/at', show that an object prefix may appear in RED even if an extension occurs with the consonantal root:

(35) a. (ú-ku-zi-) dl-el-a   →   (ú-ku-zi-) dl-el-a + dl-el-a
                 eat-APPL-FV   →   (ú-ku-zi-) dl-a-yi + dl-el-a
                                  →   (ú-ku-zi-) dl-e-yi + dl-el-a
    b. (ú-ku-) zi-dl-el-a   →   (ú-ku-)   zi-dl-a + zi-dl-el-a
           OBJ-eat-APPL-FV   →   (ú-ku-)   zi-dl-e + zi-dl-el-a

In (35a), where reduplication occurs at the stem level, there are three different possibilities. First, the full stem *dl-el-a* 'eat for/at' can be copied. Second, the applicative extension *-el-* can be truncated, in which the reduplicant consists of the root + default FV *-a* (*dl-a*) plus the dummy syllable *-yi*. This realization corresponds to *lim-a + lim-el-a* in (22a). The third stem-level reduplication consists of the root dl- plus the vowel [e] of applicative *-el-* followed again by the dummy *-yi*. This realization corresponds to *lim-e + lim-el-a* in (22a). Turning to (35b), here we see two alternatives where reduplication has gone up to the macro-stem level. In both cases the object prefix zi- is copied: In the first realization, applicative *-el-* is truncated and the default FV *-a* appears. In the second realization, the [e] of applicative *-el-* is parsed. The Ndebele facts show how extra-stem material, namely the object prefix, can be copied in red in case the root material has been exhausted. Crucially, there is no requirement to exhaust stem-level material before moving up to the macro-stem. We therefore need to extend the three-way distinction made in (24) as follows: (i) root material must copy; (ii) an extension OR object prefix may copy; (iii) inflectional endings may not copy.

In Ndebele, the only pre-stem material which can be copied in RED is the object prefix, and only if there is a second syllable slot available for it. In Kihehe (G.62) any prefix may appear in RED which syllabifies with the root (Odden & Odden 1985; Odden 2001). As seen in (36a), RED generally excludes prefixes:

(36) a. object prefix : kú-fi-gúl-a → (kú-fi-) gul-a + gúl-a 'to buy a bit of them'
     b. infinitive ku- : kú-tov-a → (kú-) tov-a + tóv-a 'to beat a bit'
     c. subject prefix : tu-gul-iite → (tu-) gul-iite + gúl-iit-e 'we shopped a bit'

Although Kihehe has full-stem reduplication, the above forms would be ungrammatical with prefix copying, e.g. *(kú-) fi-gul-a + fi-gúl-a*. In (37), on the other hand, we see that prefixes which syllabify with the base are copied:

(37) a. object   : kú-mw-iimb-il-a → (kú-) mw-iimbil-a + mw-iimb-íl-a 'to sing a
                                                                            bit to him'
     b. infinitive : kw-íimb-a → kw-íimb-a + kw-iímba 'to sing a bit'
     c. subj+obj : n-gw-iítite → n-gw-itite + n-gw-iítite 'I poured it a bit'

These examples all involve a vowel-initial root before which the class 1 object prefix /mu-/ is realized *mw-* in (37a) and the infinitive prefix /ku-/ → *kw-* in (37b). As a result of this fusion, pre-stem material is copied in RED. This is most striking in (37c), where both the first person subject prefix *n-* and the class 3 object prefix /gu-/ (→ *gw-*) are copied, presumably reflecting that the initial syllable is [ŋ͡gʷií]. The fact that both the infinitive prefix and subject prefixes can be copied shows that the macro-stem is irrelevant in Kihehe. The same point can be made from Swati (S.43), where Ziervogel (1952:81) reports the copying of a subject prefix which fuses with a -VC- root, e.g. /ɓa-ev-a/ 'they hear' → *ɓ-ev-a* → *ɓ-ev-a + ɓ-ev-a*.

The cases just examined demonstrate two different phonological motivations for including prefixes in RED: A prefix may either provide the second syllable in the case of subminimal root, or it may be copied by virtue of being syllabified with the root. The significance of Ndebele and Kihehe is that they provide innovative models by which verb-stem reduplication could become

macro-stem- or even full-word reduplication by analogy. In other words, there is a way to enlarge the domain of reduplication.

5.2. Incorporation of Inflectional suffixes

In §4 we saw that there is a tendency for full-stem reduplication to undergo morphological and phonological reduction. Most of the cases where verb-stem reduplication is less than total fall into two classes: (i) RED is identical to a PHONOLOGICAL constituent at the left edge of the base, e.g. the first syllable or bisyllabic foot. (ii) RED is identical to a MORPHOLOGICAL constituent at the left edge of the base, e.g. the root, with possible fillers (default *-a*, dummy *-yi* etc.). There are, however, cases where here neither of these conditions is met, with morphophonemic processes causing the RED and base to become phonetically dissimilar. When this happens, a counter-tendency to build towards full-stem reduplication sometimes shows up.

As a first illustration, let us return to Ndebele (S.44), which, it will be recalled, disallows inflectional material to be copied into RED. Of concern here are the complications concerning the realization of the perfective (Hyman, Inkelas & Sibanda 1998). As seen in (38a), when the base is a -CVC- root, the perfective is formed by simple suffixation of *-il-e*:

(38) a.   bá-gan-il-e   'they became betrothed'
           bá-dal-ile   'they created'

      b.   bá-hamb-el-an-il-e → bá-hambel-ain-e   → bá-hamb-el-en-e 'they agreed'
           bá-béth-an-il-e   → bá-béth-ain-e   → bá-béth-en-e   'they clashed'

      c.   bá-thath-il-e   →   bá-thaith-e   →   bá-theth-e   'they took'
           bá-sál-il-e   →   bá-sail-e   →   bá-sel-e   'they remained'

However, when the base is longer, many Bantu languages show fusion or "imbrication" of perfective *-il-e*. In the examples in (38b), the [i] of *-il-e* is imbricated before the last consonant (here the /n/ of the reciprocal extension *-an-*), and the [l] is deleted. The resulting [ai] sequence is attested in other Bantu languages, but monophthongizes to [e] in Ndebele. The derivations in (38c) show that some -CVC- roots which were historically bimoraic exceptionally undergo imbrication as well. Since this [e] fuses inflectional [i] with non-inflectional [a], the question is how it is viewed in the reduplication process.

