1. Introduction

Those of us who have assembled at this Table Ronde on Bantu Historical Linguistics share a number of interrelated historical and comparative concerns. First, we are concerned to define the Bantu group as a genetic unit and to determine the place of Narrow and Wide Bantu, Bantoid, etc. within the Benue-Congo branch of Niger-Congo. Second, as a related goal, we share an interest in refining Proto-Bantu (PB) reconstructions and therefore in establishing what was vs. was not present in the parent language. As part of this enterprise, language-internal and cross-linguistic examinations have been necessitated of the changes that have taken place in the ca. 500 Bantu languages. An oft expressed hope is that the variations characterizing Bantu languages can serve as reliable criteria for the internal sub-grouping of the family.

My paper shares all of this concerns. While those of us present (and others) have approached the above four issues in a number of ways, I would like to exemplify a particular strategy that has only occasionally been applied to Bantu, most notably in the work of Yvonne Bastin. This strategy is to focus on widespread phonological phenomena in Bantu that are conditioned in an unusual way by the morphology. Just as arbitrary features of a morphological system are cited as evidence for genetic relation, the idea
here is that phonological properties that have arbitrary—or at least unusual—morphological conditions may also serve this genetic marking function. The material for the kinds of studies I advocate here have been accessible for some time, mostly in dictionaries and lexicons, many of which we have acquired, created, or converted to electronic form as part of the Comparative Bantu On-Line Dictionary (CBOLD) project. My purpose in this paper is twofold. First, I document the well-known process of vowel height harmony (VHH) throughout the (Narrow) Bantu domain. For this purpose I have created a Bantu vowel-harmony database which at the time of this writing contains information on 134 languages. Second, I attempt to show that a peculiarity of VHH, namely an asymmetry in how it operates in front vs. back vowels, is a useful criterion to subdivide Bantu into two groups, roughly approximating the Equitorial vs. Savanna Bantu split postulated by other researchers. My tentative suggestion will be that this asymmetry was introduced into proto-Savanna Bantu after this split was effected.

2. Vowel height harmony
A process of vowel height harmony (VHH) has been documented in a wide range of languages from all parts of the Bantu zone. While widely occurring, VHH is subject to considerable variation. I refer to one pattern which occurs with significant frequency as “asymmetric” VHH in this paper. Assuming for the moment the Proto-Bantu (PB) seven-vowel system *i, *a, *u, *o, *e, *u, *e reconstructed by Meinhof and van Warming (1932), Guthrie (1967-71), Meeussen (1967) and others, the relevant asymmetry can be expressed diachronically as in (1).

(1) Asymmetric vowel height harmony
a. front height harmony
b. back height harmony

As indicated, the degree 2 vowels *i, *a, *e, degree 3 (mid) vowels, but with one both *e and *o, *u is lowered only when VHH is observed directly in many original seven-vowel (7V) system (e.g. F.22 in (2), where the applicative /-a/ are illustrated after each of the sound language:

(2) Nyamwezi F.22 [Magang'a]

a. -bon-e-a ‘see + appl’
b. -zeeng-e-a ‘build + app’
c. -Bi-it-a ‘hide + appl’
   -pund-it-a ‘edit + appl’
   -gub-it-a ‘put on lid’
   -shoun-it-a ‘gnaw + app’
   -gac-it-a ‘divide + ap

In (2a) we see that both /i/ and /u/ are however, only /i/ is lowered after /e/. is no change after the vowels /i/, /u/ occur in the vowel harmony database Lega D.25, Holo-holo D.28, Nande Rimi F.32, Kinga G.65, Nyakusa N.

In Bantu languages with five-vowel systems, *i, *u, *y respectively. The coro to show the same asymmetry as in (2) examples from Kisa F.32 in (3).

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2For discussion see Nurse’s overview (this volume) as well as other papers in this volume (especially Ehret’s).

3As we shall see below, this symbolization of the PB vowel system is equivalent to /i, /a, /e, /o, /u, /e, /u, /e, as we find in Nyamwezi in (2), as well as in most seven-vowel systems outside NW Bantu.

4Throughout this study I shall provide each cited language, indicating also the zone D and E languages into a n referential designations given to language.

5We probably should include in this cat D.28, within which *i/“opposition phon dge (i,y) et celles du second (i,u) est di
vies that have arbitrary—or at least may also serve this genetic marking of studies I advocate here have been in dictionaries and lexicons, many of which are converted to electronic form as part of the CBOLD project.\footnote{Throughout this study I shall provide the Guthrie reference letter-number for each cited language, indicating also changes proposed by Tervuren (e.g. shift of some zone D and E languages into a new zone I) or, in a few cases, Tervuren referential designations given to languages not included in Guthrie (1967-71).} My purpose is to present the well-known process of vowel harmony in the (Narrow) Bantu domain. For this VHH database which at the time of \(^1\) in 134 languages. Second, I attempt to rely on an asymmetry in how it operates in criterion to subdivide Bantu into two Equitorial vs. Savanna Bantu split Ay tentative suggestion will be that this toto-Savanna Bantu after this split was

(VHH) has been documented in a wide Bantu zone. While widely occurring, I refer to one pattern which occurs in Guthrie's VHH in this paper. Assuming \(^B\) seven-vowel system \(\ast i, \ast e, \ast e, \ast u, \ast o, \ast a\) of the language:

\( (2) \) Nyanwezi F.22 (Maganga & Schadeberg 1992)

a. \( -\text{bom-\text{el-a}} \) 'see + appl' \( -\text{hong-\text{ol-a}} \) 'break off'
b. \( -\text{zeeng-\text{el-a}} \) 'build + appl' \( -\text{zeeng-\text{ol-a}} \) 'build'
c. \( -\text{biss-\text{ol-a}} \) 'hide + appl' \( -\text{bis-\text{ol-a}} \) 'find out'
   \( -\text{pand-\text{el-a}} \) 'bend + appl' \( -\text{pand-\text{ol-a}} \) 'overturn'
   \( -\text{gub-\text{el-a}} \) 'put on lid + appl' \( -\text{gub-\text{ol-a}} \) 'take off lid'
   \( -\text{show-\text{el-a}} \) 'gnaw + appl' \( -\text{show-\text{ol-a}} \) 'show teeth'
   \( -\text{gaf-\text{el-a}} \) 'divide + appl' \( -\text{gaf-\text{ol-a}} \) 'divide'

In (2a) we see that both \( /i/ \) and \( /a/ \) are lowered after \( /d/ \). As seen in (2b), however, only \( /i/ \) is lowered after \( /d/ \). The examples in (2c) show that there is no change after the vowels \( /i/ \), \( /i/ \), \( /u/ \), \( /a/ \) and \( /a/ \). Eleven V7 languages occur in the vowel harmony database which exhibit the above asymmetry: Lega D.25, Holoholo D.28, Nande DJ-42, Kikuyu E.51, Sukuma F.21, Rumi F.32, Kinga G.65, Nyakyusa M.31 and Matumbi P.13.\footnote{We probably should include in this category one additional language, Holohoho D.28, within which \( \text{"l'opposition phonologique entre les voyelles du premier degré (i,u) et celles du second (i,u) est de portée restreinte}\) (Coupez 1955:12).}

In Bantu languages with five-vowel (SV) systems, \( \ast i \) and \( \ast u \) merge with \( \ast i \) and \( \ast u \), respectively. The corresponding suffixes typically continue to show the same asymmetry as in seven vowel systems. Thus consider the examples from Kisa E.32 in (3).

(1) Asymmetric vowel height harmony

a. front height harmony \( +i > e \) \( /e, o/ \) \( C \)
b. back height harmony \( +u > o \) \( /o/ \) \( C \)

As indicated, the degree 2 vowels \( \ast i \) and \( \ast u \) are lowered to \( \ast e \) and \( \ast o \) after degree 3 (mid) vowels, but with one difference: Whereas \( \ast i \) is affected after both \( \ast e \) and \( \ast o \), \( \ast u \) is lowered only after \( \ast o \). This front-back asymmetry in VHH is observed directly in many languages which have preserved the original seven-vowel (7V) system of PB. Such is the case in Nyanwezi F.22 in (2), where the applicative /-el-/ and reflexive transitive suffix /-ol-/ are illustrated after each of the seven vowels /i, e, u, o, a/ of the language:

(2) Nyanwezi F.22 (Maganga & Schadeberg 1992)

a. \( -\text{bom-\text{el-a}} \) 'see + appl' \( -\text{hong-\text{ol-a}} \) 'break off'
b. \( -\text{zeeng-\text{el-a}} \) 'build + appl' \( -\text{zeeng-\text{ol-a}} \) 'build'
c. \( -\text{biss-\text{el-a}} \) 'hide + appl' \( -\text{bis-\text{ol-a}} \) 'find out'
   \( -\text{pand-\text{el-a}} \) 'bend + appl' \( -\text{pand-\text{ol-a}} \) 'overturn'
   \( -\text{gub-\text{el-a}} \) 'put on lid + appl' \( -\text{gub-\text{ol-a}} \) 'take off lid'
   \( -\text{show-\text{el-a}} \) 'gnaw + appl' \( -\text{show-\text{ol-a}} \) 'show teeth'
   \( -\text{gaf-\text{el-a}} \) 'divide + appl' \( -\text{gaf-\text{ol-a}} \) 'divide'

In (2a) we see that both \( /i/ \) and \( /a/ \) are lowered after \( /d/ \). As seen in (2b), however, only \( /i/ \) is lowered after \( /d/ \). The examples in (2c) show that there is no change after the vowels \( /i/ \), \( /i/ \), \( /u/ \), \( /a/ \) and \( /a/ \). Eleven V7 languages occur in the vowel harmony database which exhibit the above asymmetry: Lega D.25, Holoholo D.28, Nande DJ-42, Kikuyu E.51, Sukuma F.21, Rumi F.32, Kinga G.65, Nyakyusa M.31 and Matumbi P.13.\footnote{We probably should include in this category one additional language, Holohoho D.28, within which \( \text{"l'opposition phonologique entre les voyelles du premier degré (i,u) et celles du second (i,u) est de portée restreinte}\) (Coupez 1955:12).}
Kisa E.32 (Sample 1976)

