# THE CANONICAL VERB ROOT AND KIKUYU REDUPLICATION[1]

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This article analyzes two interrelated phenomena in Kikuyu reduplication: transfer of prosody, and lack of it. I argue that they follow from the parsing algorithm, specifically, Kikuyu reduplication parses out the canonical root (σ.C) of the base for association to a bisyllabic template. As the canonical root delivers less than required, template satisfaction forces the insertion of a monomoraic vowel, deriving both the transfer of prosody and lack of it.

Cet article étudie deux phénomènes interdépendants présents dans la réduplication en Kikuyu: le transfert de prosodie, et l'absence de prosodie. Je défends la thèse que ces deux phénomènes découlent d'un algorithme d'analyse; plus précisément, la réduplication en Kikuyu réalise une analyse de la racine canonique (σ.C) de la base visant une association avec un schéma bisyllabique. Comme la racine canonique retourne moins que ce qui est demandé, la satisfaction de schéma force l'insertion d'une voyelle monomoraque, ce qui produit à la fois le transfert de prosodie et son absence.

## 1. INTRODUCTION

This article studies the patterns of reduplication in Kikuyu, a Bantu language spoken in Kenya (classified as Zone E, group 50 by Guthrie (1967–1971)). Like many Bantu languages, Kikuyu expresses the sense of 'a little, somewhat or diminished in force', by reduplicating the first two syllables of the base. But this is not what is significant. The pattern of reduplication that calls for explanation is that vowel length and vowel-glide distinctions are transferred from the first syllable of the base, while these same prosodic distinctions are not preserved from the second syllable of the base. I argue that the simultaneous transfer and lack of it follows from the parsing algorithm. Kikuyu reduplication parses out a subdomain of the base for association to the template, namely, the canonical root ($R_{can}$). $R_{can}$ is defined as consisting of a syllable and an additional consonant: [σ.C].

This article is organized as follows. In §2, I provide a formal analysis of the patterns of reduplication, focussing on the transfer of vocalic length and glides. Section 3 examines the lack of transfer in reduplication, arguing for the $R_{can}$ as the parsing domain, and §4 explores the theoretical implications of this analysis.

## 2. THE PATTERNS OF REDUPLICATION

Kikuyu reduplication is bisyllabic. In §2.2, I argue that this property derives from a $F_{trochaic}$ template, which insists on a minimum of two syllables: [σ σ]. I further show that reduplication is a stem-level process as reduplicative morphemes form a stem domain. Turning to transfer in §2.3, I show that transfer follows from the LEXICALLY DISTINCTIVE COPYING HYPOTHESIS (McCarthy and Prince 1987), which allows the contrastive moraic structure to be preserved. Before we examine the data of reduplication, a brief note of Kikuyu morphological structure and tone is in order.

### 2.1. PRELIMINARIES[2]

Kikuyu verbs are formed by roots and affixes. The canonical root ($R_{can}$) is made up of a syllable and a consonant: i.e., **rɛ.ɣ-** of **rɛ.ɣ-á** 'refuse'; **rɛɛ.h-** of **rɛɛ.h-é** 'bring'.

[1]Special thanks go to Robert Hedinger and the anonymous reviewers, whose critiques have led to a substantial improvement in both the content and presentation of this article. I would also like to thank Jean Ann, Diana Archangeli, Mike Hammond, Masahide Ishihara, Kelly Sloan, and Cari Spring, with whom I am fortunate enough to discuss the research reported here. I am grateful to Peter Mwangi, a native speaker of Kikuyu, for doublechecking the Kikuyu data. My research on Kikuyu is partially funded by a grant from the Graduate Student Development Fund at the University of Arizona. The last revision is completed while I am a Mellon postdoctoral fellow at University of Rochester.

[2]Unless explicitly noted, Kikuyu data presented in this paper are taken from Benson (1964). However, I have adopted Armstrong's (1967) transcription system of Kikuyu, except for /v, n, ð/, which I represent as /ß, ñ, θ/ for phonetic accuracy.

Some roots are smaller than $R_{can}$, made up of a monosyllable: **hɛɛ-** of **hɛɛ-á** 'give'. A large number of roots exceed the $R_{can}$: **rahor-** of **rahór-a** 'foresee'. The smallest verb surfaces with a root and a final vowel (FV) suffix, which is usually **a** (**rɛ.ɣ-á** 'refuse'), occasionally **ɛ** (**rɛɛ.h-ɛ́** 'bring'). Longer verbs take derivative suffixes called extension suffixes (EXT), illustrated in (1). **an** and **er** marks the reciprocal/associative and applicative functions, respectively.

(1)

| **ko-** | **má-** | **rɛɣ** | **-án** | **-er** | **-a** | to refuse together with them |
|---|---|---|---|---|---|---|
| INFL | OM | root | EXT | EXT | FV | |
| pre-stem | | | stem | | | |

Kikuyu verbs may take additional pronominal and tense/aspect prefixes. In (1), **ko** marks the infinitive (INFL); the object marker (OM) **má** appears closest to the root.

Kikuyu verb roots divide into two tonal classes: those that possess a low tone (left unmarked), and those that possess a high tone (marked by ´). Due to a historical tone shift in Kikuyu (Clements and Ford 1979), the high tone is dislodged from the root-initial syllable and appears on the second syllable from the left edge of the root. Extension suffixes and the FV **a** are toneless. They appear with the high tone if they happen to be the second syllable of the stem, otherwise it surfaces as the low tone.

## 2.2. THE FTROCHAIC TEMPLATE

The pre-stem affixes do not take part in reduplication in Kikuyu. This is clear from (2b), showing that the smallest root **hɛɛ-** 'give' does not incorporate the prefix appearing closest to the root. Thus in the following presentation, I have omitted the prestem affixes.