As seen in (39a), if the fused [e] appears in the third (or later) syllable of the imbricated stem, there will be no complications:

(39) a.   bá-hamb-el-en-e   →   (bá-) hamb-e + hamb-el-en-e   'they agreed a bit here
           /bá-hamb-el-an-il-e/   ~ hamb-a + hamb-el-en-e   and there'

      b.   bá-béth-en-e   →   (bá-) béth-a + beth-en-e   'they clashed a bit here
           /bá-béth-an-il-e/   ~ béth-e + beth-en-e   and there

      c.   bá-théth-e   →   (bá-) tháth-a + theth-e   'they took a bit here and there'
           /bá-tháth-il-e/   ~ théth-a + theth-e
                                     *(bá-) théth-e + theth-e

      d.   *bá-tháth-il-e   (bá-) tháth-a + thath-il-e

As we saw in (22), there are two variants: the first copies the [e] of applicative *-el-*, while the second truncates *-el-* and uses the default FV *-a*. The two variants are therefore as expected. Now consider the two variants in (39b). While the first RED has truncated all suffixal material to produce *béth-a*, the second RED, *béth-e*, has copied the first two syllables of the base. Recall that this *-e* results from the fusion of the [a] of the reciprocal extension *-an-* with the [i] of perfective *-il-e*. In other words, the front feature of [i] has been copied even though Ndebele normally prohibits inflectional material from RED. The same options are seen in (39c), where the front feature can be realized on the root syllable of RED.

The interpretation which Hyman, Inkelas & Sibanda (1998) give to doublets such as in (39b,c) is that Ndebele speakers vary in whether they treat the fused [e] as inflectional or non-inflectional: While the front feature derives from underlying /-il-/, the vowel slot on which it is realized belongs either to a derivational suffix or to the root. The third starred form in (38c) shows that it is not possible for the FV *-e* to appear in RED since it is unambiguously inflectional. Note in (39d) that although /tháth-il-e/ obligatorily undergoes imbrication in the simplex form, imbrication can be optionally blocked in the corresponding reduplication (Sibanda 2004). In this case inflectional *-il-e* is not copied, and *thath-* is realized identically in RED and in the base.

The significance of these facts is twofold. First, forms such as *béth-a + beth-en-e* and especially t*háth-a + theth-e* again provide a way in which a smaller domain (the verb base or derivational stem) may reach out to include material from a larger one (the inflectional stem), which is otherwise prohibited. This is also seen in closely related Swati (S.43), which, like Ndebele, normally disallows *-il-e* in RED, but may copy *-il-* when it follows a -VC- root (Ziervogel 1952:81):

(40) a.   en- 'be overgrown' + PERF ⟶   en-il-e   ⟶   en-il-a + n-il-e
     b.   om- 'become dry'   + PERF ⟶   om-il-e   ⟶   om-il-a + m-il-e

The expected forms are *en-a + yen-il-e* and *om-a + yom-il-e*, and indeed Ziervogel mentions the latter as a variant. (-VC- roots often alternate with -yVC- in Bantu.) In (40) the initial root vowel is excluded from the process, leaving *n-il-e* and *m-il-e* as the inputs to reduplication. Since *-n-* and *-m-* are subminimal, *-il-* is incorporated into the base as if it were a derivational extension rather than part of the inflection ending *-il-e*. However, inflectional *-e* may not be copied into RED (*en-il-e + n-ile*, *om-il-e + m-il-e*).

The second significance of imbrication is that outputs like *thath-a + theth-e* and *sal-a + sel-e* (from /sal-il-e/ ⟶ *sel-e* in (38c)) now produce forms in which the reduplicants and bases start to drift apart from each other. Such forms are the only ones where the first vowel of RED is different from the root vowel. To make the two parts more similar, the alternative forms *theth-a + theth-e* and *sel-a + sel-e* become acceptable. The logical endpoint of such a strategy would be to make the reduplicant and the base exactly identical, i.e. to have total copy. While *theth-e + theth-e* and *sel-e + sel-e* are not acceptable in Ndebele, other Bantu languages seem to have taken the step of re-introducing inflectional endings into RED.

One such case concerns Luvale (Lwena) (K.14) about which Horton (1949:101) writes: "The Frequentative form indicates that the action or state is repeated a number of times or applies to a number of subjects.... This derivative is formed by reduplication of the stem. Originally these reduplicated stems were treated as single verbs, with single inflectional suffixes. Today, in the case of disyllabic stems in the perfect, both parts of the reduplicated form undergo

mutation...." What this means that the earlier structure in (41a) involving root reduplication is being replaced by full stem reduplication in (41b).

(41) a. [[ROOT-a-ROOT] INFL]
     b. [[ROOT - INFL] [ROOT - INFL]]

In the perfect, Luvale uses a pattern common in central-western Bantu (Grégoire 1979), whereby the FV is -e after -CaC- roots, as in (42a), otherwise a copy of the root vowel, as in (42b).

(42) a. tu-na-tal-e   'we have looked for'
         tu-na-mbat-e   'we have carried'
     b. tu-na-het-e   'we have arrived'
         tu-na-hik-i   'we have stirred'
         tu-na-mon-o   'we have seen'
         tu-na-tumb-u   'we have planted'
     c. tu-na-lis-a   'we have caused to eat'   (/li-is-/ 'eat-CAUS')
         tu-na-ci-many-is-a   'we have finished it'   (/man-is-/ 'finish-CAUS')
         tu-na-hambakan-a   'we have passed by'

As seen in (42c), derived and longer verb stems take the FV -a. Horton indicates that reduplications were originally treated as one long base, thus taking -a in the perfect, as in (43a).

(43) a. (va-na-ci-) tal-a + tal-a   [[tal-a-tal] -a]   'they have looked for it'
     b. (va-na-ci-) tal-e + tal-e   [[tal-e] [tal-e]]

However, he adds that speakers "now frequently" use innovative forms such as in (43b), where the FV -e appears also in RED. That the motivation is to derive total identity between the two parts of the reduplicated verb stem is confirmed in the remote past tense in (44).

(44) a. (va-mu-) vet-a + vet-el-e   [[vet-a-vet] -el-e]   'they each of them struck him
     b. (va-mu-) vet-el-e + vet-el-e   [[vet-el-e] [vet-el-e]]   again and again'

As indicated, the older variant in (44a) shows a reduplicated ROOT-a-ROOT followed by a single inflection. However, Horton points out that speakers "now often" produce forms such as in (44b), where the perfective ending -el-e occurs in RED. This points to the first of two conceptual conflicts, that between the two desirable analyses in (45), where BASE is used in the Bantu sense of ROOT + possible derivational extensions:

(45) a. [[BASE]$_i$ + [BASE]$_i$] + INFL]   reduplicated base + single inflection
     b. [BASE + INFL]$_i$ [BASE + INFL]$_i$ reduplicated compound stem with inflection

As shown in (45a), speakers would like to reduplicate the base with a single inflection. This can result in a truncated RED, as in *vet-a + vet-el-e*. On the other hand, they would like a reduplicated compound stem where the two parts are identical, as in *vet-el-e + vet-el-e*. Since both structures are motivated, the diachronic implication is that either should be able to change into the other.