- tson-el-a  'pierce + appl'
- tson-el-a  'pull out'
- rek-el-a  'set trap + appl'
- rek-ul-a  'spring trap'
- bs-il-a  'hide + appl'
- bs-ul-a  'reveal'
- fung-il-a  'lock + appl'
- fung-ul-a  'unlock'
- bmb-il-a  'spread out + appl'
- bmb-ul-a  'spread apart'

The examples in (3a) show the lowering of /i/ and /u/ after /el/, while in (3b) only /e/ lowers after /el/. Finally, these suffixes are realized with /i/ and /u/ after /el/, /ul/ and /al/ in (3c). Within the Bantu vowel harmony database, 46 languages attest this pattern. These include, among others: Rwanda (D.J.61), Rundi (D.J.62), Nyankore E.13/J.21, Ganda El.15, Haya El.22, Jita E.25, Shamba G.22, Swahili G.42, Shi D.J.53, Cokwe K.11, Lwena K.14, Songye L.23, Luba-Kasai L.31a, Bemba M.42, Tonga M.64, Cowa N.31b, Yao P.21, and Shona S.11.6 It is safe to say that this asymmetry is quite the rule among 5V Bantu languages.7

The languages just cited exemplify what I refer to as the "canonical" VHH system in Bantu. Whether having a 7V or a 5V system, canonical VHH is characterized by the following five properties:

(i) Canonical VHH has the above asymmetry. In other words, within asymmetric VHH there is an independence of front height harmony and back height harmony, as indicated in (1).

(ii) Canonical VHH is not conditioned by the degree 4 vowel /al/. Thus, assuming that VHH is a lowering process, as virtually all scholars do, /al/ fails to pattern with degree 3 vowels in conditioning VHH. Instead, by this criterion, /al/ patterns with degree 1 and 2 vowels.

(iii) Canonical VHH does not apply to /al/. Just as /al/ does not trigger lowering in canonical VHH, it also is not targeted for vowel harmony.

(iv) Canonical VHH does not apply to the final vowel (FV) morpheme. By final vowel I mean to refer both to the inflectional final vowels that occur on verbs, e.g. -i, -e, -a, according to tense/aspect etc., as well as final vowels used in derivational morphology, e.g. verb-to-noun derivation.

(v) Canonical VHH does not apply to prefix vowels. Thus, both noun class prefixes and inflectional prefixes on verbs (marking subject, tense/aspect, object etc.), fail to harmonize in languages with canonical VHH.

Defined this way, canonical VHH characterizes 57 languages in the vowel harmony database. As seen in Map 1, these languages are located in the Central and Eastern parts of the Bas the Shona group.

Languages, most of which fall out the canonical system by providing e definiing characteristics, as summarized

(i) Some languages have no VH Suku H.32, Mhala H.41, and Ruund 1 the distribution of mid vowels is sev

6As will be elaborated below, front-back differences in VHH are even more widespread than this list of languages would suggest.

7Quite strikingly, the only five-vowel Bantu languages that have symmetric VHH, i.e. with lowering of *e to [ə] after *e as well as after *o, are to be found in zone H, e.g. certain Kongo H.10 dialects (see below).

8Enya D.14 (7V) and N. Bingi D.26 (7V) in addition, Caga E.62 (5V) is generally a productive suffixes such as applicative Philippson (personal communication) has considerably more complex in pn monomorphemic or which have tightly situations which obtain in zone S (exclus
the Central and Eastern parts of the Bantu region, extending as far South as the Shona group.

Map 1. Bantu Vowel Height Harmony

Languages, most of which fall outside this contiguous area, differ from the canonical system by providing exceptions to one or more of the five defining characteristics, as summarized below:

(i) Some languages have no VHH, e.g. Punu B.43, Lengola D.12,8 Suku H.32, Mbalu H.41, and Ruund L.53. In these languages, all with 5V, the distribution of mid vowels is severely restricted. Thus in Punu B.43,

8Enya D.14 (7V) and N. Binja D.26 (5V) may also belong to this group. In addition, Caga E.62 (5V) is generally believed to not have VHH, since productive suffixes such as applicative -i do not harmonize. However, Gérard Philippson (personal communication) has pointed out to me that the situation is considerably more complex in polysyllabic forms which are either monomorphic or which have tightly bound suffixes. Both Caga and similar situations which obtain in zone S (exclusive of Shona S.19) are discussed in §5.
"les phonèmes /e/ et /o/ ne se trouvent qu'en position initiale et radicale" (Kwenza Meka’a 1980:8). As a result, when not /a/, the vowel of a verb extension will always be [i] or [u], as seen in (4), from Blanchen (1995):9

(4) No VH in Punu B.43

a. -kil-il-a 'repasser'  b. -kib-ul-a 'découvrir'
   -sub-il-a 'uriner sur'  -tung-ul-a 'révéler'
   -ded-il-a 'obéir à'   -tes-ul-a 'briser'
   -got-il-a 'se frotter avec'  -doh-ul-a 'extraire, extirper'
   -gab-il-a 'distribuer à'   -gab-ul-a 'séparer'

(ii) Prefixes harmonize in Londo A.11, Bakweri A.22, Nen A.44, Gunu A.62, Koyo C.24, Bobangi C.32, Mongo C.61, Tetela C.71, Kela C.72, ombo C.76, Budu D.35, Logooli E.41, and Gusii E.42. It is significant perhaps that all of these languages have 7V (except Budu, which has 9V). Harmony of the class 5 noun prefix /e-/ to [e] and of the class 3 noun prefix /o-/ to [o] are illustrated in (5) and (6), respectively, from Koyo C.24:10

(5) Harmony of class 5/e/- prefix in Koyo C.24

a. e-simu 'scream'  b. e-be 'thigh'
   e-tüsi 'shoulder'  e-sëgë 'hose'
   e-tëmbi 'debt'  e-tëgë 'arm'
   e-körö 'skin'  e-sëgë 'hip'
   e-lagö 'promise'

(6) Harmony of class 3/o/- prefix in Koyo C.24

a. o-lingu 'love'  b. o-késë 'stream'
   o-kul 'hill'  o-tëgë 'basket'
   o-yëlo 'morning'  o-tëgë 'mouth'
   o-körö 'clothing'  o-kë 'night'
   o-sanga 'rope'

Besides being found only among certain languages, the restriction on the vowel height involves only degree 2 and 3 vowels. As a result, when not /a/, the vowel of a verb extension will always be [i] or [u], as seen in (4), from Blanchen (1995):9

(iii) Among languages that restrict the harmonic class 3 vowel height, there are three additional restrictions on harmony. In Londo A.11, Londo A.22, Nen A.44, Gunu A.62, Koyo C.24, Bobangi C.32, Mongo C.61, Tetela C.71, Kela C.72, ombo C.76, Budu D.35, Logooli E.41, and Gusii E.42, it is significant perhaps that all of these languages have 7V (except Budu, which has 9V). Harmony of the class 5 noun prefix /e-/ to [e] and of the class 3 noun prefix /o-/ to [o] are illustrated in (5) and (6), respectively, from Koyo C.24:10

(7) Final vowel harmonizing in *Ruttenberg 1971*

a. tsëb-idzi 'vagabonder'
   këd-idzi 'chasser qzn'
   këc-idzi 'barrer'
   kës-idzi 'lier'

In addition, most languages that harmonize the final vowel, e.g. Monge.

(iv) The asymmetry is not found in Gusii E.42, Kuria E.43, Beembe H. Mbunda H.21a (see Map 1). Whereas obtain in one of the four relevant environments in these languages (*eC*

Symmetric VH in Mongo-Nkundo C. 5V in (9):

(8) Symmetric VH in Mongo-Nkundo

a. -kot-xl 'couper + appl'
   -kënd-xl 'aller + appl'
   -t-xl 'appeler + appl'
   -t-xl 'envoyer + appl'
   -o-xl 'voler [seca] +
   -l-xl 'travailer + appl'
   -kambi-xl 'travailer + appl'

(9) Symmetric VH in S. Kongu

a. -somp-xl 's'attacher à'
   -leng-xl 'dépêrir, languir'
   -sik-xl 'soutenir, fortifier'
   -vur-xl 'surpasser, l'empê'
   -lax-xl 'suivre'

9Note that the only claim made about these languages is that they do not have vowel height harmony. Thus, Fonamey (1980) shows that postradical /a/ and /u/ assimilate to a following /u/, while /a/ also assimilates to a following /a/. She thus analyzes the suffix sequences -imín- and -iman- as /am-il/ and /am-ul/, respectively. Note in this context that postradical /a/ is actually realized as schwa in Punu, e.g. the FV in all of the examples in (4). Cf. below and Hyman (1998) for discussion of similar assimilations in Yaka.

10Based on Gazania (1972) and personal research conducted in Lyon with Mr. Yvon-André Ndizambo.
Besides being found only among certain 7V languages, prefix harmony involves only degree 2 and 3 vowels. That is, /u/ is not involved, as it may be in progressive harmony (see below).

(iii) Among languages that restrict VHH to the stem, the final vowel harmonizes in the B.30 languages (Bose, Bit, Pinzi etc.), Boma B.82 (B.74b7), Leke C.14, and, in the perfective only, in Kongo H.10 and Yaka H.31. Although we shall return to consider what is “really” going on in Yaka in §4, we illustrate VHH of the perfective final vowel in (7).

(7) Final vowel harmonizing in Yaka H.31 (van den Eynde 1968, Ruttenberg 1971)

a. tšü-idi ‘vagabonder’ b. këb-ele ‘faire attention’
   tšü-idi ‘vagabonder’ b. këb-ele ‘faire attention’
   kūd-idi ‘chasser qan’ tšib-ele ‘vencre’
   kūk-idi ‘harer’ sōd-ele ‘déboiser’
   kás-idi ‘lier’ sōb-ele ‘changer’

In addition, most languages that have extended VHH to prefixes also harmonize the final vowel, e.g., Mongo C.61, Tetela C.71, Gusi E.42.