(2)

| | | | | |
|---|---|---|---|---|
| a. | **ko-ma-rɛɣ-a** | → | **ko-má-*rɛɣa*-rɛɣ-á** | to refuse them a little |
| b. | **ko-ma-hɛɛ-a** | → | **ko-má-*hɛɛa*-hɛɛ-á** | to give them a little |

Suffixes, however, do take part in reduplication under certain conditions, to be shown in §3.

Consider the reduplication data below.[3] In (3), I use periods and dashes to mark syllable and morpheme boundaries. Data in (3a) illustrate the consonant-initial stems; stems from (3b) are vowel-initial stems.

(3)

| | Root-FV | Reduplication | |
|---|---|---|---|
| a. | **ci.n-á** | **ci.na-ci.n-á** | burn a little |
| | **ß o.co.r-a** | **ß o.ca-ß o.co.r-a** | be a little indented |
| | **mɛ.né.rɛ.r-a** | **mɛ.na-mɛ.né.rɛ.r-a** | take a little care of |
| | **ci.ßi.ßa.n-i-a** | **ci.ßa-ci.ßi.ßa.n-i-a** | darken a little |
| b. | **ir-á** | **i.ra-i.r-á** | scorn a little |
| | **i.ɣó.r-a** | **i.ɣa-iɣó.r-a** | become a little full of |
| | **a.θi.mo.r-a** | **a.θa-a.θi.mo.r-a** | sneeze a little |
| | **ɛ.rɛ.ɣɛ.θo.r-a** | **ɛ.ra-ɛ.rɛ.ɣɛ.θo.r-a** | make a little pale |
| | | **[ɛ.rɛ-ɛ.rɛ.ɣɛ.θo.r-a]**[4] | |

One clear pattern of reduplication emerges from the data in (3). Regardless of the size of the stem, reduplicative morphemes are invariably bisyllabic.[5] To derive bisyllabic reduplication, I posit a $F_{trochaic}$ template: [σ σ]. This template imposes a minimum of two syllables on the size of reduplicative morphemes; but it does not dictate the syllable weight.

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[3]My analysis of reduplication focuses on verbs in Kikuyu. Few nouns and adjectives reduplicate. When they do, they have different meanings. I have not included in (3) reduplication of surface monosyllabic roots such as those in (5). These roots reduplicate exactly like (2b): **reea-ree-a** 'eat a little' and **ñuua-nuu-a** 'drink a little'.

[4]Vowels rendered adjacent by affixation undergo coalescence in Kikuyu. For instance, a prefixal **a** in contact with a root-initial vowel **e** gives rise to **ɛɛ**: **/á + et-íré/ → [ɛɛt-íré]** 'he called' and **/ma + et-íré/ → [mɛɛt-íré]** 'they called'. Since vowel coalescence is independent of reduplication, it is not discussed here. See Peng (1992) for a detailed analysis of vowel coalescence.

[5]In Benson (1964), there are three exceptions to the claim that reduplicative morphemes are bisyllabic: i) **ha-hahek** 'chat a little'; ii) **na-nat** 'push somewhat right on'; and iii) **tɛ-tiyer** 'be a little afraid'. I have no explanation as to why these forms reduplicate as such.

There is evidence suggesting that phonetic stress assignment is sensitive to whether the base is monosyllabic versus bisyllabic. Though Kikuyu is a tonal language, stress is a prominent phonetic feature of lexical items. According to Barlow (1960), stress falls on the penultimate syllable. In the following, stress is marked by underlining the relevant syllable. In (4a), I illustrate penultimate stress with lexical items; (4b) displays stress placement under suffixation with the root **kɔm-** 'lie down'. Nasal stop sequences represent single prenasalized consonants in Kikuyu.

| | | | | | |
|---|---|---|---|---|---|
| (4) | a. | **ñuu.mba** | → | ***ñuu*.mba** | house |
| | | **ke.hu.ti** | → | **ke.*hu*.ti** | feverish cold |
| | | **θio.ro.ro.ka** | → | **θio.ro.*ro*.ka** | to be dizzy |
| | b. | **a-kɔ.m-ɛ** | → | **a.*kɔ*.mɛ** | |
| | | **a-kɔ.m-a.ɣ-ɛ** | → | **a.kɔ.*ma*.ɣɛ** | |
| | | **a-kɔ.m-a.ɣ-e.r-ɛ** | → | **a.kɔ.ma.*ɣe*.rɛ** | |

These stress patterns can be accounted for by building a bisyllabic left-headed foot on the right edge.

Barlow (1960:10, 259) points out that monosyllabic words do not have stress when they appear in isolation.

| | | | | | |
|---|---|---|---|---|---|
| (5) | a. | **θe** | → | **θe** | ground |
| | b. | **ŋgɔ** | → | **ŋgɔ** | shield |
| | c. | **re-á** | → | **reá** | eat |
| | d. | **ñu-á** | → | **ñuá** | drink |

In a sentential or affixation environment, stress is placed on the immediately preceding syllable.

| | | | | | |
|---|---|---|---|---|---|
| (6) | a. | **ikara θe** | → | **ika*ra* θe** | remain on the ground |
| | b. | **maare na ŋgɔ** | → | **maare *na* ŋgɔ** | broad shield |
| | c. | **ko-re-á** | → | ***ko*.reá** | to eat |
| | d. | **ko-ñu-á** | → | ***ko*.ñuá** | to fall |

The examples in (5) can be explained by assuming that foot construction imposes a minimality condition, such that degenerate feet are not permitted in Kikuyu (see Hayes (1985) for languages with conditions of this sort). The forms in (5) do not possess sufficient materials for proper footing to take place; consequently, they are not stressed. This explanation hinges on the assumption that feet must be bisyllabic in Kikuyu.[6]