A second conceptual conflict concerns the question of whether the reduplicated verb stem consists of one BASE or two? In Mambwe (M.15), the perfective is realized *-il-e* after CVC-roots (whose final consonant may undergo mutation), as in (46a), but is imbricated after longer roots, as in (46b) (Halemba 1994):

(46) a. land-   + il-e → lanz-il-e   'talk'
        sent-   + il-e → sens-il-e   'gnaw'
        lil-   + il-e → liz-il-e   'cry'
        lot-   + il-e → los-il-e   'dream'
        fum-   + il-e → fum-il-e   'go out'

    b. pongan- + il-e → pongin-e   'be unrecognizable'
        pelem-   + il-e → pelim-e   'disobey'
        vwitik- + il-e → vwitik-e   'bewitch'
        folol-   + il-e → folwil-e   'scratch'
        simul-   + il-e → simwil-e   'run'

Of relevance here is how the perfective is realized on reduplicated verb stems, i.e. whether the latter are treated as one long base or two short ones. Both possibilities are attested. Most lexicalized reduplications which have no transparent simplex base are treated as a single base and hence undergo a single imbrication as in (47).

(47) a. [fuk-a-fuk] + il-e → fuk-a-fwik-e   'be restless, fidgety'
    b. [tang-a-tang] + il-e → tang-a-ting-e   'be embarrassed, perplexed'
    c. [tuw-a-tuw] + il-e → tuw-a-twiw-e   'be slow, lazy'

On the other hand, most productive or semantically transparent reduplications are treated as two bases, only the second of which is visible to the perfective morphology. Where the second base is short, there is no imbrication, as seen in (48).

(48) a. [lap-a] [lap] + il-e → lap-a + laf-il-e   'swear often without good reason'
                                                           (cf. lap-a 'swear')
    b. [cit-a] [cit] + il-e → cit-a + cis-il-e   'do as one wishes, not following rules'
                                                           (cf. cit-a 'do bad things')
    c. [kow-a] [kow] + il-e→ kow-a + kov-il-e 'fumble everything'
                                                           (cf. kow-a 'catch, grab, cling to')

Even though the final consonant often undergoes mutation to [f] or [s] before *-il-e*, the motivation for not imbricating is that there is greater identity between RED and the base, which will have an identical initial CV (and sometimes CVC). Still, while I expect that (48) represents the way that productively created reduplications would be realized in the perfective, as well as most of those which are lexicalized but transparent, there are a few of the latter which exceptionally undergo imbrication, as in (49).

(49) a. [cew-a] [cew] + il-e → cew-a + ciw-e 'look all around'
                                                    (cf. cew-an-a 'look, wink at e.o.')

     b. [suk-a] [suk] + il-e → suk-a + swik-e 'be restless, fidgety'
                                                     (cf. suk-an-a 'fidget, wriggle body')

In fact, there is the following minimal pair in (50).

(50) a. [kap-a] [kap] + il-e → kap-a + kaf-il-e 'blink' (cf. kap-awil-a 'blink',
                                                       kap-a-iz-y-a 'cause to wink, blink')
     b. [kap-a] [kap] + il-e → kap-a + kip-e 'rustle, as dry leaves'

As expected, (50a) does not undergo imbrication, as there are related verbs with the root *kap-*.
(50b), on the other hand, does not have any obviously related verb (other than the derivative *kap-a + kap-ol-a* 'cause to rustle') and hence undergoes imbrication.

We have not addressed the question of which perfective strategy is older. Before we do, consider how longer reduplicated verb stems form the perfective in (51).

(51) a. simul-a + simul-a   →   simwil-e + simwil-e 'run here and there'
     b. pongan-a + pongan-a →   pongin-e + pongin-e 'be completely unrecognizable'
     c. folol-a + folol-a   →   folwil-e + folwil-e 'scratch all over'

As seen, both stems are imbricated (cf. the corresponding unreduplicated verb stems in (46b)). The reason is clear: If the outputs had been *simul-a + simwil-e*, *pongan-a + pongin-e*, and *folol-a + folwil-e*, there would have been a significant difference between the two parts of the reduplication. As in the case of *lap-a + laf-il-e* 'swear often without good reason' vs. *lap-a + lif-e* in (48), the preferred form is the one where the vowels of RED and the base are identical. Two strategies are employed to achieve this effect: Imbrication underapplies in (48), where the roots are CVC-, but overapplies in (51), where the inputs are CVCVC-. That *-il-e* is not expected to be copied, is seen not only from the CVC-a-CVC-il-e bases in (48), but also from longer verb bases such as in (52).

(52) a. sinteek- + il-e →   sintees-il-e 'cauterize over a large area'
     b. sukook- + il-e →   sukoos-il-e 'wriggle continuously one's body'
     c. peelook- + il-e →   peeloos-il-e 'give much without measure'

What these have in common is the length of their penultimate vowel, which blocks imbrication. As seen now in (53), *-il-e* is not copied in the corresponding reduplications:

(53) a. sinteek-a + sintees-il-e 'cauterize all over'
     b. sukook-a + sukoos-il-e 'wriggle continuously one's body'

Finally, reduplicated subminimal roots are not consistent with respect to *-il-e*:

(54) a. sy-a   → s-il-e   'leave'
         sy-a + sy-a   → s-il-e + s-il-e   'leave things lying about'

        sy-a + sy-a + sy-a → s-il-e + s-il-e + s-il-e 'leave things lying all over the place'
  b.   fw-a   →   fw-il-e   'die'
        fw-a + fw-a   →   fw-a + fw-il-e   'die in big numbers'
  c.   pw-a   →   pw-il-e   'dry up'
        pw-a + pw-a   →   pw-il-e   'get dry frequently'

As seen, *-il-e* is copied in (54a), but not in (54b). Curiously, Halemba (1994:692) provides the same -il-e form for *pw-a + pw-a* as he does for *pw-a*.[11] Since -il-e is regularly copied into RED only when imbricated, it would seem logical to consider this an innovation, as in Ndebele. Again, we see that the domain of reduplication can be extended "upwards" to incorporate the inflectional ending.