(iv) The asymmetry is not found in zones A-B-C and Mituku D.13; Gusi E.42, Kuria E.43, Beembe H.11, Vili H.16d, Laadi H.16f, and Mbandu H.21a (see Map 1). Whereas in asymmetric systems VHH fails to obtain in one of the four relevant combinations (*eCa), it applies in all four environments in these languages (*eCa, *eCa, *oCa and *eCa). I illustrate symmetric VHH in Mongo-Nkundo C.61 (7V) in (8) and in S. Kongo H.10 (5V) in (9):

(8) Symmetric VHH in Mongo-Nkundo (7V) (Hulstært 1965)

a. -kot-el- ‘couper + appl’ b. -mōm-ol- ‘décoller’
   -kēnd- ‘aller + appl’ -mōm- ‘dés Approcher’
   -at- ‘aller + appl’ -bēt- ‘éveiller’
   -tōm- ‘envoye + appl’ -kōmb- ‘ouvrir’
   -fē- ‘voler + appl’ -sō- ‘découvrir’
   -lōk- ‘pagayer + appl’ -kūd- ‘décaper’
   -kēmb- ‘sautiller + appl’ -bēt- ‘désacer’

(9) Symmetric VHH in S. Kongo (5V) (de Gheele 1962)

a. -somp- ‘s’attacher à’ b. -tōm- ‘faire monter’
   -leng- ‘déperdre, languir’ -lēmb- ‘barer, effacer’
   -sik- ‘soutenir, fortifier’ -vil- ‘mouvoir, remuer’
   -vur- ‘surpasser, l’emporter’ -bub- ‘corrompre’
   -land- ‘suivre’ -hāng- ‘faire violence’
As before, the forms in (8a) and (9a) involve the applicative extension (*-id-), while those in (8b) and (9b) contain the reversive transitive extension (*-nd-). It is perhaps worth noting that the data in (9) are taken from de Ghezé’s (1652) dictionary of a southerly dialect of Kongo H.10 (cf. Lamin 1936:lvii). Such dialects of Kongo appear to constitute the only 5V languages with symmetric VHH. This dictionary shows that they have had such harmony for at least three and a half centuries.

(v) Whereas in symmetric languages /a/ does not lower a following vowel, /a/ conditions VHH in Mbunda H.21a, Mbunda K.15, Kwangali K.33, Kwezo K.35, Deiriku K.52, Pende L.11/K.52, Mbundu R.11, Kwanyama R.21, Ndongo R.22, and Herero R.31, all 5V languages.11 As seen in Map 2, these languages are roughly contiguous, belonging to zones K and R. The illustration in (10) comes from Pende:

(10) Front height harmony (front height harmony) in Pende L.11/K.52 (Niyonkur 1978)

a. -lomb- ‘demander’ → gu-lomb-él-a ‘demander pour’
   -bemb- ‘abandonner’ → gu-bemb-él-a ‘abandonner pour’
   -sas- ‘hacher’ → gu-sas-él-a ‘hacher pour’

b. -díg- ‘vendre’ → gu-díg-él-a ‘vendre pour’
   -túng- ‘bârir’ → gu-túng-él-a ‘bârir pour’

While these languages appear to have extended front height harmony, so that the change of /a/ to [e] also occurs after /o/, it should be noted that back height harmony is still restricted to occurring only after /a/:

(11) Back height harmony (back height harmony) of /o/ only after /a/ in Pende (Gusimana 1972)

a. gu-bóg-él-a ‘briser’
   gu-nyóng-él-a ‘tordre’
   gu-sóm-bn-él-a ‘sauter’
   gu-kál-ug-él-a ‘gémir’

b. gu-séng-él-a ‘absoudre’
   gu-shit-él-a ‘défaire (nœud)’
   gu-vumb-él-a ‘détérer’

11Boma B.74b (B.827), a 7V language, may also fall in this category, though I have not been able to confirm this. Interestingly, Leitch (1996), in fact, shows that the stem sequences [aCe] and [aCe] are disallowed in favor of [aCe] and [aCe] in a number of zone C languages. Since we independently know that /a/ may become a trigger of retracted tongue root (RTR) harmony outside Bantu, e.g. in Akan (Clements 1985), Yoruba (Archangieli & Pulleyblank 1989) and Gokara (Hyman 1985), we expect that this might also be the case in some of the 7V languages, particularly in zone A. The fact that it is better attested in 5V languages in the Bantu vowel harmony database may only reflect the areal nature of the feature, i.e. characterizing languages in the Southwest part of the Bantu region.
This then provides another argument for the independence of front height harmony and back height harmony.

![Map 2. Languages Lowering /a/ to /e/ after /a/](image)

(vi) /a/ undergoes vowel harmony in Londo A.11, Bakweri A.22, Nea A.44, Guru A.62, Kota B.25, Nzebi B.52, Tiene B.81, BomB.74b (B.82), Leke C.14, Koyo C.24, Mboji C.25, Doko C.31, Lingala C.36d, Ngombe C.41, Leka C.60, Bembe H.11, and Lwalwa L.00. In all of these languages /a/ becomes /e/ after /e/ and/or /u/ after /u/. This is illustrated with respect to the final vowel /-a/ in Bakweri A.22 and Koyo C.24 in (12) and (13), respectively:
(12) Harmonizing of /a/ in Bakweri A.22 (Hawkinson 1985)

a. li-sik-a 'to groan/groaning'  
li-tut-a 'to sweep'
li-kot-a 'to light'
i-vend-a 'to plait'
i-faf-a 'to hit'
b. i-kimb-a 'to laugh'
i-kim-a 'to beat'

(13) Harmonizing of /a/ in Koyo C.24 (Gazania 1972)

a. i-yis-a 'to hide'
i-kun-a 'to plant'
i-wog-a 'to hear'
i-yeg-a 'to learn'
i-lamb-a 'to cook'
b. i-dag-a 'to laugh'
i-log-a 'to bewitch'

Of course, by definition, such harmonizing of /a/ is absent in languages that I have characterized as having "canonical" VHH.12

With so many parameters, one might ask what is not found? Or, which combinations of features are found only rarely. First, three departures from canonical VHH are restricted to languages with 7V:

(i) All languages having prefixal VHH have 7V. None has 5V.
(ii) All languages having final-VHH have 7V. None has 5V.
(iii) Among the 19 languages in the database that harmonize /a/, all have 7V except Bembe H.11 and Lwalwa L.00.

On the other hand, all of the languages where /a/ conditions vowel lowering have 5V. In addition, of the 18 languages lacking VHH, only 3 have 7V: Duala A.24, Wonga C.85, Enya D.14.

Our focus here is on the front-back asymmetry in VHH. All languages that lack the asymmetry have in fact 7V except for dialectal Kongo H.10.13 It is interesting that no language has been found with asymmetric VHH and either prefixal harmony or final-vowel harmony. It seems that the asymmetric pattern is limited to languages where VHH affects only the base—i.e. the stem minus the final vowel (Meeussen 1967). As we shall further justify below, the specific asymmetric pattern is a property only of stem-internal VHH. That is, height harmony of the final vowel and prefixes.

12It is not clear whether we should view the harmonizing of /a/ as VHH, with which it frequently, though not necessarily, co-occurs. One argument from Koye for distinguishing the two is that whereas /a/, of harmonize to [a-e] in prefixes (as well as in suffixes), as we saw in (5), /a/ harmonizes only in suffixes. Thus we obtain the class 6 plural nouns a-bée 'beasts' (not *e-bée), and a-loé 'thorns' (not *a-loé).
13For discussion of Yaka, see Hyman (1998) and below.
ri A.22 (Hawkinson 1985)

b. i-lem-b-e 'to laugh'
   i-k3-m-o 'to beat'

2.24 (Gazania 1972)

b. i-dzeg-e 'to laugh'
   i-lg-o 'to bewitch'

When occurring, is strictly symmetric—and, as we have said, typically requires a 7V system.

Before turning to that issue, let us provide further evidence of the independence of front height harmony and back height harmony. First, a group of Southern Bantu languages that includes Lozi K.21/S.34, Luyana K.31, Mabikulu K.33, Maku P.31 and all of zone S except Shona S.10 (e.g., Venda S.21, Tswana S.31, Nguni S.40) lack front height harmony. In these languages the applicative suffix contains an invariant mid vowel /el/, while the causative suffix contains a non-alternating high vowel /o/. In each case, however, /o/ harmony after [o] is either fully productive, as in asymmetric languages, or is statistically prevalent. For example, in Lozi (SV), "the alodinesence /-ol-/ [and its doubled realization /olol-/] occurs with most radicals having radical vowel /ol/" (Gowlett 1967:64). Elsewhere one obtains /al-/ and /ulul-/; Hence: -bog-a 'tie' → -bog-ol-a 'untie, release' vs. -fung-a 'tie a beast' → -fung-ul-ul-a 'untie a beast'. On the other hand, the applicative is always -el-, while the causative is always -as-, i.e., neither undergoing VHH. In Mabikulu K.33b (SV), the applicative again has a mid vowel, -er (-en, after a nasal) and the causative a high vowel -ih- (Fisch 1977:123). However, while these front vowels are exempt from VHH, /a/ is realized [o] after /a/, [u] after /i, e, u, a/. Thus, the reverse suffix and its double alternate between -or (→ on-) and -ur (→ an-): -ter-a 'einfullen', -ter-ar-a 'Tropf vom Feuer entfernen' vs. -long-a 'stöhnen', -long-on-on-a 'beiuchen'.