Kikuyu reduplication is a stem-level process. Reduplicative morphemes form the stem boundary. Dahl's Law offers some evidence, a [–voiced] dissimilation that turns **k** into **ɣ** when **k** precedes **t/c/θ/k**: **ka-ɣoko** 'small chicken' versus **ɣa-cera** 'small path'. Dahl's Law applies across the affixational boundary. Davy and Nurse (1982) report that Dahl's Law does not take place in reduplication, even though conditions on its application are otherwise met: /**aka**/ → [**akaaka**] *[**aɣaaka**] 'build a little'. This suggests that reduplication must be distinguished from regular affixation.[7]

One other property of the data in (3) is worthy of comment here. Note that **a** appearing in the second syllable of reduplication is independent of the root that supplies the melody. One suggestion may be that it is related to the final vowel suffix. However,

[6]The anonymous reviewer suggests that what is called stress here may be a phrasal high tone that docks on the last vowel but which is dislodged from there by an intonational tone, as proposed for Kinande by Hyman (1990) and Mutaka (1990). There are three reasons why this analysis may not be right. First, there is no such phrasal high tone (see Pratt (1972) and Clements and Ford (1977, 1979)). Second, even in non-phrasal and non-sentential environments, penultimate stress is clearly present. Third, phonetic stress is weight-sensitive. The affixation of 'me' prefix induces lengthening of the preceding vowel. This vowel attracts stress, as shown by **a-ɣoo-θen-i-a** 'he is persecuting me' (Barlow 1960:10-11). Weight-sensitivity is a characteristic of stress.

[7]Thanks to the anonymous reviewer for pointing out that Kikuyu verb reduplication is a stem-level process, rather than a compounding process. Forms such as **á-kɔm-ɛ** 'he lies down' and **o-tɛm-íré** 'you cut today' reduplicates as **á-kɔma-kɔm-ɛ** and **o-tɛma-tɛm-íré**, not as ***kɔma-á-kɔm-ɛ** and ***tɛma-o-tɛm-íré**. This supports the reviewer's suggestion that reduplication is a stem-level process.

this hypothesis is not supported by roots taking the alternate final vowel ɛ: **rɔra-rɔr-ɛ** 'see a little' and **rɛɛha-rɛɛh-é** 'bring a little'.

I assume that **a** is epenthesized to satisfy the template. $F_{trochaic}$ requires two syllables, but only $R_{can}$ is parsed out for association. As the parsing algorithm supplies less than what is needed, **a** is inserted. Peng (1992, 1993) analyses the suffixal vowel harmony in Kikuyu and shows that **a** is underlyingly unspecified. Thus, Kikuyu **a** appears to be a default vowel, derived by redundancy rules. Incidentally, Mutaka and Hyman (1990) reach a similar conclusion regarding Kinande, arguing that **a**, appearing systematically in the second syllable of reduplication, is the default vowel in Kinande.

It is also evident from (7) that the high tone is not preserved in reduplication.

| (7) | | | |
|---|---|---|---|
| | **ci.n-á** | **ci.na-ci.n-á** | burn a little |
| | **mɛ.né.rɛ.r-a** | **mɛ.na-mɛ.né.rɛ.r-a** | take a little care of |
| | **ir-á** | **i.ra-i.r-á** | scorn a little |
| | **i.ɣó.r-a** | **i.ɣa-iɣó.r-a** | become a little full of |

This aspect receives a ready explanation from parsing out $R_{can}$. Mentioned earlier, the high tone appears on the second syllable of the stem due to the tone shift. As $R_{can}$ parses out [σ.C], the fact that the high tone of the second stem syllable is not copied follows from the parsing algorithm. The surface low tones on the reduplicative copy can be completely derived by the default assignment of the low tones.

## 2.3. TRANSFER

Vowel length is contrastive in Kikuyu, shown by the minimal pair: **kora** 'grow' and **koora** 'pull out'. Reduplication preserves this contrast, illustrated in (8). Following Clements (1985), I refer to this phenomenon as TRANSFER.

| (8) | Root-FV | Reduplication | |
|---|---|---|---|
| | **ko.r-á** | ***ko.ra*-ko.r-á** | grow a little |
| | **koo.r-á** | ***koo.ra*-koo.r-á** | pull out a little |
| | **ßu.t-a** | ***ßu.ta*-ßu.t-a** | pluck out a little |
| | **ßuu.t-a** | ***ßuu.ta*-ßuu.t-a** | depose a little |
| | **tɛ.rɛ.m-a** | ***tɛ.ra*-tɛ.rɛ.m-a** | trample a little |
| | **tɛɛ.hó.r-a** | ***tɛɛ.ha*-tɛɛ.hó.r-a** | tear a little |
| | **hɔ.rɔ.r-a** | ***hɔ.ra*-hɔ.rɔ.r-a** | pour out a little |
| | **hɔɔ.rɛ.r-a** | ***hɔɔ.ra*-hɔɔ.rɛ.r-a** | be a little quiet |

Diphthongs are preserved in reduplication as well, as seen in (9).

| (9) | Root-FV | Reduplication | |
|---|---|---|---|
| | **ßoi.k-a** | ***ßoi.ka*-ßoi.k-a** | march a little |
| | **ɣua.ñ-á** | ***ɣua.ña*-ɣua.ñ-á** | be a little wet |
| | **tɛi.θí-a** | ***tɛi.θa*-tɛi.θí-a** | help a little |
| | **θɔɛ.rɛ.r-a** | ***θɔɛ.ra*-θɔɛ.rɛ.r-a** | be a little used to |

Even though diphthongs are not classified as a transfer phenomenon, I mention them here to highlight the fact that the moraic count of the root-initial syllable is preserved whether or not it consists of a short vowel or a long vowel or a diphthong. This point will be important in §3 once we consider that the moraic count of the second syllable is not preserved.