      Not mentioned thus far is the possibility of a semantic conflict between the perfectivity of *-il-e* and the frequentative meaning. At the very least, reduplicated perfectives may occur less commonly than non-perfectives. An indication of this comes from Bemba (M.42): "Generally the use of the -ILE tenses is avoided, but when they are used the tenses are repeated...." (van Sambeek 1955:91) While Bemba requires full verb stem reduplication, two different tone patterns are reported by Sharman (1963:82-83):

(55) a.   (bá-a-) [lim-íné + lím-íné]   'they hoed by fits and starts'

                        H
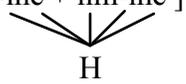
    b.   (bá-a-) [lim-íné] + [lím-íné] 'they hoed enormously (or scrappily, badly)'

                   H   H
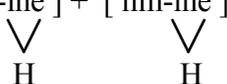
In (55a) a single H tone suffix is linked from the second to the last vowel of the reduplicated stem. In (55b), however, there are two suffixal H tones which to the second and final vowel of each part of the reduplicated stem. In (55a), speakers treat the reduplicated verb as a single stem which receives one intonational pattern just like other stems. The single tone pattern is almost universal in Bantu verb stem reduplication. In (55b), two inflectional tone patterns are assigned to the reduplicated verb. This is extremely rare in Bantu, the only well-known case being Chichewa (N.31b) (Carleton & Myers 1996, Hyman & Mtenje 1999).[12] Examples involving the hortative are observed in (56).

(56) a.   ti-tandiz-é   →   ti-tandiz-é tandiz-é   'let's help here & there'
     b.   ti-vundikir-é   →   ti-vundikir-é vundikir-é   'let's cover here & there'
     c.   ti-khululukir-é →   ti-khululukir-é khululukir-é 'let's pardon here & there'

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[11] Unfortunately, Halemba's dictionary doesn't indicate the *-il-e* forms for *ly-a + ly-a + ly-a* 'eat anything' (from *ly-a* 'eat') or *y-a + y-a + y-a* 'wander about aimlessly (from *y-a* 'go to'), nor does it provide reduplicated forms of the other subminimal roots.
[12] Joyce Mathangwane (personal communication) informs me that Subiya (K.42) also copies tones in verb-stem reduplication.

As seen, a single H tone appears on the FV of each stem. Hyman & Mtenje (1999) present arguments that the second stem constitutes a separate phonological word, which again makes Chichewa verb reduplication quite different from other Bantu languages. Since Chichewa is not a particularly conservative Bantu language (e.g. it has lost *-il-e* and the nominal "augment" and has innovated contrastive tones on verb extensions), it is likely that it is innovative in its verb-stem reduplication as well. In other words, Chichewa is an extreme case of rebuilding full reduplication from an earlier system. We next turn to consider why this may have happened.

6. A new hypothesis: Bidirectionality

In the preceding sections I have documented some of the variation on the realization of RED in verb reduplication in different Bantu languages: Some impose a bisyllabic condition, some ban inflectional material, some allow prefixes to creep in, some under- or overapply imbrication of perfective *-il-e*, and so forth. At the one end is full-stem reduplication, at the other, a bisyllabic (more rarely monosyllabic) maximum. It is not hard to explain why such variation exists, since both full- and partial-reduplication are motivated by conflicting principles. Consider, first, full-stem reduplication. In this case the two parts of the reduplicated verb are exactly identical, as expected of reduplication, especially at its early "iconic" stage. This identity thus avoids the phonological or morphological mismatch problems which arise in partial reduplication. Finally, full-stem reduplication is more in keeping with the reduplication processes affecting other parts of speech in Bantu: reduplicated noun- and adjective stems are rarely truncated, and numerals typically show full-word reduplication, as was seen in Kanyok (L.32) in (11) above.

On the other hand, full-stem reduplication has disadvantages. The first is the "effort" problem: the stem can be quite long, hence awkward to repeat in toto. Recall from (14) that Ciyao (P.21) has full-stem reduplication. It also allows quite complex verb stems, as the octosyllabic example in (58) shows (Ngunga 2000):

(57) taam-uk-ul-igw-aasy-an-il-a   'cause each other to be unseated for/at'
      be seated-IMPOSITIVE-REVERSIVE-PASS-CAUS-RECIP-APPL-FV

If reduplicated, the result would be 16 syllables, which is considerable overkill when one considers that from a semiotic point of view, RED realizes only one morpheme, e.g. {frequentative}. In terms of marking the frequentative construction, repeating all of the extensions and an inflectional FV does no more than, say, copying the first CV-. There is also the semantic issue that verb-stem reduplication typically is concerned with a diminution or intensification of the lexical root meaning ('do something a little bit here & there, perhaps aimlessly or badly'), which ultimately can become disassociated from the original meaning, as we have seen in some of the glosses. From a semantic point of view derivational suffixes are schizophrenic. To the extent that they are frozen or contribute unpredictably to the lexical meaning, it would make sense to copy them as well. Where they have a productive, grammatical function, e.g. licensing a causative or applicative argument, as in the Ciyao example in (57), it would seem less motivated for them to appear in RED. In cases where the semantics of the extension is specifically targeted, the extension may itself be repeated, as when causative *-is-* is used with an intensive function in Shona (S.10) (Dembetembe 1978:43):

(58)   fár-a   'be happy'   bát-á   'hold'   nak-a   'be good'

fár-ís-á	'be too happy	bát-ís-á	'hold fast'	nak-is-a	'be very good'
fár-ís-ís-a	'be excessively happy'	bát-ís-ís-a	'hold very firmly'	nak-is-is-a	'be extremely good'

Since reduplication originally targets the lexical meaning of the root, it makes less sense for the tense/aspect/mood endings to be repeated in RED. Interestingly, it is in those languages which have most reduced RED (e.g. to a single syllable) that imperfective or habitual aspectual meanings are observed. There is, however, no reason to think that copying of the inflectional endings *-i, -e,* or *-il-e* contributes to the semantic drift towards "more general meanings" (Bybee et al 1994).

What this means is that RED is subject to a conflict between IDENTITY vs. ECONOMY, i.e. between the expressive demands of full-stem identity vs. the various phonetic shortcuts that have been observed. In this context it should be noted that most nouns have bisyllabic stems in Bantu, which also produce a two-syllable RED, as was seen in (12a).

Given that both full and reduced reduplication are motivated by conflicting concerns, I would like at this point to advance the hypothesis in (59).

(59) Hypothesis: the historical development of RED goes in both directions
    a.   full   >   partial
    b.   partial >   full

(59a) recapitulates the general assumption that partial reduplication derives historically from full reduplication (Eulenberg 1971, Bybee et al 1994, Niepokuj 1997). In previous sections we have observed both full verb-stem reduplication as well as various reduced versions of RED predicted by the phonological and morphological scales in (25). However, we have also seen cases where prefixes and inflectional endings become incorporated in RED in order to fulfill minimality or to enhance the identity between RED and the corresponding full stem. As mentioned earlier, either of these considerations could in principle provide the model for extending the direction in (59b).