It is striking that no Bantu language has front height harmony without back height harmony. We thus see that front height harmony can either be extended to applying after /a/, in zones K and R, or can be absent, as in Southern Bantu, without any necessary effect on back height harmony. Assuming, following Meussen (1967), that these harmony systems were once "canonical" in the sense of (1), these examples show that Bantu languages can and do separate front height harmony and back height harmony in their histories. The important observation is that even when a language restructures the inherited situation, a front-back asymmetry typically survives. As another example, consider the possible vowel combinations in Matusi M.13 (SV) shown in the table in (14),

---

12 The one counterexample I once believed to exist is Suku K.21 (7V). In this language the applicative varies as expected between -el- and -ek- (Batibo 1985:167) as does the newer/spativial -ek-/-ek- (p.168). The causative also shows VHH but with a slightly more complex pattern: -is-y after /i, u, a/, -es-y after /e, o/ and -e-s-y after /e, o/. Although the same source appears to report that the revenue /ol/ is used as such after all vowels, Batibo (personal communication) has clarified that indeed it lowers to -ol- after /ol/.

13 In §5 I shall propose an alternative, namely that PB lacked FH entirely.
(14) \( V + XV \) (postradical vowel) in Matumu mb P.13 (Odden 1996)

<table>
<thead>
<tr>
<th>V/XV</th>
<th>i</th>
<th>i</th>
<th>e</th>
<th>u</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>x</td>
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<td>x</td>
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<td>u</td>
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<td>a</td>
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<td>x</td>
<td>-</td>
</tr>
</tbody>
</table>

As seen, any of the seven vowels can be followed by postradical /a/, which we can set aside. The restrictions in force are as follows: First, degree 1 high vowels \( i, u, o \) are followed by another degree 1 high vowel, while the degree 2 high vowels \( i, u \) are followed by another degree 2 high vowel. This much is symmetric. On the other hand the degree 3 vowels /e/ and /o/ have asymmetric properties: /e/ can only be followed by /e, u/, while /o/ can only be followed by /e, o/. Finally, degree 4 /a/ can only be followed by /i, o/. Whereas in other 7V languages the default high vowels are degree 2 (cf. Nyamwezi in (2) above), in Matumu mb the default high vowels are degree 1, or [+ATR].

This completes the initial survey of VHH. We now turn to questions of reconstruction.

3. Reconstruction of the Proto-Bantu vowel system

The question that arises in the face of the variations outlined in §2 is: What should we reconstruct and for whom? All Bantu? Some subgroup? The problem of whether to reconstruct VHH for PB, and if so, which kind (e.g. symmetric? asymmetric?) is compounded by questions concerning the nature of the vowels themselves in Proto- and pre-Proto-Bantu. We take up these two issues in this and the following section.

While most scholars agree that PB had a system with seven vowels, occasional suggestions of more vowels, either nine or ten, have been heard:

[...it seems most likely that proto-Bantu had a classic system of CHVH [cross-height vowel harmony]—LMH] with nine (or possibly ten) vowels, and that it inherited this system largely unchanged from proto-Volta-Coago. (Stewart and van Leynseele 1979:51)\(^{17}\)

La forme à neuf voyelles est notamment attestée dans le groupe Akan de Greenberg, 1963. Stewart 1970, qui désigne ce groupe sous le nom de

\(^{16}\)For the same reason noun prefixes contain the vowels /i/ and /u/, not /i/ and /u/. This interpretation differs from that given by Odden (1996), who assumes that the [±ATR] is presupposed.

\(^{17}\)Stewart (1983) has since come back to his original position (Stewart 1970) that Bantu had 7 vowels, specifically those in (15a,b).

Volta-Como, a emit l'hypothèse que en sont issues. Une hypothèse anal proprment bantous, à savoir l'alternat bantoues contemporaines par rapper reflétant le premier degré avec de de (Coapze 1980:67)

Even sticking with the traditional vic systems in (15) should be reconstructed:

(15) a. \( i, u, o \) b. \( i, u, o \)

I assume that the standard Bantu recon 1980[1969] and Guthrie (1967-71) phonetically transcribed vowels in (15) was an opposition between tense and le degree 2 vowels are interpreted to be lax, although there is no opposition. It was an opposition in tense-laxness (or [ATR] vowels: in this system degree 2 vowels are lax mid vowels. The qi reconstruct, (15b) or (15c)?

Part of the difficulty in deciding b be seen in the inconsistencies that appear of different Bantu languages. First, the analysis uses (15b), while pointing o system is (15c). Thus, Kupere (1985): u, u, u, o, o, rather than orthographic /i/ vowels written e,o in Londo sound like e,o but they function like the [±ATR]. Therefore ATR is used, rather than, say, analyzes Mituku D.13 with \( i, i, e, u, o, o \), but add: "We have whether the difference between i and t other is to be analyzed as an [Advance of various degrees of vowel height]."

What seems to be part of the diffi often more close, i.e. more similar to a author's preferred transcription in (15c) following three languages symbolized the following observations:
Volta-Comoé, a émis l’hypothèse que les sept voyelles du protobantou en sont issues. Une hypothèse analogue semble se dégager de faits proprement bantous, à savoir l’alternance, dans les références des langues bantoues contemporaines par rapport au protobantou, de voyelles reflétant le premier degré avec des voyelles reflétant le troisième. (Coupez 1980:67)

Even sticking with the traditional view, as I shall do, which of the 7V systems in (15) should be reconstructed?

(15) a. i u b. i u c. i u
    i u i u e o
    a a c c

I assume that the standard Bantu reconstructed system of Mecussen (1967, 1980[1969]) and Guthrie (1967-71) in (15a) is meant to symbolize the phonetically transcribed vowels in (15b). As seen, it is assumed that there was an opposition between tense and lax (or [-ATR]) high vowels. That is, degree 2 vowels are interpreted to be lax high vowels. Mid vowels are also lax, although there is no opposition. In (15c), on the other hand, the proto opposition in tense-laxness (or [ATR]) is assumed to be among the mid vowels: In this system degree 2 vowels are tense mid vowels, while degree 3 vowels are lax mid vowels. The question, then, is which system to reconstruct, (15b) or (15c)?

Part of the difficulty in deciding between these two interpretations can be seen in the inconsistencies that appear in present-day synchronic analysis of different Bantu languages. First, there are studies where the phonological analysis uses (15b), while pointing out that the corresponding phonetic system is (15c). Thus, Kuperus (1985:58) analyzes Londo A.11 with /i, i, e, u, o, o/, rather than orthographic /i, e, u, o, o, a/, explaining: “The vowels written e,o in Londo sound like the [+ATR] vowels usually written e,o, but they function like the [-ATR] vowels usually written i, u or e, o. Therefore ATR is used, rather than, say, mid.” Similarly, Snappes (1973:3) analyzes Mitaku D.13 with /i, i, e, u, o, o, a/, though pointing out that the vowels are phonetically [i, e, u, o, o, a].

In other cases authors are upfront about the difficulty. Thus, Maganga & Schadeberg (1992:26) symbolize the vowel system of Nyamwezi E.22 as /i, i, e, u, o, o, a/, but add: “We have no phonetic evidence for deciding whether the difference between i and u on the one hand and i and u on the other is to be analyzed as an [Advanced Tongue Root] distinction or as one of various degrees of vowel height.”

What seems to be part of the difficulty is that the degree 2 vowels are often more close, i.e. more similar to degree 1 vowels, phonetically, than an author’s preferred transcription in (15c) would suggest. Thus, concerning the following three languages symbolized with /i, e, u, o, o, a/, authors make the following observations:
(i) Bobe B.30: “Les voyelles du second degré d’aperture sont très fermées... et tendent pour cette raison à être confondues avec les voyelles correspondantes du premier degré” (van der Veen 1991:60).

(ii) Doko C.31: “Les voyelles du second degré sont phonétiquement plus proches de celles du premier degré que celles du troisième degré” (Twilingyimana 1984:3).

(iii) Kela C.75: /u/ are “très proches phonétiquement” (Forges 1977:27).

The literature thus shows not only possible disagreement, but also confusion over the phonetics and phonology of the above cited and other Bantu vowel systems. In fact, all three of the systems in (15) have been used to describe individual Bantu languages. A sample of 46 7V systems in the vowel harmony database can be summarized as follows:

(i) 6 languages are symbolized with ṭ, i, e, ū, u, o, a/. Ombo C.76, Mitaku D.15, Holohole D.28 (6V), Bira D.32, Nande D.42 (7V → 9V phonetically), Matumumbi E.13.

(ii) 6 languages are symbolized with /i, i, e, u, o, a/. Londo A.11, Logoli E.41, Kikuyu E.51, Nyanwesi F.22, Rimi F.32, Kinga G.65.


(iv) One language, Enya D.14, is transcribed as /i, e, ū, o, a/ by Koloni (1971) but as /i, e, ū, o, a/ by Spa (1973).

(v) In addition to the above, there are 4 9V languages described with [±ATR] in both high and mid vowels: Budu D.35, Konzo D.41, Tswana S.31, Sotho S.33. In the last two languages, the 8th and 9th vowels /e/ and /o/ can in many cases be interpreted as a tensing of /e/ and /o/ before higher vowels, or before /ts/ and /ŋ/ in a fairly transparent way. Konzo D.41, on the other hand, most likely derives these vowels by spreading of [+ATR] from /i, u/ as in mutually intelligible Nande D.42, which I placed in the first group with 7 underlying vowels.

Since the transcriptions in (15a) and (15b) have been said to be equivalent, the first two groups above can be combined to provide 12 7V systems (out of 46) that have been symbolized with a tense-lax opposition in the high vowels (i.e. orthographically, not necessarily phonologically). That leaves 34 7V systems for which a tense-lax opposition is instead posited among mid vowels. It would appear that (15c) is more frequently used to transcribe NW Bantu languages (zones A-D), while (15b) is more restricted to Eastern Bantu. However, it is hard to make reliable generalizations from this small sample, particularly as the first group, utilizing (15a), consists largely of a Matumumbi P.13.18

Of course one question we should of the vowel arrays in (15) represents relevant opposition is one between h and above citations indicate, many researchers the proper analysis of individual languages on vowel features even attempt to use ATR. Clements (1991), for instance p the single feature [open] as a uniform height [including ATR]. However, I distinguishing (15b) and (15c).