Kikuyu reduplication also appears to possess glide transfer, as shown in (10).[8]

[8]My search through Benson (1964) uncovers one example **kya.ra-kyar-a** 'be somewhat poor' where *y* is preserved as an onset (p.223). Surface *Cy* clusters are found in prefixes. Kikuyu has several prefixes of the shape *(C)e*. /**e**/ undergoes gliding when preceding /**a, ɛ, ɔ, o, u**/, giving rise to *(C)y* and inducing compensatory lengthening of the following vowel (Sharp 1960:51). As prefixes do not participate in reduplication, I have chosen to illustrate glide transfer with *Cw* clusters.

| (10) | Root-FV | Reduplication | |
|---|---|---|---|
| | **twɛ.k-á** | ***twɛ.ka*-twɛ.k-á** | be a little diluted |
| | **θwa.r-a** | ***θwa.ra*-θwa.r-a** | split a little |
| | **ɣwɛ.t-a** | ***ɣwɛ.ta*-ɣwɛ.t-a** | talk about a little |
| | **twa.ré.re.r-a** | ***twa.ra*-twa.ré.re.r-a** | push a little closer |

McCarthy and Prince (1987) point out that transfer is a phenomenon resulting from the preservation of the lexically distinctive information of the base. Just because reduplication shows up with an exact copy of the base, it does not mean that transfer has occurred. To demonstrate a case of genuine transfer, it is crucial to show that the information preserved by reduplication is lexically distinctive. In other words, it is essential to show that the glide is underlying before it can be concluded that (10) constitutes cases of glide transfer.[9]

Underlying glides and derived glides pattern differently in their ability to induce compensatory lengthening in Kikuyu. This can be demonstrated by the glide formation rule that turns **o** into **w**. Illustrated in (11a) with examples from Armstrong (1967:68-69), the second-person nominative prefix shows up as **o** in front of consonant-initial roots. It surfaces as **w** preceding vowel-initial roots (11b).

| (11) | | | | | |
|---|---|---|---|---|---|
| | a. | **o-tɛm-íré** | → | **otɛmíré** | you cut today |
| | | **o-θɔɔm-íré** | → | **oθɔɔmíré** | you read today |
| | b. | **o-et-íré** | → | **weetíré** | you called today |
| | | **o-ɔn-íré** | → | **wɔɔníré** | you saw today |

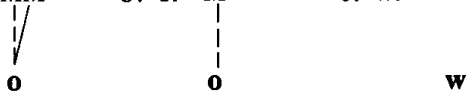
In (11b), glide formation induces compensatory lengthening. Note that the initial vowels in the root **et-** and **ɔn-** are underlyingly short, as they surface as **ñetíré** 'I called today' and **ñɔɔníré** 'I saw today' when the first person nasal prefix is attached.

In contrast with the derived glide in (11b), the glide in (10) is all followed by a short vowel. If the glide in (10) is analyzed as an underlying **o**, then there would be no explanation for why it fails to condition compensatory lengthening. I conclude that the glide in (10) is underlying.

I account for transfer by appeal to the lexically distinctive copying hypothesis proposed by McCarthy and Prince's (1987), which states that "all and only the lexically distinctive information is copied."

For Kikuyu, this hypothesis translates into the preservation of the moraic information in (12) by parsing.

(12) a. **oo**: MM b. **o**: M c. **w**:

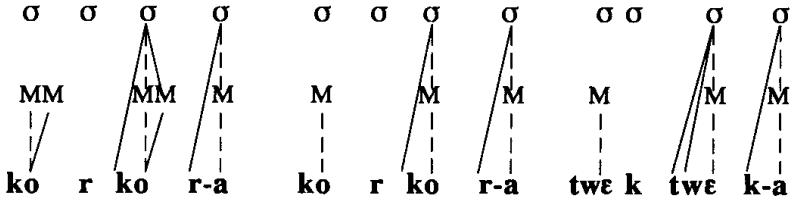



Underlying glides must be distinguished from short vowels by linking one mora (M) to short vowels. Short vowels are distinguished from long vowels by associating the latter to two moras.

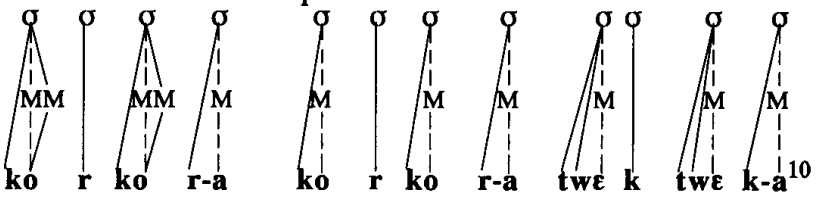
The reduplication data are derived in (13), illustrated by ***koo.ra*-koo.r-á** 'pull out a little'), ***ko.ra*-ko.r-á** 'grow a little', and ***twɛ.ka*-twɛ.k-á** 'be a little diluted'. In (13a), the base is shown with a $F_{trochaic}$ template concatenated to the base. Anticipating the result of §3, I show that the $R_{can}$ of the base is parsed out and aligned to the left of the base. Association to the template takes place in (13b). Notice that $F_{trochaic}$ is not satisfied at the end of (13b). As the template is obligatorily satisfied (McCarthy and Prince 1986, 1990), the default vowel **a** is inserted.

[9]Thanks to an anonymous reviewer for emphasizing this point.