In fact, there is reason to speculate that the original reduplication applied only to the verb root.[13] The main argument is that verb reduplication is so widespread in Niger-Congo that it had to predate the evolution of at least some of the verb morphology. In §2 I alluded to the controversy surrounding the question of whether pre-stem morphemes were prefixes, clitics, or separate words in PB. In addition, there are arguments that at least some of the inflectional endings have a shallow history. In Hyman (1993:21-23) I present evidence which suggests that "perfective *-id-*, just like imperfective *-ag-*, went through a clitic stage, and in fact is only now being fully incorporated as a regular suffix within the Bantu verb stem."[14] A second argument is that there are lexicalized reduplicated verbs which copy only the first syllable. As seen in the following examples from Kinyarwanda (D.61) (Kimenyi 2002:254-255, 260), some of these have

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[13] While preparing the oral presentation of this paper, I contacted several senior colleagues in comparative and historical Bantu to ask if they had any intuition as to whether PB reduplicated the verb root, the verb stem, or the verb base (root + extensions). Of the respondants, only Yvonne Bastin ventured the hunch I share that only the verb root was reduplicated in PB.

[14] As expected, floating H tone prefixes are not reduplicated, e.g. the H assigned by the infinitive prefix ku- in Chichewa. What would be particularly persuasive would be a language which reduplicates a root H tone, but not an inflectional H tone suffix. I am unaware of any such cases.

meanings suspiciously similar to the verb-stem reduplication semantics surveyed in (8), specifically, 'do a little bit here & there, perhaps aimlessly (60a) or badly (60b)':

(60) a. bé-beer-a   'go around aimlessly'   (~ béer-a + beer-a)
         jáa-jaab-a   'walk around aimlessly'
         hwíi-hwis-a   'gossip'
      b. búu-buut-a   'walk bent (old age)'   (~ búut-a + buut-a)
         dé-demaang-a   'stutter'
         sé-serez-a   'miscut nails'

As mentioned, the semantics concerns the action of the verb, not the extensions or inflection. If these reduplications pre-date the requirement that all verbs end in a FV (Grégoire 1979), the earlier forms might well have had abutting consonants. The two forms of 'walk bent' might then have come from *búut-búut and *búut-a + búut-a, respectively.

The suggestion, then, is that the PB derived verb in (61a) first reduplicated as in (61b).

(61) a. PB *dɪm-ɪd-an-a   'cultivate for each other'
         cultivate-APPL-RECIP-FV
      b. PB *dɪm-a + dɪm-ɪd-an-a   'cultivate for each other a little bit here & there'

If correct, this means that Kikerewe *lim-il-an-a + lim-il-an-a* from (15) would have to be an innovation, and that *lim-il-a + lim-il-an-a* might have two sources: partial build-up from *lim-a + lim-il-an-a* or partial build-down from *lim-il-an-a + lim-il-an-a*.

    If only the verb root was originally involved in reduplication, we may be able to push back one step further: Perhaps the verb root was reduplicated as a separate syntactic constituent appearing in post-verbal position, as in (62).

(62) pre-PB *dɪm-ɪd-a   ba-dɪm-i   dɪm-a-dɪm-a   'cultivate for the farmers
               cultivate-APPL-FV farmers   cultivate-cultivate   here & there'

The reduplicated constituent would, in effect, have functioned as an ideophone iconically representing the frequentative meanings of current reflexes.[15] Not only are ideophones extremely widespread in Bantu, but they are also often reduplicated, as seen in the Chichewa examples in (63) (Scott & Hetherwick 1957):

(63) a. khotá-khótá   'bending, stooping; stooping with one's head down'
                        (cf. khot-á 'be bent or crooked' from /khót-a/)
         bwada-bwada   'noise of water boiling' (cf. bwad-a 'to bubble')
         nyáŋa-nyáŋa   'walking softly on tiptoe' (cf. nyaŋam-a 'step out gently, lightly,
                        walk slowly')
      b. kaya-kaya   'of a disease or accident from which it is doubtful if a person will
                        recover' (cf. kaya 'perhaps; I don't know; it may be so or not')

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[15] Although bearing a remarkable resemblance to the West African Niger-Congo verb-focus construction, the Bantu reduplicated constituent would presumably have had a different function.

chinya-chinya   '(walking) in a slow way'
towa-towa   'soft, as a cotton pillow, or overripe fruit'

As seen, the ideophones in (63a) derive from corresponding verbs. We know that they are not themselves verbs, because of their tones, e.g. the underlying H of /khót-/ has been copied. The ideophones in (63b) may or may not have had a verbal source.

Where there is a corresponding verb, it is not always possible to tell the direction of derivation. The following examples from Shona (S.10) however appear to be de-ideophonic verbs (Hannan 19984, Dembetembe 1987):

(64) chichi-nh-a   'trot (e.g. like a cow)'   chi chi chi   'ideo. of trotting'
      tutu-m-a   'foam, seethe'   tu tu tu   'ideo. of foaming'
      sese-r-a   'trot (heavy person, animal'   se se se   'ideo. of trotting'
      pfípfí-dz-á   'squeak'   pfí pfí pfí   'ideo. of squeaking (of rats, new shoes)

As seen, these verbs are formed by adding a consonant formative plus the FV. Since most verbs have a corresponding ideophone in Shona and certain other Bantu languages, and since ideophones often reduplicate, one should not underestimate the relationship.

Before concluding this section, I would like to draw attention to a recurrent pattern in lexicalized reduplicated verbs which I will exemplify from Ciyao (P.21) (Ngunga 2000). Recall from (14) that Ciyao has total verb-stem reduplication in the frequentative, which is productive in the language. Among the nearly 3,000 verbs in Sanderson (1954), I have found only one entry where RED has more than two syllables: *patul-a + patul-a* 'chop here & there', clearly derived from *patul-a* 'chop off'. There also is one doubly-reduplicated monosyllabic verb: *dy-a* 'eat' → *dy-aa + dy-aa + dy-a* 'eat frequently'. The rest tend not to be so transparently derived and fall into two categories. The first consists of 14 CVC-a verb stems which are fully reduplicated. Examples are given in (65).

(65) a.   lak-a + lak-a   'long for, cry out for'
           sov-a + sov-a   'be unusually rare, usually absent'
           tik-a + tik-a   'tickle'

      b.   nyik-a + nyik-a   'jog; jostle, bump into (esp. another person)'
           ŋany-a + ŋany-a   'show a glimpse of something and then put it away; tantalize.'