While some Bantuists have some transcriptions of seven proto-vowel question. Perhaps the most thoughtful who argues that (15b) is the more likely.

The situation in Volta-Comorian languages the plausibility of the possible post-1 for the plausibility of the possible (p.349)

It is worth pointing out that, in the use of the symbols /i, e, u, o, a/, Common Bantu starred forms is most.

What this would mean is that lango, /u/ would have had to have developed a later article. Stewart (1983:22:23) re.

I suggest that a sound change e, o > this case would not have been a phonetically). In the first place the marked than the replaced sounds, an case in which the change can be clear.

The idea here is that the widely at would not by itself change to the high Stewart’s intuition re the relative mark out by Maddieson (1984), who reports opposition in ATR in the high vowels in the mid vowels.19

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18 One would also have to make sure that training that the researchers obtained and that they studied.
19 These are Kpelie, Dani and Kunamu. I however, has informed me that Kunamu.
utilizing (15a), consists largely of a group of Zairian languages (plus Matumbi P.13). 18

Of course one question we should consider is whether it matters which of the vowel arrays in (15) represents the proto system, i.e., whether the relevant opposition is one between high vowels or mid vowels. As the above citations indicate, many researchers have found it difficult to decide on the proper analysis of individual languages. In addition, certain recent views on vowel features even attempt a uniform treatment of vowel height and ATR. Clements' (1991), for instance, proposes an aperture theory based on the single feature [open] as a uniform phonological dimension of vowel height [including ATR]. However, his theory is still also capable of distinguishing (15b) and (15c).

While some Bantuists have seen an equivalence in these two transcriptions of the seven proto-vowels, others have taken sides on the question. Perhaps the most thoughtful response is seen in Stewart (1970), who argues that (15b) is the more likely reconstruction:

The situation in Volta-Congó languages... provides strong evidence for the plausibility of the possible post-Bantu shift (i, u) → a, but none for the plausibility of the possible post-Bantu shift (e, o) → i, u. (p.349)

It is worth pointing out that, in the light of this, Professor Guthrie's use of the symbols i, e, a, o, u rather than i, e, a, o, u in his Common Bantu starred forms is most fortunate. (p.350)

What this would mean is that languages with the system /i, e, a, o, u/ would have had to have developed it from earlier /i, e, u, o, a/. In a later article, Stewart (1983:22-23) reaffirms his position:

I suggest that a sound change e, o > i, u which is not a merger (and in this case would not have been a merger) is highly implausible phonetically. In the first place the replacing sounds are more highly marked than the replaced sounds, and in the second place I know of no case in which the change can be clearly shown to have occurred.

The idea here is that the widely attested 7V system /i, e, a, o, u/ would not by itself change to the highly marked one /i, e, u, o, a/. Stewart's intuition re the relative markedness of /i, e, u, o, a/ is borne out by Maddison (1984), who reports only three languages which have an opposition in ATR in the high vowels without a corresponding opposition in the mid vowels. 19

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18 One would also have to make sure that the numbers aren't affected by either the training that the researchers obtained and what was the practice during the time that they studied.

19 These are Kpele, Dani and Kunama. Lionel Bender (personal communication), however, has informed me that Kunama does not have this vowel system, but
Besides the examples of the reverse changes in Volta-Cornoe discussed by Stewart (1970), Mould (1981:187) suggests the same change to have occurred in Luhya E40:

Gusii and Logooli have seven vowel systems by virtue of being Banu... Gusii and evidently all of East Nyanza (e.g. Kuria)... show other adjustments to the system: \( \hat{i}, \hat{e}, \hat{u}, \hat{o}, \hat{a} \to \hat{i}, \hat{e}, \hat{u}, \hat{o}, \hat{a} \).

It is perhaps significant for our purposes that languages that are agreed unambiguously to have the vowel system \( \hat{i}, \hat{e}, \hat{u}, \hat{o}, \hat{a} \) all have symmetric VHH: If their vowel system has been altered since PB, perhaps their vowel harmony system has as well?

Although he uses the transcriptions in (15a) in presenting his comparative series of “Common Bantu” roots, Guthrie (1967) presents two arguments in favor of reconstructing (15c) as the likely pronunciations of these vowels in PB. The first argument is one of frequency:

...this series \((15c)-LMH\) is the most widespread (series (2)) \((15c)\) occurring mainly in D.20, 40, 50, F.20, M.10, N.10 and P.10, and in consequence is likely to be closer to the original. (p.61)

However, this may be only the result of the fact that there are so many 7V languages clustered in the northwest, where \((15c)\) is the normal transcription (see above). In any case, as Stewart (1983) points out, frequency should not be the major guide to reconstruction. My own feeling, in fact, is that if the argument of frequency is relevant at all, it leads to the opposite conclusion: Given that \( \hat{i}, \hat{e}, \hat{u}, \hat{o}, \hat{a} \) is an unusual system, it would make more sense to reconstruct it once in PB—or innovate it once—rather than seeing it evolve independently in different Bantu subgroups.\(^{20}\)

Guthrie’s second argument is the following: If \( \hat{*i}, \hat{*e}, \hat{*u}, \hat{*o}, \hat{*a} \) is reconstructed, then the change of this 7V system to \( [i, e, u, o, a] \) could be seen as an intermediate step on the way to the widely occurring 5V system \( [i, e, u, o, a] \). By Guthrie’s reasoning, two sets of sound changes would have occurred, as in (16a).

\[
\begin{align*}
16a. \quad \hat{*i}, \hat{*o} & \to i, u \\
16b. \quad \hat{*i}, \hat{*u} & \to e, o \\
16c. \quad \hat{*i}, \hat{*u} & \to e, o \\
16d. \quad \hat{*i}, \hat{*u} & \to i, u
\end{align*}
\]

The mid vowels \( \hat{*e}, \hat{*o} \) are first “closed” to \( [i, u] \) and then again to \( [i, u] \). The idea here is that \( [i, u] \) are logically mid-way between \( [e, o] \) and \( [i, u] \).

hence both the change within 7V s; distinction between degree 1 and 2 process. By contrast, a reconstruction would not expect the lax high vowels then become high. Of course an e exchange could be as follows: Let perceptive problem found in many B's were very close perceptually to degree could have done one of two things. vowel space as in (16c): \( \hat{*i}, \hat{*o} \) became second. they themselves simple S merge a 5V system. The result would be the original system in (15b): (ii) (15c); and (iii) those with the derived of course, attested, although Guthrie i distribution. Rather than pr reconstruction, (15b) could be the somewhat fewer languages because of of course related to Stewart’s argument, e, o \( > i, u \) is less natural than the value also to be attested in the history of the.

What other evidence might on choosing the appropriate vowel syse slight argument in favor of (15b) deny vowels merge with degree i vowels with the degree 3 vowels *e, o. A a wide (largely contiguous) area withi of Guthrie 1967:66). The argument distinction among high vowels is to shifts of the sort Mid > High (although this context is the fact that the merge same for long vowels and short -vowel of vowel height, one might expect the laxness) and perhaps a merger pattern vowels. A constant ATR specification consistent with the observed facts.

On the other hand, the same rea (15b) and in favor of (15c). If degree of height similarity, then why do deg instead assume the proto system /i, e expected to harmonize with /e, o/. For this argument, the degree 2 vowels (e, u, /, because this is not height harm contrast, if we assume that the degree /=, and
hance both the change within 7V systems (to [e, o]) and the loss of the
distinction between degree 1 and 2 vowels are actually part of the same
process. By contrast, a reconstruction as in (16b) would not be coherent: We
would not expect the lax high vowels to first become tense mid vowels and
then become high. Of course an equally likely explanation of the two
changes could be as follows: Let us assume that PB already had the
perceptual problem found in many Bantu languages today: Degree 2 vowels
were very close perceptually to degree 1 vowels. As a response, languages
could have done one of two things. First, they could have reshaped the
vowel space as in (16c): *i, *o became [e, o] (and *e, *o became [e, o]). Or,
second, they could simply have merged *i, *u, thereby yielding a
5V system. The result would be three types of Bantu languages: (i) those
with the original system in (15b); (ii) those with the derived 7V system in
(15c); and (iii) those with the derived 5V system /i, u, e, o, a/. All three are,
of course, attested, although Guthrie claims that (15b) is the most restricted
in distribution. Rather than providing an argument against its
reconstruction, (15b) could be the original vowel system maintained in
somewhat fewer languages because of the natural changes in (16c,d). This is
of course related to Stewart's argument in favor of (15b): a sound change of
e, o > i, u is less natural than the reverse change i, u > e, o, which he argues
also to be attested in the history of the Volta-Comoé languages.

What other evidence might one bring to bear on the question of
choosing the appropriate vowel system or PB. (15b) or (15c)? Perhaps a
slight argument in favor of (15b) derives from the fact that the proto degree 2
vowels merge with degree 1 vowels in so many Bantu languages—rarely
with the degree 3 vowels *e and *o. As seen in Map 3, this has occurred in a
wide (largely contiguous) area within the Bantu zone (cf. also Topogram 1
of Guthrie 1967:66). The argument here is that the loss of a tense/lax
distinction among high vowels is to be expected, perhaps more than vowel
shifts of the sort Mid > High (although these too occur). Perhaps relevant in
this context is the fact that the merger of PB degree 1 and 2 vowels is the
same for long vowels and short vowels. If the original opposition were one
of vowel height, one might expect slight differences in quality (e.g.
tenselessness) and perhaps a merger pattern that is different for long vs.
short vowels. A constant ATR specification independent of vowel length is thus
consistent with the observed facts.