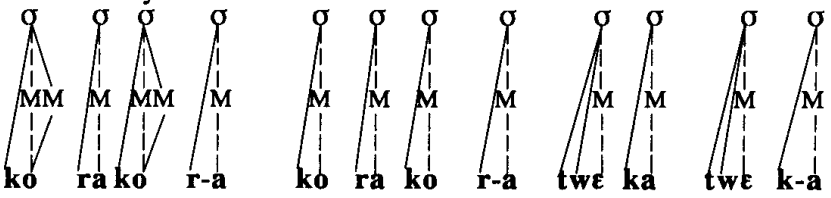
(13) a. input representation




b. association to the template




c. redundancy rules




Three points are worth mentioning. First, recall that Kikuyu verbs ending in ɛ fail to reduplicate, i.e., **rɔra-rɔr-ɛ** 'see a little'. Second, the high tone on the second syllable of the root is not preserved. Third, in the examples of reduplication, the inserted **a** is invariantly short.

These properties follow from parsing the $R_{can}$ of the base. In the case of **rɔra-rɔr-ɛ**, ɛ does not show up in reduplication, because it is not parsed out as part of the $R_{can}$. The non-preservation of high tone follows from the fact that the melody bearing the high tone is never parsed out. Monomoraic **a** derives from the interaction of template satisfaction and the MAXIMIZATION OF ASSOCIATION (McCarthy and Prince 1986), together with the $F_{trochaic}$ template. $F_{trochaic}$ requires two syllables, but it does not impose a moraic count on the syllable. Default insertion of a short vowel satisfies the template. As the maximization of association applies only when there are melodies available for association, the epenthesized **a** remains monomoraic even if the template licenses up to two moras per syllable. In §3, we will see that this prediction is borne out and provides one of the two motivations for parsing out the $R_{can}$.

## 3. THE LACK OF TRANSFER

Up to now, I have assumed that Kikuyu reduplication parses out a $R_{can}$ of the stem. $R_{can}$ is not a prosodic unit. As Kikuyu consists typically of CV/CVV syllables like other Bantu languages, $R_{can}$ ([σ.C]) is not small enough to fit into a single syllable, nor is it as big as a foot. Parsing out a nonprosodic unit of the base raises questions as to what can or cannot be parsed out of the morphological base that supplies the melody. This is an important question, for without principles determining the parsing algorithms, any generalization made about reduplication is likely to be dubious.

McCarthy and Prince (1990) propose such a parsing algorithm. It is the PROSODIC CIRCUMSCRIPTION OF DOMAINS which states that "the domain to which morphological operations apply may be circumscribed by prosodic criteria as well as by the more familiar morphological ones."

[10]The reviewer suggests that it is awkward to map a single consonant to the syllable before the default vowel a is epenthesized. This ordering is necessitated by template satisfaction developed by McCarthy and Prince (1986, 1990). Unless the copied melodies are mapped to the template first, there is no way to determine whether the template is satisfied and, consequently, whether it requires epenthesis.

The fundamental insight of prosodic circumscription of domains is that morphological operations may redefine the boundary of a morphological base. However, circumscription is not random. It circumscribes only a prosodic or morphological subdomain of the base.

In §3.1, I argue that Kikuyu reduplication parses out the $R_{can}$ of the base. This argument is made on the basis of two sets of facts involving reduplication: stems with heavy second syllables, and stems with suffixation. The first set shows that the moraic count of the base syllable is not preserved. The second set reveals that onset clusters may be simplified when reduplicated. These properties follow if reduplication circumscribes the $R_{can}$. Section 3.2 examines the role of $R_{can}$ in Kikuyu morphology, arguing that it plays a productive role in forming larger morphological units.

## 3.1. FOR CIRCUMSCRIBING THE $R_{CAN}$

To understand the argument for circumscribing the $R_{can}$, it is critical to consider the alternatives to parsing out the $R_{can}$ in Kikuyu. One alternative to $R_{can}$ is that reduplication copies the entire base, which is then associated to the template. Considering that $F_{trochaic}$ is a prosodic category allowed by Prosodic Circumscription of Domains, the other choice is that the $F_{trochaic}$ part of the base is circumscribed for association to the template. I argue that neither option provides an account of the data presented below.

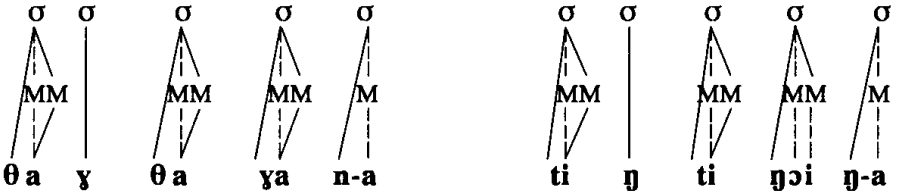
One distinctive property of reduplication is that it preserves the weight of the first syllable of the base. As the template is [σ σ] and Kikuyu syllables may be monomoraic or bimoraic, it is expected that the moraic count of the second base syllable is preserved as well. But this expectation turns out to be false.

| | | | | |
|---|---|---|---|---|
| (14) | a. | **ha.haa.t-a** | ***ha.ha*-ha.haa.t-a** | feel about a little |
| | b. | **θaa.ɣaa.n-a** | ***θaa.ɣa*-θaa.ɣáa.n-a** | go out a little |
| | c. | **rɛ.rɛo.r-a** | ***rɛ.ra*-rɛ.rɛo.r-a** | skim off a little |
| | d. | **tii.ŋɔi.ŋ-a** | ***tii.ŋa*-tii.ŋɔi.-a** | loiter a little |

***θaa.ɣa*-θaa.ɣáa.n-a** is particularly illustrative. Reduplication transfers the vocalic length of the first syllable without preserving that of the second syllable.

Under the analysis advocated in this paper, the account of (14) is straightforward. (14a) results from compounding the $F_{trochaic}$, parsing out the $R_{can}$, and associating the melodies to the template. Then, redundancy rules insert **a**, as insured by template satisfaction.