The second category consists of 50 longer verbs which have a CVlV- reduplicant (realized Cidi- when the root vowel is /i/). Among these are 20 entries such as in (66) which consist of a bisyllabic verb stem with a long vowel:

(66) a.   pala-paat-a   'scrape off (as scales of fish)' (cf. paat-a 'rub down, massage')
           gala-gaat-a   'roll about on ground, esp. in salute to a chief or to the spirits'
           pele-peet-a   'be loose, too large (e.g., a finger-ring), irresolute, half-hearted'
      b.   gulu-guus-y-a   'be unruly, insubordinate, mischievous'
           vala-vaas-y-a   'beat a drum heavily' (cf. vaand-a 'beat down tall grass')

nyele-nyees-y-a   'tickle, stroke' (cf. nyeesy-a 'hit, strike')

c. wulu-wuumb-a   'roll about on the ground covered by sand or powder'
nyulu-nyuund-a   'fall in a light shower (of rain, water, or powder); sprinkle'
mulu-muuny-a   'mumble food'

These fall into three categories: 8 entries have the root shape CVVt- (66a); 7 entries have the base shape CVVs-y- (66b), where -*y*- is the short causative suffix;[16] 5 entries have a root-final nasal or nasal cluster (66c). The remaining 30 entries have longer verb stems, as exemplified in (67).

(67) a. midi-miisik-a   'contort the body in dancing, shrug shoulders'
nyele-nyeenduk-a 'melt, dissolve'
kulu-kuutal-a   'be hard and stiff'
kolo-koombok-a   'fall from a height'
vala-vaanduk-a   'appear, become visible'

b. vala-vadil-a   'tie a batten to pole or rafter'

As also seen, all but the verb in (67b) have a long vowel in their root syllable. This verb is also unique in having an /l/ as its second root consonant: /vala-valil-a/ → *vala-vadil-a*. The second root consonants found on these longer vowels are the following: /t/ (14), /l/ (1), /s/ (3), /mb/ (2), /nd/ (10).

It is clear that the input bases for the two patterns are different in length. The table in (68) also reveals distributional skewings in terms of the first (C_1) and second (C_2) consonants:

(68)

	labials						velars				palatals				alveolars					
C_1:	p	b	v	m	mb	w	k	g	ŋ	ng	c	j	ny	y	t	l	s	s-y-	n	nd
CV_iIV_i	9	1	9	3	-	4	8	4	4	-	4	1	4	-	-	-	-	-	-	-
CVC-a	-	-	-	-	-	-	-	-	2	-	-	-	2	-	2	4	4	-	-	-
C_2:	p	b	v	m	mb	w	k	g	ŋ	ng	c	j	ny	y	t	l	s	s-y-	n	nd
CV_iIV_i	-	-	-	-	3	-	-	-	-	-	-	-	1	-	22	1	3	7	-	13
CVC-a	-	-	3	-	-	1	4	-	1	2	-	-	1	1	-	-	-	-	1	-

One observes, first, that there are no CVlV- reduplicants which begin with an alveolar consonant. On the other hand, 10 of the 14 CVC-a reduplicants do begin with an alveolar consonant. The only place where there is overlap is with the C_1 nasals /ŋ/ and /ny/. Turning to C_2, the situation is largely reversed: 11 out of the 14 CVC-a reduplicants have a labial or velar C_2 vs. only 3 out of 50 CVlV- reduplicants (all of which have a base C_2 /mb/). Instead, 46/50 of the bases which have a CVlV- reduplicant have a C_2 alveolar consonant (including the 7 which have [s] followed by causative -*y*-. Assuming that CVC-a is the older form, we can draw the two generalizations in (69).

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[16] Some of these causativized bases may be derived from simplex roots. Thus, both *gala-gaat-a* and *dii-gala-gaas-y-a* are entered with the gloss 'roll about on the ground' (the latter includes the reflexive prefix *dii*- and literally means 'cause oneself to roll on the ground').

(69) a. CVC-a tends to be replaced by CVlV- when the C_2 is alveolar
 b. CVC-a tends to inhibit replacement by CVCV- when the C_1 is alveolar

As indicated, /l/ is more likely to overwrite an alveolar consonant with which it shares its place of articulation, but it will be inhibited from occuring if C_1 is also alveolar. The resulting skewed distributions of the two reduplicant shapes is revealed in the following C_1/C_2 tables inspired by Pozdniakov & Segerer's (2008) work on similar place avoidance:

(70)   RED = CVC-a

	P	K	Y	T
P				
K			1	1
Y		2		
T	4	5	1	

RED = CV_ilV_i-

	P	K	Y	T
P	1		1	23
K	2			14
T				
Y				9

Following Pozdniakov & Segerer, I have grouped labials (P) and velars (K) together vs. palatals (Y) and alveolars (T). As seen, the CVC-a reduplicant examples cluster in the lower left quadrant, where C_1 = coronal and C_2 = non-coronal, while the CV_ilV_i- reduplicant clusters in the top right quadrant, where C_1 = non-coronal, and C_2 = coronal. The patterns are thus unmistakeable. But why should CVC-a be replaced by CV_ilV_i-? Where does this [l] come from?[17]

Recall that we now have three RED patterns in verb reduplication in Ciyao (and elsewhere in Bantu). At one end, stem reduplication, RED has two or more syllables and ends in the FV morpheme. At the other end, we have single-syllable reduplication (e.g. *tee-teek-a* 'appease, quiet down, console'). In between the two there is CV_ilV_i- reduplication, which has two syllables, but no FV. What this means is that two of the three patterns only copy root material. At this point I would like to suggest that the CV_ilV_i- reduplicant is an archaism providing further evidence for an early bisyllabic (perhaps bimoraic) RED. In at least a subset of verbs whose base stem could not fit into the CVCV- reduplicant, the first CV appears followed by *d* [l] and a repetition of the root vowel. Why some verbs are lexicalized with a CV_ilV_i- RED and others CV(V)- is not clear.

In seeking a source for this *d* [l], I could not help being struck by the unusual iterative reduplication process in Beo (C.45) about which Gérard (1924:77) states: "Verbes réitératifs. Formation. On les forme en ajoutant au verbe simple la particule *la*, et puis on répète le verb." The infinitives in (71) reflect Gérard's analysis:[18]

(71) a. ka-konga 'demander' ka-konga-la-konga 'demander à plusieurs reprises'

---

[17] Although some CVlV-CVVs-y-a verbs might have come from earlier *CVl-a + CVVl-i-a, where causative *-i- (-y-) mutates [l] and certain other consonants to [s], a number of further changes would be necessarily to explain why the CVl-a reduplicant spread to other bases, and especially why the first and second vowels became identical.