On the other hand, the same reasoning can be used to argue against
(15b) and in favor of (15c). If degree 2 vowels merge with degree 1 because
of height similarity, then why do degree 2 and degree 3 harmonize? If we
instead assume the proto system /i, e, e, u, o, a/, then /e, o/ would be
expected to harmonize with /e, o/, from which they differ only in ATR. By
this argument, the degree 2 vowels /e, o/ do not harmonize with degree 1 /i,
u/, because this is not height harmony, but rather ATR harmony. By
contrast, if we assume that the degree 2 vowels were *i and *u, harmonizing
with *e and *o, phonetically *[e] and *[o], this would have been a height

 blackjack: ** clients: | 612x792.7 **
harmony between [-ATR] high and mid vowels. Cross-linguistically, ATR harmony of mid vowels is more expected than height harmony of [-ATR] vowels.

vowel system /ɪ, ɛ, û, o, õ, a/ and ATR back asymmetry so prevalent in EAsymmetric VHH bear on the question of answer depends on whether asymmetric reconstructed at the PB level. This is section.

4. Reconstruction of vowel harmo

The question that we must now address is system existed in PB? There are at least considered: (1) PB had asymmetric VHH; PB did not have VHH.21 Virtually every issue agrees that VHH should be reconstr...

vowel harmony goes back to Prot found widely in Africa outside of the that systems similar to that of Prharmonisation of levels, have been demonstrated by the African continent and from languages demonstrating a genetic relation to each other, Louko). (Greenberg (1951:818)

Bien que les phénomènes d'harmonic régnent dans le monde et puissent apparaître par convergence, il semble que le pas troisième degré d'aperture puisse être postérieur que J. Gr dans d'autres langues du groupe Niger.

While Stewart (1970) had once hypothesized that had a larger vowel inventory modified his position in favor of height.

We now have good reason, then, to advancing harmony in any form, bu segmental feature category and th developed advancing harmony in one reversing the pre-Bantu u > i, u > 1, u > 1 height harmony as in the case of the with symmetric VHH—LMH, or by vowels to any +Advanced vowel in the height harmony as in the case of Nen.

The next question therefore is whether asymmetric type. Basing himself in p...

2) A fourth possibility not considered here from either of those under discussion 1 possibility that PB had other than a 7V sy
vowel system ñ, e, e, u, o, ñ, ñ, and ATR harmony do not show the front-back asymmetry so prevalent in Eastern Bantu. Could the issue of asymmetric VHH bear on the question of which system to reconstruct? The answer depends on whether asymmetric VHH (or any VHH) can be reconstructed at the PB level. This issue is taken up in the following section.

4. Reconstruction of vowel harmony in Proto-Bantu

The question that we must now address is: What kind of vowel harmony system existed in PB? There are at least three potential answers that must be considered: (i) PB had asymmetric VHH; (ii) PB had symmetric VHH; (iii) PB did not have VHH.21 Virtually everyone who has commented on the issue agrees that VHH should be reconstructed for PB:

vowel harmony goes back to Proto-Bantu... vowel harmony... is found widely in Africa outside of the Bantu languages. It is noteworthy that systems similar to that of Proto-Bantu, in that they involve harmonisation of levels, have been described from distant portions of the African continent and from languages which in some cases have no demonstrable genetic relation to each other” (e.g. Twi, Ibo, Moru-Madi group, Lotuko). (Greenberg (1951:318-819).

Bien que les phénomènes d’harmonie vocalique soient très largement répandus dans le monde et puissent apparaître de manière indépendante par convergence, il semble que le passage de i à e après une voyelle du troisième degré d’aperture puisse être attribué au proto-bantu ou même à une période antérieure puisque J. Greenberg en a relevé des exemples dans d’autres langues du groupe Niger-Congo.” (Bastin 1983a:32).

While Stewart (1970) had once hypothesized that PB or its immediate ancestor had had a larger vowel inventory with ATR harmony, he has since modified his position in favor of height harmony in PB.

We now have good reason, then, to suppose that proto-Bantu lacked advancing harmony in any form, but that it retained advancing as a segmental feature category and that some descendant languages developed advancing harmony in one or the other of two ways: either by reversing the pre-Bantu e, o > i, u shift, therefore introducing single-height harmony as in the case of the Bobangi-type languages [(15c) with symmetric VHH—I.MH], or by assimilating all the -Advanced vowels to any -Advanced vowel in the word, thereby introducing cross-height harmony as in the case of Nen”. (Stewart 1983:35)

The next question therefore is whether PB VHH was of the symmetric or asymmetric type. Basing himself in part on distributional restrictions of

21A fourth possibility not considered here is that PB had a VHH system different from either of those under discussion here. We also will not consider the possibility that PB had other than a 7V system.
vowels in CVCV noun stems, Greenberg (1951) assumes a symmetric system. Evidently... the parent Bantu language did not permit vowels of level two and three in successive syllables. The vowel of the third level was lowered to the second level to harmonize with the vowel of the preceding syllable. Thus o was replaced by ë and e by e when the preceding syllable had o or e. (Greenberg 1951:814)

However, virtually all other scholars have assumed asymmetric VHH in PB. Thus, Meeussen (1967:92) states:

The absence of morphophonemes lal and lol in suffixes is worth noticing; this gives free space to the rule stated in 1.7.

The rule in §1.7 to which Meeussen refers is asymmetric VHH:

/ \ appears as /l/ after either lal or lol,... Similarly, /l/ appears as /lo/ after lol (but not after /l/). (Meeussen 1967:84)

Other representative agreement with Meeussen’s position include the following:

Most Bantu grammars record the paired extensions *-ud/-uk-. They both appear in two allomorphs conditioned by the preceding vowel but the distribution of the two variants is significantly different from the kind of vowel harmony applying to the front vowel suffixes -iC:

* -iC; * uC- / *[i, i, a, u, y] (C) _
* -eC; * uC- / *[eh] (C) _
* -eC; * uC- / *[oh] (C) _ (Schadeberg 1982: 61)

Le plus souvent la voyelle s’ouvre uniquement lorsqu’elle succède à une autre voyelle postérieure dont le degré d’aperture est plus grande,... Le passage à o après e et o... est relativement rare et apparaît comme une extension du phénomène alors que ce type d’assimilation constituerait le trait prédominant pour *-id.... La distribution très générale de

l’assimilation vocalique de la voyelle postérieure (o) indique que ce ph
proiotantou. (Bustin 1983a:33)

This rule [VHH] extends to prefixes Llogoori, probably as an innovation in some languages (e.g. Kongo), also p that [u] generally assimilates only a crosslinguistic tendency according to likely to assimilate to another segment have more features in common (Kipu
The earliest recognition of asymmetric VHH (1862), concerning Herero R.31:

The rule of vowel harmony is in a way the termination of inverve verbs, -a -ona after a preceding o, but retain vowels, even after the flat a and e." (B
However, in the “first Bantu dictionary Peaders 1928), which treats a souther clearly symmetric. Recall from earlier the only 5V language (dialect cluster forms were cited in (9) in §2. Given a studies, it is not surprising that it has fr
However, contrary to the general rule -uk- occur after e of the verb root it seems to be generally true of the B instances, e.g. Kikongo, -ok-, -ok-.
In general the presence of a vowel-e- a radical vowel e- or o- corresponds extensions preceded by any other radical extension is -o- following a rac corresponds to an extension with a radical vowel.... In few languages, for example, extensions containing vowel -o- also have -o-following e- 'chew/chew up completely', -kot completely', -yal/-yalum- 'spread dialects of this language, however, it pairs occurs as -kesum- and -ke

22 As seen in the quotation a few paragraphs below, Greenberg is of course aware that many Bantu languages have lowering of degree 2 /a/ to [o] only after degree 3 /l/. He is more impressed, however, with both the comparison with non-Bantu harmony systems as well as with his claim that degree 2 and 3 vowels do not co-occur in noun stems in Meinhold and van Warmelo’s (1932) PB reconstructions, an issue which I shall address shortly. Let us note, however, that some scholars “misspeak” when characterizing height harmony in Bantu. For example, in presenting their reconstructions of Northeastern Coastal Bantu, Nurse & Hinnemush (1993:370) state: “The limited vowel harmony... whereby /a/ and /e/ occur after stems with mid vowels, and /a/ and /i/ after nonmid vowels, is an NEC feature, apparently inherited, as it also occurs widely in other eastern Bantu languages.” Looking over the discussion, it is clear that they meant to reconstruct an asymmetric system which is remarkably stable in these languages (cf. also Bakari 1985).
(1951) assumes a symmetric id not permit vowels of level of the third level was nize with the vowel of the by a and e by e when the 1951:814) assumed asymmetrical VHH in and lol in suffixes is worth stated in 1.7. : asymmetric VHH: narily, lol appears as /ol/ after cussen's position include the extensions *-ud-/*uk-. They d by the preceding vowel but significantly different from the ont vowel suffixes -ic-:

u, y) (C) __

(Schadeberg 1982:61) rent lorsqu'elle succède à une apertture est plus grande.... Le n rare et apparaît comme une d'assimilation constituant le distribution très générale de

low, Greenberg is of course aware degree 2 /u/ to [o] only after degree in the comparison with non-Bantu at degree 2 and 3 vowels do not van Wierol's (1932) PB as shortly. Let us note, however, seize height harmony in Bantu, as of Northeastern Coastal Bantu, limited vowel harmony, whereby is, and /o-/ and /i-/ after nonmid f, as it also occurs widely in other discussion, it is clear that they which is remarkably stable in these

l'assimilation vocale de la voyelle du suffix *-ud- après une voyelle postérieure (o) indique que ce phénomène peut être attribué au proto-bantu. (Bastin 1983a:33)

This rule [VHH] extends to prefixes in a few languages (e.g. Gusii, Lloogoor), probably as an innovation. Also [u] lowers to [o] after [e] in some languages (e.g. Kongo), also probably as an innovation. The fact that [u] generally assimilates only after [o] and not [e] may reflect a cross-linguistic tendency according to which one segment, A, is more likely to assimilate to another segment B, to the extent that A and B have more features in common (Kiparsky 1988). (Clements 1991:59)

The earliest recognition of asymmetric VHH I have found comes from Bleek (1862), concerning Herero R.31:
The rule of vowel harmony is in a very restricted manner carried out in the termination of inverse verbs, -ura or -una, which become -ora or -ona after a preceding o, but retains its sharp vowel after all other vowels, even after the flat a and e.” (Bleek 1862:62)

However, in the “first Bantu dictionary” (de Cheek 1652 [van Wing & Penders 1928]), which treats a southerly dialect of Kongo H.10, VHH is clearly symmetric. Recall from earlier discussion that Kongo was cited as the only 5V language (dialect cluster) with symmetric VHH. Relevant forms were cited in (9) in §2. Given the prominence of Kongo in Bantu studies, it is not surprising that it has frequently received special mention:

However, contrary to the general rule, the u form of suffixes, e.g. -ul-, -uk- occur after e of the verb root instead of the expected -ol-, -ok-. This seems to be generally true of the Bantu languages, though in a few instances, e.g. Kikongo, -ol-, -ok- are the rule.” (Greenberg 1951:813).