(15) a. compounding $F_{trochaic}$, parsing, and mapping



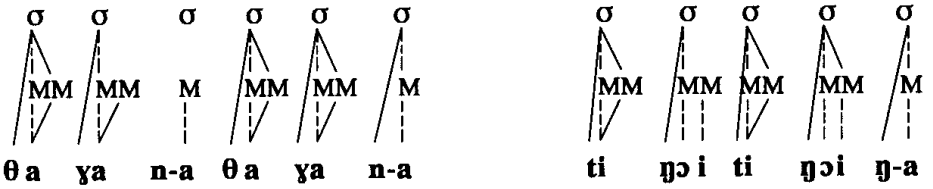

b. redundancy rules


This proposal provides a principled explanation for the fact that **a** is short. Inserting a monomoraic **a** renders the $F_{trochaic}$ obligatorily satisfied. As the maximization of association is relevant only when there is melody left for association (McCarthy and Prince 1986), the patterns of reduplication surface as predicted.

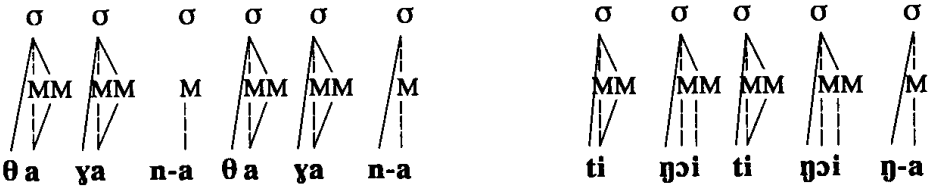
In contrast, the roots with bimoraic second syllables in (14) are problematic for parsing either the entire base or the $F_{trochaic}$ of the base. Consider the representations

of (14b) and (14d) as a result of attaching the $F_{trochaic}$, parsing, and left-to-right association. Note that at the end of (16a), the $F_{trochaic}$ is obligatorily satisfied. But the template is not maximized. As there are melodies left for association, the maximization of association conditions further association, giving rise to the representations in (16b)

(16) a. parse the entire base parse the $F_{trochaic}$




b. maximization of association




Though **a** can be derived through melody overwriting (McCarthy and Prince 1986, 1990) or insertion (Steriade 1988), the moraic count of the second syllable poses a problem. Inserting a into the second syllable in (16) predicts ***θaa.ɣaa*-θaa.ɣáa.n-a** and ***tii.ŋaa*-tii.ŋɔi.ŋ-a.**[11] This problem arises from the fact that syllable weight is represented prosodically on a separate tier by moraic representations. Overwriting or insertion may alter the melody, but not the prosodic representation already in place.

To derive the monomoraic **a** in reduplication, it is essential to delete the extra mora in the second syllable before or after insertion. However formulated, this deletion rule remains a stipulation. It is not conditioned by the template nor is it triggered by the phonotactic constraints of Kikuyu. Worse yet, applying such a rule loses the generalization that reduplication is a single unitary process. If the moraic count of a template may be altered by deletion, the very notion of template loses its substantive content, as prosodic templates determine the shape-invariance of reduplication.

The stems with heavy second syllables provide one important argument for parsing out the $R_{can}$. The $F_{trochaic}$ template demands two syllables [σ σ]; but the parsing mechanism delivers only a syllable and a consonant [σ.C]. This mismatch derives the lack of length transfer in reduplication.

Apart from the monomorphemic data, multimorphemic verbs also require that reduplication delimit the $R_{can}$ of the base. Recall that verb roots can take extension suffixes to form larger stems in Kikuyu. When extension suffixes are attached to these roots, they appear not to participate in reduplication, illustrated by the causative suffix **iθi** or the passive suffix **wɔ** in (17).

| | | | |
|---|---|---|---|
| (17) | **re.m-i.θi-a** → | ***re.ma*-re.m-i.θi-a** | till a little |
| | **ti.r-í.θi-a** → | ***ti.ra*-ti.r-í.θi-a** | clip a little |
| | **ha.r-wɔ́** → | ***ha.ra*-ha.r-wɔ́** | be a little purged |
| | **ta.h-wɔ́** → | ***ta.ha*-ta.h-wɔ́** | be a little drawn |

To explain the failure of suffixes to take part in reduplication, one may suggest that reduplication takes place prior to the suffixation of **iθi** and **wɔ**. In fact, Clements (1984, note 12) suggests that suffixes like **iθi** are infixes, concatenated to the root after the final-vowel suffix is already attached.

[11]This is not merely a straw man. Melody overwriting does not lead inevitably to the loss of moraic structures. Kolami, a Dravidian language reported in McCarthy and Prince (1990:246), is such a language: **pal** → **pal-gil** 'tooth' and **maasur** → **maasur-gíisur** 'men'. Note that the initial consonant of the copy is replaced with **g** and the vowel **a** is overwitten with **i**. But the vowel length of the base is preserved in the copy.

This hypothesis would be correct if these suffixes never took part in reduplication. This is not the case.

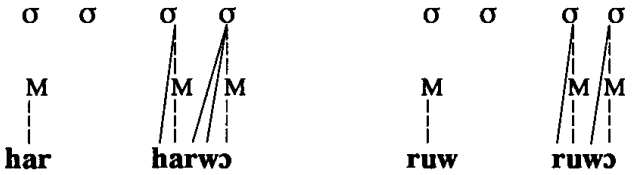
(18)

| | | | |
|---|---|---|---|
| **ree-i.θí-a** | → | ***rei.θa*-re-i.θí-a** | eat a little |
| **ru-i.θi-a** | → | ***rui.θa*-ru-i.θi-a** | receive circumcision |
| **ree-wɔ́** | → | ***ree.wa*-ree-wɔ́** | be a little eaten |
| **ru-wɔ** | → | ***ru.wa*-ru-wɔ** | be a little circumcised |

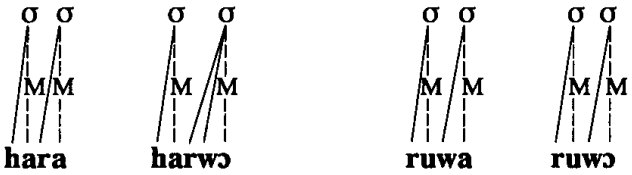
The monosyllabic roots in (18) show clearly that extension suffixes must be present prior to reduplication.