[18] It is tempting to identify the *la* particle with the preposition *là* 'with, and' found instead of more widespread *nà* in certain NW Bantu languages. This is particularly attractive as the reciprocal/comitative extension -an-, which is often claimed to be related to *nà*, has been seen to crop up in verb-stem reduplications (e.g., in Duala in (8b)). Unfortunately *nà* is the preposition 'with' in Lebéo.

   b.   ka-kumba   'plier'   ka-kumba-la-kumba   'plier et replier'
   c.   ka-kanda   'lier'   ka-kanda-la-kanda   'lier et relier'

Gérard (1924:78) indicates that the meaning of this construction is that "l'action a été répétée plusieurs fois ou que le sujet l'a subie à plusieurs reprises." He goes on to say that Béo has the additional verbal particles *-la* 'lentement, doucement, un à un', *-ba* 'encore' (in the sense of 'still') and *-ga* 'intensif' and provides the following forms of the verb *deda* 'say':

(72) a.   deda-la   'dis lentement'   b.   deda-la-ga   'dis encore une fois, répète'
          deda-ba   'dis encore'   deda-la-deda   'dis et redis (plusieurs fois)'
          deda-ga   'dis fortement'   deda-ga-ga   'dis beaucoup de choses'

Gérard does not give enough information to tell if the morpheme boundaries have been correctly identified (vs. *ded-ab-a*, *ded-ag-a* etc.), and indeed, some languages employ extensions to do similar frequentative work to verb-stem reduplication. For example, compare the Mbukushu (K.33b) reduplications in (73a) with the *-aghur-* and *-urur-* (~ *-unun-*) extended forms in (73b,c) (Fisch 1998:123, 126):

(73) a.   kwat-a   'touch'   →   kwat-a + kwat-a   'touch everything'
          korw-a   'be sick'   →   korw-a + korw-a   'always be sick'
          tjir-a   'run away'   →   tjir-a + tjir-a   'keep running away'
          fith-a   'lose'   →   fith-a + fith-a   'constantly abort, constantly lose'
          peth-a   'destroy'   →   peth-a + peth-a   'fail to take care, carelessly destroy'

     b.   ghamb-a   'speak'   →   ghamb-aghur-a   'discuss, talk a lot'
          yend-a   'go'   →   yend-aghur-a   'walk around aimlessly'
          tet-a   'cut'   →   tet-aghur-a   'chop up, crush, chew up'
          pep-a   'play'   →   pep-aghur-a   'be disposed towards playfulness'
          nw-a   'drink'   →   nw-aghur-a   'be addicted to alcohol'

     c.   ruk-a   'weave'   →   ruk-urur-a   'improve the wickerwork'
          kurang-a   'be slow' →   ku-rang-urur-a   'be never ending, always do slowly'
          kun-a   'sow'   →   kun-unun-a   're-sow'
          fum-a   'sew'   →   fum-unun-a   'resew so as to enlarge'

Many Bantu languages exhibit similar reflexes to PB *-ag-ud-* in (73b) and *-ud-ud-* in (73c). In Ila (M.63), "repetitive" *-ulul-* is glossed as 'doing over & over again' and "persistent repetitive" *-a-ul-* (< *-ag-ul-*) as 'doing over & over again, keep on doing, be in the habit of doing, do something gradually' (Smith 1907:131). While *-ud-* itself is a transitive reversive or "separative" (Schadeberg 1982), it clearly has some of the frequentative semantics in combination with less well-defined *-ag-*. More importantly, perhaps, it contains a *d* [l]. Finally, it should be noted that many Bantu languages show a long FV on bisyllabic reduplicants, as in the Kinyarwanda (D.61) verbs in (74) (Kimenyi 2002:259-260):

(74) a.   shun-a   'bite'   →   shun-aa + shun-a   'bite repeatedly'
     b.   hin-a   'fold'   →   hin-aa + hin-a   'fold repeatedly'

   b.   pfuk-a 'cover'   →   pfuk-aa + pfuk-a   'cover meticulously'

Perhaps this FV-lengthening, which has slightly different properties in even closely related languages (cf. Hyman 1992 for Luganda (J.15) and Haya (J.22)) is an indication that RED originally contained an additional suffix not found on the base stem.

7.   Conclusion

In the preceding sections I have documented the considerable variation found in verb-stem reduplication in Bantu. While it seems overwhelming likely that PB had verb-stem reduplication, determining the shape of the PB reduplicant is less clear. Both full-stem reduplication and root-only reduplication were said to have advantages. Copying the full stem (root+suffixes) has the advantage of guaranteeing identity of the two parts. On the other hand, full-stem reduplication can become quite unwieldy. We thus have seen that RED can be subject to restrictions that are either morphological (e.g. don't copy inflectional endings) or phonological (e.g. maximum of two syllables). Phonological innovations may, however, also motivate the incorporation of inflectional prefixes and endings, thereby building up RED on both peripheries. In all cases we note the primacy of the root in reduplication: As was schematized for Ndebele (S.44) in (24), non-root material can appear in RED only if all of the root material has been exhausted. This presumably has to do with the function of the construction, which is to comment on the quantity, quality, or extent involved in carrying out the lexical root semantics.

   The supremacy of the root may also explain why verb-stem reduplication is prefix. Whenever truncated, RED is clearly preposed to the full stem. Hyman, Inkelas & Sibanda (1998) and Downing (2004) report a speaker of Bukusu (E.31c), who truncated productive extensions in preposed RED, as in (75a), but who at least variably truncated the root-initial syllable of postposed RED, as in (75b).[19]

(75) a.   lim-il-a   'cultivate for/at'   →   lim-a + lim-il-a
          rém-er-a   'cut for/at'   →   rém-a + rem-er-a

     b.   kacul-a   'chat, talk'   →   kacul-a + cul-a
          mulix-a   'flash'   →   mulix-a + lix-a

Of the 334 quadrisyllabic or longer verb stems in Khisa, Wong & Lowe (2000), I found 46 lexicalized reduplications of which the following three contain bases of three syllables:

(76) a.   sób-a + soban-a   'be of uneven length or size'
     b.   kali + kalikan-a   'complicate oneself, do stubbornly' (cf. kalikan-a 'complicate')
     c.   mulix-a + mulix-a   'twinkle' (cf. mulix-a 'flash (of lightning), to flower')

---

[19] Among the reduplicated verb stems which Fisch (1998:123) provides from Mbukushu (cf. (73a)), there are two trisyllabic stems, one of which shows post-truncation: *kurang-a + rang-a* 'be extremely slow'. The other shows full reduplication: *tjaper-a + tjaper-a* 'lock everything up'.

While the first two show a preposed RED, the third exhibits total reduplication (conflicting with the output in (75b)). No lexicalized verbs were found of the shape of *kacul-a + cul-a*, suggesting that this may be an innovation.