In general the presence of a vowel -e- in an extension that is preceded by a radical vowel -e- or -o- corresponds to the presence of a vowel -i- in an extensions preceded by any other radical vowel. When the vowel of an extension is -o- following a radical vowel -o-, this normally corresponds to an extension with a vowel -u- following any other radical vowel... In a few languages, such as certain dialects of Kongo, for example, extensions containing a vowel -o- following a radical vowel -o- also have -o- following -e-, as in: S. Kongo -kes-/kesemon- 'chew/chew up completely', -komb/-kombomon- 'sweep/sweep up completely', -yal-/yalumun- 'spread/spread out completely' in other dialects of this language, however, the extended radical of the first two pairs occurs as -kesumun- and -kombumun- respectively. (Guthrie 1962:102)

To summarize, as indicated in the above citations, most Bantuists seem to lean towards reconstructing asymmetric VHH. According to this view, all cases of symmetric VHH would have been innovative. Specifically, as we saw in Map 1, a number of rather disparate languages making up Northwest
Bantu in zones A, B and C, as well as the languages of EJ.40 to the East of Lake Victoria, would have had to innovate harmony of degree 2 *u after degree 3 *e. Since zone ABC languages do not constitute a genetic subgroup of Bantu (Heine 1973), it is unlikely that they would have independently innovated as a one-time change. Instead, one would have to propose that this change spread areally throughout mus of the Northwest. The change in EJ.40 would have been an independent development. While this interpretation requires at least two statements, the alternate view that asymmetric VHH was an innovation is a simpler hypothesis to maintain. Asymmetric VHH could be viewed either as the result of areal spread or as a one-time innovation affecting the relatively coherent subbranch of Bantu in which it occurs. As Map 1 indicates, these languages are more homogeneous than their complement and correspond roughly to the Savanna branch of Bantu, as presented, for example, by Ehret (this volume). It would thus be quite significant if asymmetric VHH were a reliable genetic marker of this subbranch of the family—as I suggested in my presentation at the Table Ronde. In this case asymmetric VHH would have existed in PB, with degree 2 and 3 vowels never mixing within stems. We thus would have had phonetic [CeCoC] rather than [CeCuC], the latter being introduced only later into the Savanna branch.

In support of this proposal was Greenberg’s (1951) inquiry concerning the nature of VHH within words with bisyllabic stems:

The question cannot be investigated further in the verb, since practically all verb roots in Proto-Bantu had only a single syllable and the effects of the addition of a derivational suffix has already been examined. For nouns, adjectives and other parts of speech a review of the forms that have been reconstructed suggests that it is indeed a general rule within Proto-Bantu that sequences of vowels one of which belongs to level three (e or o) and the other of which belongs to level two (e or o) are almost nonexistent. On the other hand, vowels in successive syllables both of which belong to level three or both of which belong to level two are very common” (Greenberg 1951:813).

The claim here is that monomorphic forms such as noun stems show symmetric VHH in PB reconstructions (based on Meinhof and van Wiermer 1932). In fact, even some languages with asymmetric VHH in verbs, show symmetric VHH in bisyllabic noun stems. One such language is Nande DJ.42. As seen in (17a,b), based on Kavutirwaki (1978).

(17) Nande DJ.42 (Kavutirwaki 1978)

a. -bó̃-er-a ‘tie + appl’
   -bó̃-ol-a ‘untie’

b. -ses-er-a ‘make a bed + appl’
   -ses-ul-a ‘unmake bed’

c. -king-ir-a ‘close + appl’
   -king-ul-s ‘open (door)’

d. -sun-ir-a ‘pinch + appl’
   -sun-ul-a ‘loosen (from fingers)’

Nande verb extensions show the class suffix is realized -er- after both /e/ or realized -ol- only after /a/. In other cases, as seen in (18), a quite different stems:

(18) V1 + V2 in Nande B

<table>
<thead>
<tr>
<th>V1/V2</th>
<th>i</th>
<th>i</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>31</td>
<td>--</td>
<td>8</td>
</tr>
<tr>
<td>i</td>
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<td>25</td>
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<tr>
<td>e</td>
<td>14</td>
<td>--</td>
<td>70</td>
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<tr>
<td>u</td>
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<td>--</td>
<td>4</td>
</tr>
<tr>
<td>u</td>
<td>--</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>o</td>
<td>18</td>
<td>--</td>
<td>16</td>
</tr>
<tr>
<td>a</td>
<td>21</td>
<td>21</td>
<td>12</td>
</tr>
</tbody>
</table>

As seen in the shaded cells, the con -CoCu, where a degree 3 vowel is /e/ exist in the language. 24. The second pattern found on longer forms, where -CeCoC-

Similar observations can be seen vowels of bisyllabic noun stems in Schadeberg (1992).


24 The language is less consistent about followed by a degree 3 vowel. Although -CoCo all are. The only point I wish to degree 2 vowel would have to lower after stems but asymmetric in longer stems, -CVVC- or longer.
the languages of EI to the East of vate harmony of degree 2 if they would have independently been postulated a genetic subgroup of the race that one would have to propose that this is of the Northwest. The change in the development of Productive or as a result of areal spread or as a result of coherent subbranch of Bantu in these languages there are much more pronouncedly roughly to the Savanna to, by Ehret (this volume). It would be possible that no reliable genetic markers are presented, in my presentation at the INH would have existed in PB, with the former. We thus would have had, the latter being introduced only in the verb, since practically a single syllable and the effects of harmony has already been examined. For an example of the forms that are indeed a general rule within one of which belongs to level belongs to level two (i or a) are vowels in successive syllables of both of which belong to level 2:815).

Forms such as noun stems show syneon in Meinhof and van Wijnen’s asymmetric VHH in verbs, show. One such language is Nande urwaki (1978),

-both-ol-a ‘untie’
-pl’-ses-ol-a ‘unmake bed’
-kong-ol-a ‘open (door)’
-sun-ol-a ‘loosen (from fingers)’

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-d-land-ir-a ‘sew + appl’ -land-ul-a ‘unsew’
-d-him-yr-a ‘build + appl’ -him-ul-a ‘demolish’
-d-p-w-m-yr-a ‘grasp firm + appl’ -p-w-m-ul-a ‘release grasp’

Nande verb extensions show the classic asymmetric pattern: The applicative suffix is realized -er- after both /l/ and /r/, while the reversive suffix is realized -ol- only after /l/. In other cases the vowel is high. On the other hand, as seen in (18), a quite different pattern emerges in bisyllabic noun stems:

(18) $V_1 + V_2$ in Nande Bisyllabic Noun Stems

<table>
<thead>
<tr>
<th>$V_1/V_2$</th>
<th>i</th>
<th>i</th>
<th>i</th>
<th>u</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
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<tr>
<td>i</td>
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<td>70</td>
<td>4</td>
<td>37</td>
<td>28</td>
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<tr>
<td>u</td>
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<td>4</td>
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<td>18</td>
<td>32</td>
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<tr>
<td>u</td>
<td>15</td>
<td>10</td>
<td>43</td>
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<td>16</td>
<td>42</td>
</tr>
<tr>
<td>o</td>
<td>18</td>
<td>16</td>
<td>5</td>
<td>46</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>21</td>
<td>12</td>
<td>17</td>
<td>10</td>
<td>38</td>
<td>113</td>
</tr>
</tbody>
</table>

As seen in the shaded cells, the combinations -CeCi, -CeCu, -CoCi and -CoCu, where a degree 3 vowel is followed by a degree 2 vowel, do not exist in the language. The second of these, -CeCu, contrasts with the pattern found on longer forms, where -CeCuC is attested to the detriment of -CeCoC.

Similar observations can be seen in the following plotting of the two vowels of bisyllabic noun stems in Nyamwezi, based on Maganga & Schadeberg (1992).

23Rightward spreading of the [+ATR] of the root onto the suffixes in (17d) is a Nande-specific innovation. In fact, (19) shows that [+ATR] [i, u] may not co-occur with [-ATR] [i, u] in either order.

24The language is less consistent about sequences where a degree 2 vowel is followed by a degree 3 vowel. Although -GCo is unattested, -CiCo, -CuCe and -CuCo all are. The only point I wish to make here is that a process by which a degree 2 vowel would have to lower after a degree 3 vowel is symmetric in -CVCV stems but asymmetric in longer stems, specifically, verb stems of the shape -CVCVC- or longer.
(19) \[ V_1 + V_2 \text{ in Nyamwezi Bisyllabic Noun Stems} \]

<table>
<thead>
<tr>
<th>V1/V2</th>
<th>i</th>
<th>i</th>
<th>e</th>
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<tr>
<td>i</td>
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<td>—</td>
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<td>16</td>
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<tr>
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<td>(1)</td>
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<td>—</td>
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<td>u</td>
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<td>(2)</td>
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<td>o</td>
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<td>43</td>
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<td>a</td>
<td>17</td>
<td>16</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>32</td>
<td>74</td>
</tr>
</tbody>
</table>

Again, the shaded cells, -CeCi, -CeCu, -CoCi and -CoCu, are completely lacking. Could this be a relic of symmetric VHH in PB?