The analysis of (17)–(18) is straightfoward if the $R_{can}$ of the base is circumscribed for association.

(19) a. compounding $F_{trochaic}$ and parsing out the $R_{can}$



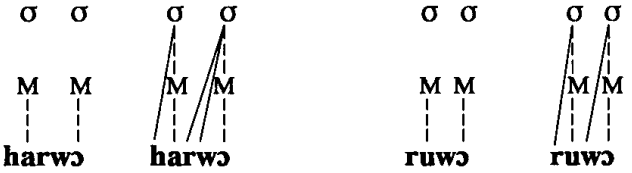

b. left-to-right mapping and redundancy rules



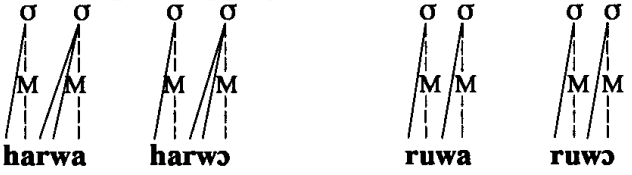

In the left derivation, **w** is never parsed out and thus fails to appear in reduplication. In the right derivation, the $R_{can}$ consists of the monosyllabic root **ru-** and **w** of **wɔ**.

The form ***hara*-har-wɔ́** 'be a little purged' in (17) is particularly problematic for parsing out the entire base or the $F_{trochaic}$ of the base.

(20) a. compounding $F_{trochaic}$ and parsing




b. left-to-right mapping and redundancy rules




Under either parsing the entire base or the $F_{trochaic}$ of the base, there is no principled way to prevent **w** from associating to $F_{trochaic}$ as an onset, predicting incorrectly ***harwa-har-wɔ**. The association of the glide is permitted by the template and required by the maximization of association. It is consistent with Kikuyu syllable structures as Cw is licensed as onset clusters.

By parsing out the $R_{can}$, we account for why transfer is there in one syllable and absent in another. The loss of vocalic length and glides argue compellingly in favor of the parsing algorithm adopted.

## 3.2. IDENTIFYING THE $R_{CAN}$

Once $R_{can}$ is established as the domain of circumscription, one may ask why the canonical root figures so prominently in Kikuyu reduplication. My following answer,

based upon the examination of Kikuyu roots, is that $R_{can}$ is not a random unit; it has played an important role in forming multisyllabic but monomorphemic roots before and it continues playing a productive role in deriving larger verb stems in Kikuyu today.

Consider the statistics in (21). Of a total of 1,775 verbal roots in Benson (1964), 767 roots (43%) are identical with [σ.C], the $R_{can}$ circumscribed in reduplication. These roots are no doubt productive in forming larger units and identifiable as separate morphological constituents, as already shown in (1).

(21)

| Root | Number | Percentage |
|---|---|---|
| σ | 33 | 2% |
| σ.C | 767 | 43% |
| σ.σ or more | 975 | 55% |
| total | 1,775 | 100% |

33 roots are smaller than $R_{can}$, accounting for 2 percent. These roots do not constitute an exception to the claim that $R_{can}$ is made up of [σ.C]. Most of these roots, if not all, are historically derived from the $R_{can}$. Their present phonological shapes (that is, a monosyllable) result from the truncation of the last consonant (Meinhof 1932).

Of the 1,775 roots, those larger than [σ.C] (975: 55%) are most problematic for the claim that the canonical root is [σ.C]. Benson (1964) lists them as independent roots as they cannot be analyzed in terms of their constituent parts. I argue that $R_{can}$ is to some extent identifiable even in these roots. I show that present-day multisyllabic but monomorphemic roots result historically from the concatenation of $R_{can}$ and suffixes in Kikuyu. Due to semantic and phonological changes, they are reanalyzed as single units.

Peng (1993) conducts a study of the ATR harmony, which reveals the following synchronic alternations in Kikuyu suffixes as in (22).

(22)

| | | |
|---|---|---|
| **i** | **tiɣ-érer-ek-a** | abandon |
| **u** | **tum-érer-ek-a** | intrude |
| **e** | **ger-erer-ek-a** | go fetch more of |
| **o** | **hoθ-erer-er-a** | make light of |
| **ɛ** | **tɛm-érɛr-ɛk-a** | cut into very small pieces |
| **ɔ** | **ßɔc-ɛrɛr-ɛk-a** | churn |
| **a** | **ßaθ-erer-ek-a** | become very wealthy |

Of particular interest in (22) is the behavior of the low vowel root. Even though **a** can be shown to be [–ATR], it does not trigger [–ATR] harmony sychronically in suffixes. Examination of multisyllabic but monomorphemic roots reveals that patterns such as [**a . . . ɛ**] are systematically absent, even though roots like **carek-** 'pop' is abundantly attested. The lack of [**a . . . ɛ**] patterns can be explained if it is assumed that large roots such as **carek-** were historically formed by the concatenation of the $R_{can}$ **car** and the suffix **ek**, and the ATR harmony that operates synchronically in Kikuyu suffixes also operated before suffixes were frozen in multisyllabic monomorphemic roots. As the low vowel takes the [+ATR] variant of the mid vowel, the presence of **carek-** and the absence of [**a . . . ɛ**] are accounted for. This explanation hinges on the first assumption that large roots resulted historically from the combination of the $R_{can}$ and suffixes.