Except for this Bukusu case (and the one example mentioned in note 18), suffixal verb-stem reduplication appears to be avoided in Bantu. The reason for this is not hard to understand. The non-occurring forms in (77) are intended to be reminiscent of the bisyllabic RED in Ndebele (S.44), but which is instead postposed:

(77) a. lim-el-a   →   lim-el-a + lim-e   'cultivate for/at'
                        →   lim-el-a + lim-a
          lim-is-a   →   lim-is-a + lim-i   'make cultivate'
                        →   lim-is-a + lim-a
          lim-is-el-a   →   lim-is-el-a + lim-i   'make cultivate for/at'
                        →   lim-is-el-a + lim-a

      b. lim-el-a   →   lim-el-a + m-el-a   'cultivate for/at'
          lim-is-a   →   lim-is-a + m-is-a   'make cultivate'
          lim-is-el-a   →   lim-is-el-a + s-el-a 'make cultivate for/at'

In (77a) the stem material is mapped left-to-right onto the postposed bisyllabic RED. As seen, the result is an "entrapment" of productive derivational suffixes (applicative *-el-* and causative *-is-*) inside the verb. A worse outcome is seen in (77b), where the segmental material of the base stem is mapped right to left. As seen, there is not only internal entrapment of *-el-* and *-is-*, but also failure of root material to be copied into RED. The first two examples have only the final /m/ of /lim-/ 'cultivate', while the third example has no root material in RED. While Nelson (2002) suggests that there is a prefixing preference for RED in general, Hyman, Inkelas & Sibanda (1998) argue that the unmarked positon for red is "opposite edge affixation", as in (78).

(78) a.   The reduplicant will tend to be preposed when the base has a suffixing structure
      b.   The reduplicant will tend to be postposed when the base has a prefixing structure

Since the verb stem has a suffixing structure, RED is preposed. Since nouns have a prefixal structure, RED is postposed in word-level nominal reduplication (recall the Kinande (J.42) examples seen in (12a)). By developing a truncated RED on the opposite side of affixation, the result is that affixes do not get entrapped as in (77).

The final question concerns the role of inflection in verb-stem reduplication. We have seen several examples where there has been an option or a requirement that the inflectional endings other than -a be excluded from RED, in some cases even when derivational suffixes can be copied. The same issue actually arises in cases of looser reduplication or word repetition, in fact in English. The following number of hits on Google were obtained on September 4, 2007:

(79) a.   "was/were talking talking talking" : 596 hits

           "I wasn't mad, I was confused... everyone *was talking, talking, talking* at me and I couldn't understand a word they were saying..."

b. "was/were talk talk talking" : 169 hits

"she *was talk-talk-talking* away on her cell phone, holding it to her ear with one hand and gesticulating wildly with the other**..."**

Although the numbers differ, with the verb *talk* it is possible to repeat the inflected participle talking, as in (79a), or express it once only on the last of the three verbs, as in (79b). Later I queried Google with respect to the third person singular -*s*, where the numerical differences turned out to be much more dramatic:

(80) a. "he/she talks talks talks" : 959 hits

"He *talks, talks talks* about acting in some fashion.

b. "he/she talk talk talks" : 9 hits

"As always in such situations, I say nothing and he *talk-talk-talks*."

As seen in the examples, the repeated inflected forms are typically separated by commas, while the single-final inflected forms are sometimes combined together with hyphens. While we are a long way from Ndebele verb-stem reduplication, the same question arises: Which is older? If the direction of change is from word repetition to reduplication, as it appears to be in English, then the inflected form is older. I have, however, tried to argue that both directions make sense in Bantu, where one can also claim that root reduplication expanded to include derivational and inflectional material. The potential relation to ideophones and to the mysterious linker morphemes is also best not ignored. Additional research will hopefully provide definitive evidence concerning the origin and development of verb-stem reduplication in Bantu.[20]

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[20] After finishing this study I became aware of Tak (2003), who compares reduplication in five Bantu languages with the same goal of determining the form of reduplication in PB and the direction of change. Tak argues for an original bisyllabic RED on the basis of its frequency in the world's languages, its economy of effort, and the naturalness of a diachronic process which would replace it with full reduplication (which is said to constitute an improvement in learnability). While my emphasis has been on establishing the morphological constituents that could be copied, Tak is mostly concerned with the bisyllabic constraint (which does not necessarily rule out derivational or inflectional material in RED). We both recognize that there are motivations for change in either direction: A shorter, e.g. bisyllabic, RED is superior to a longer RED, but an exact copy is more transparent than a truncated RED.

APPENDIX: Map Showing the Guthrie Bantu Zones
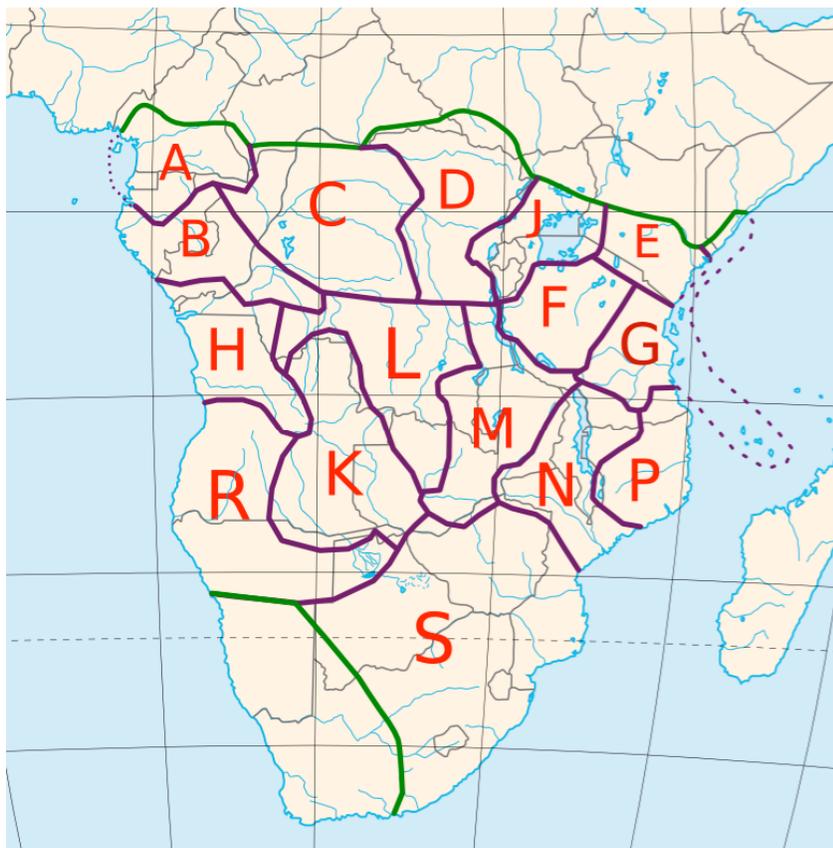
http://en.wikipedia.org/wiki/Bantu_languages

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