In (23), the comparison of canonical roots and multisyllabic roots also shows that $R_{can}$ is identifiable to some extent.

(24)

| | | |
|---|---|---|
| a. | **caɣ** | roam about |
| | ***caɣaaɣ*** | roam about idly |
| b. | **cɔŋ** | be deformed, ugly |
| | ***cɔŋih*** | be ugly, unattractive, unappealing |
| c. | **ɣɛk** | break, crack |
| | ***ɣɛkeñ*** | split, widen a gap |

| | | | |
|---|---|---|---|
| d. | **kar** | scratch | |
| | ***karar*** | scratch with a point | |
| | ***karañana*** | scratch one another | |

Benson (1964) enters the italicized roots as independent roots. Shown by the glosses, they are clearly related to the canonical roots preceding them. The comparison between **kar** and **karar** illustrates this point. **karar-** 'scratch with a point' is related to **kar-** 'scratch'. The form **ar** is no longer a productive independent suffix, making it impossible to isolate **karar-** as a canonical root followed by a suffix.

Certainly, not all of the multisyllabic roots have a corresponding root of the shape [σ.C] like those in (24). This is in part due to the semantic drifts and phonological changes which render it impossible to trace the origins of these roots.

In designating the $R_{can}$ as the domain of circumscription, I am not claiming any internal morphological boundary in multisyllabic roots. Just as Arabic plurals parse out a minimal word (=[$F_{MM}$]) of their corresponding singular forms (McCarthy and Prince 1990), Kikuyu reduplication circumscribes the $R_{can}$ of the base. In either language, no claim is made about the prosodic or morphological constituency of the base. This discussion aims only at establishing that the canonical root is not an arbitrary unit invoked to account for reduplication. Its role in forming larger roots historically and multisyllabic stems today speaks to that.

## 3.3. KINANDE REDUPLICATION

In light of Kikuyu reduplication, it is useful to consider reduplication in Kinande, a Bantu language. Mutaka and Hyman (1990) report that Kinande possesses a productive operation of reduplication, expressing a similar semantic function. Like Kikuyu, Kinande attaches a bisyllabic $F_{trochaic}$ template and reduplication reveals an epenthetic **a**.

Kinande multisyllabic but monomorphemic roots are of particular interest to the discussion on canonical roots. With respect to reduplication, they divide into three types, two of which are pertinent. One type of roots does not reduplicate at all (24). The other reduplicates exactly like Kikuyu (25) (Mutaka and Hyman 1990:106–7).

| | | | |
|---|---|---|---|
| (24) | **e-rí-bugul-a** | to find | no reduplication |
| | **e-ri-huhuman-a** | to be sad | no reduplication |
| (25) | **e-ri-goner-a** | to neglect | **e-ri-*gona*-goner-a** |
| | **e-ri-gambul-a** | to talk | **e-ri-*gamba*-gambul-a** |

To explain the failure of roots to reduplicate in (24), Mutaka and Hyman appeal to MORPHEME INTEGRITY CONSTRAINT which states that "mapping of a melody to a redu- plicative template takes place by morpheme. If the whole of a morpheme cannot be successfully mapped into the bisyllabic reduplicative template, then none of the morpheme may be mapped."

This constraint explains why roots such as **bugul-** and **huhuman-** fail to undergo reduplication, as only **bugu** of **bugul-** and **huhu** of **huhuman-** can be mapped into a bisyllabic template.

Morpheme integrity constraint predicts that the roots in (25) would fail to reduplicate as well. As they do reduplicate in Kinande, Mutaka and Hyman propose that the roots in (25) are underlyingly marked as **gon-er** and **gamb-ul**. That is, a morpheme boundary separates the canonical root portion from the rest of the root. Note that such roots as **goner** and **gambul** are analyzed as bimorphemic in Kinande only to derive the distinct behaviors of multisyllabic roots in reduplication.

The significance of this discussion for Kikuyu is that Kinande offers some independent support for the claim that the canonical root must be identified in otherwise multisyllabic but monomorphemic roots. The distinction between the two languages is that in Kinande, this is true only of a subset of multisyllabic roots, which supports the proposal by Mutaka and Hyman. In Kikuyu, where the

bipartite division in (24) and (25) does not exist, the claim is true of all multisyllabic roots. Thus, Kikuyu dramatizes what is only partial in Kinande.[12]

## 4. CONCLUSION

The striking property of reduplication to be addressed in Kikuyu is that it transfers the vocalic length and consonant-glide clusters without preserving them at the same time. This property follows from two independent principles developed by McCarthy and Prince (1986, 1987, 1990). The lexically distinctive copying hypothesis makes it possible to preserve the lexically distinctive moraic count. Prosodic circumscription of domains expresses the generalization that morphological operations may redefine the domain of the base. Together, they account for the transfer and the lack of transfer in Kikuyu reduplication. The specific contribution of Kikuyu is the demonstration that the category $R_{can}$ can be parsed out of a base.

In addition, this paper supports the two conditions on association: template satisfaction, and the maximization of association (McCarthy and Prince 1986, 1990). Kikuyu reduplicative template is bisyllabic while the parsing algorithm delivers only [σ.C]. Template satisfaction sanctions the epenthesis of **a**. The maximization of association, conditioned only on the availability of unassociated melodies, guarantees the monomoraicity of **a**.

The mismatch between the bisyllabic template and the parsed out constituent [σ.C] further confirms the view that templates are independent of the parsing algorithm, a conclusion reached in McCarthy and Prince (1990), Archangeli (1991), and Lombardi and McCarthy (1991).

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[12]Note that Kikuyu reduplication cannot be explicated in terms of morpheme integrity constraint. Reduplication data such as ***reiθa*-re-iθi-a** 'eat a little' and ***reewa*-ree-wɔ** 'be a little eaten' in (18) show that portions of a morpheme can be mapped into a template.