I think not. First, Greenberg's reliance on Meinhof's limited reconstructions may have affected the overall picture. In (19) I plot out the 7 x 7 matrix of vowels in the bisyllabic stems in Meeussen's (1980/1969) reconstructions:

(20) \[ V_1 + V_2 \text{ in Meeussen's Proto-Bantu Bisyllabic Noun Stems} \]

<table>
<thead>
<tr>
<th>V/FV</th>
<th>i</th>
<th>i</th>
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<tr>
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<tr>
<td>u</td>
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<tr>
<td>a</td>
<td>16</td>
<td>24</td>
<td>6</td>
<td>9</td>
<td>32</td>
<td>24</td>
</tr>
</tbody>
</table>

As seen, although -CeCi, -CeCu, -CoCi and -CoCu reconstructions are not among the most numerous combinations, they do exist and should be examined carefully before concluding that symmetric VHH characterized noun stems in PB.

Nande does, however, underscore an important observation that cuts across the Bantu languages: VHH properties are frequently different within bisyllabic (nominal) -CVCV vs. longer -CVCVC... stems. Using "V2" to designate vowels in second or later stem syllables, and # to designate word boundary, I refer to this as the independance of V2C and V2# vowel distributions. Harmony of medial vs. final vowels can be quite distinct—even when all vowels belong to the same morpheme. Not only is this the case in Nande, where the opposition is between symmetric vs. asymmetric VHH, but also in languages where other environment.

The ideal languages in which to course those like Nande and Nyamw and have preserved the TV system in CBOLD are at present accidentally s languages, we have to calculate tl respectively, of "i" and "i" and of "y" and can be quite revealing of the discrep

A case in point is Yaka H.32. T (1971), show that neither the /i/ of the a-, nor the /u/ of the reverse s after /e/ and /o/:

(21) Applicative -il-

- kik-il-a 'batter pour'
- kud-il-a 'chasser pour'
- kas-il-a 'lier pour'
- keb-il-a 'faire attention'
- sol-il-a 'déboiser pour'

Reversive intransitive -uk-

- zib-uk-a 'être cuvert'
- hul-uk-a 'être sauvé'
- bal-uk-a 'être reversé'
- yek-uk-a 'être séparé'
- tob-uk-a 'être percé'

This would seem to suggest that language. How then to reconcile these suffix -idi harmonizes to -e after a perfectives of the forms in (21) show

(22) Applicative + Perfective

- kik-ididi 'batter pour'
- kud-ididi 'chasser pour'
- kas-ididi 'lier pour'
- keb-el-ele 'faire attention'
- sol-el-ele 'déboiser pour'

---

25 I thus am not referring to the oft made observation that a FV morpheme does not harmonize in many Bantu languages. See, for example, Leitch's (1996) treatment of this as a parameter within zone C.
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Syllabic Noun Stems

<table>
<thead>
<tr>
<th>y</th>
<th>a</th>
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<td>32</td>
<td>74</td>
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</table>

-CoCI and -CoCu, are completely tic VHH in PB?
reliance on Meinhof's limited erall picture. In (19) I plot out the 7 stems in Meeuwiser's (1980[1969])

into Bisyllabic Noun Stems

<table>
<thead>
<tr>
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</table>

and -CoCu reconstructions are not ons. they do exist and should be hat symmetric VHH characterized

important observation that cuties are frequently different within-CVCVC... stems. Using "V₂" to syallables, and # to designate word endurance of V₂C and V₂# vowelal vowels can be quite distinct—e morpheme. Not only is this the between symmetric vs. asymmetric
observation that a FV morpheme does See, for example, Leitch's (1996)

VHH, but also in languages where VHH may be lacking in one vs. the other environment.

The ideal languages in which to compare V₂C and V₂# harmony are of course those like Nande and Nyamwezi, which both have asymmetric VHH and have preserved the 7V system of PB. Unfortunately, the resources in CBOLD are at present accidentally skewed towards 5V languages. In these languages, we have to calculate that /i/ and /u/ represent the merger, respectively, of *ɪ and *i and of *y and *u. Nevertheless, even 5V languages can be quite revealing of the discrepancies between V₂C and V₂# harmony.

A case in point is Yaka II:32. The forms in (21), based on Ruttenberg (1971), show that neither the /i/ of the applicative or causative suffixes -il- and -is-, nor the /u/ of the reversive suffixes -uk- and -ul- undergo lowering after /e/ and /o/:

(21)  | Applicative -il- | Causative -is-
<table>
<thead>
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<tbody>
<tr>
<td>a. kik-il-a</td>
<td>'barrer pour'</td>
<td>b. kik-is-a</td>
</tr>
<tr>
<td>kud-il-a</td>
<td>'chasser pour'</td>
<td>kud-is-a</td>
</tr>
<tr>
<td>kas-il-a</td>
<td>'lier pour'</td>
<td>kas-is-a</td>
</tr>
<tr>
<td>keb-il-a</td>
<td>'faire attention pour'</td>
<td>keb-is-a</td>
</tr>
<tr>
<td>sol-il-a</td>
<td>'déboiser pour'</td>
<td>sol-is-a</td>
</tr>
<tr>
<td>Reversive intransitive -uk-</td>
<td>Reversive transitive -ul-</td>
<td></td>
</tr>
<tr>
<td>c. zib-uk-a</td>
<td>'être ouvert'</td>
<td>d. zib-ul-a</td>
</tr>
<tr>
<td>hul-uk-a</td>
<td>'être sauvé'</td>
<td>hul-ul-a</td>
</tr>
<tr>
<td>bal-uk-a</td>
<td>'être renversé'</td>
<td>bal-ul-a</td>
</tr>
<tr>
<td>yek-uk-a</td>
<td>'être séparé'</td>
<td>yek-ul-a</td>
</tr>
<tr>
<td>tob-uk-a</td>
<td>'être percé'</td>
<td>tob-ul-a</td>
</tr>
</tbody>
</table>

This would seem to suggest that there is no left-to-right VHH in this language. How then to reconcile these data with the fact that the perfective suffix -idi harmonizes to -ele after a mid vowel? In (7)? The corresponding perfectives of the forms in (21) show a similar pattern in (22).

(22)  | Applicative + Perfective | Causative + Perfective |
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>a. kik-ididi</td>
<td>'barrer pour'</td>
<td>b. kik-is-i</td>
</tr>
<tr>
<td>kud-idik</td>
<td>'chasser pour'</td>
<td></td>
</tr>
<tr>
<td>kas-ididi</td>
<td>'lier pour'</td>
<td>kas-is-i</td>
</tr>
<tr>
<td>keb-el-ele</td>
<td>'faire attention pour'</td>
<td>keb-es-e</td>
</tr>
<tr>
<td>sol-el-ele</td>
<td>'déboiser pour'</td>
<td>sol-es-e</td>
</tr>
</tbody>
</table>
Reversive intransitive + Perfective  Reversive transitive + Perfective

c. zib-uk-idi ‘être ouvert’  d. zibwel-e ‘ouvrir’
hul-uk-idi ‘être sauvé’  hulwel-e ‘sauver’
bal-uk-idi ‘être renversé’ (camion)  bidwel-e ‘renverser’
yek-ok-ele ‘être séparé’  yekwel-e ‘séparer’
tob-ok-ele ‘être percé’  tobwel-e ‘percer’

The realizations in (22a,c) are as in (7): -idi after i, u, a vs. -ele after i/e, o/e. (22b) shows the same vowel distribution, though in this case the [id] or [el] part of the perfective suffix does not surface. It apparently fuses with the reversive transitive -ul- suffix in (22d) and for some reason requires the vowel [e] even after root/?u, a/

As argued in Hyman (1998), the alternation between [i] and [e] found only in the perfective is not a case of the left-to-right VHH we have been considering up to now. Instead, recognizing that the perfective ending reconstructs as *-id-e (Meeussen 1967, Bastin 1983b), what we have in (7) and (22) is a case of where the height feature of the final [e] spreads right-to-left. In order for this process to occur, the root syllable must, however, contain a mid vowel. Hence the process is one of “plateauing”: high vowels become mid when wedged between mid vowels. Concerning (22d), the first three forms would be expected to zibwid-i, hulwid-i and balwid-i, a pattern that is attested in certain Kongo dialects. However, the sequence [wi] cannot occur in Yaka (Hyman 1998). As a second right-to-left harmony process, the height feature of the final [e] thus spreads to convert a [Cwi] syllable to [Cwe], as seen.

With this explanation of the limited (right-to-left) VHH found in Yaka only in the perfective, let us now consider the 5 x 5 matrix of vowels in bisyllabic noun stems in this language:

\[
V_1 + V_2 \text{ in Yaka Bisyllabic Noun Stems}
\]

\[
\begin{array}{c|ccccc}
V_1 \times V_2 & i & e & u & a & o \\
\hline
i & 41 & 51 & 51 & 66 & \\
e & 32 & 14 & 56 & 112 & \\
u & 61 & 124 & 124 & 140 & \\
o & 56 & (1) & 104 & 94 & \\
a & 121 & 126 & (1) & 205 & \\
\end{array}
\]

The shaded cells indicate which combinations are not found (or are found only exceptionally, typically in borrowings). As seen, there are two relevant generalizations. First, bisyllabic noun stems do not have the shape CVCe. Second, CVCe noun stems are acceptable only if the first vowel is /e/ or /o/. However, CeCe and CoCo contrast with CeCu and CoCu. What this means is that there has been an on-going change of “peripheralization”

finally in bisyllabic noun stems. In th
to change *o to [u] has been seen suc
a mid root vowel, which reinforces,
*o, this does not happen: For *e to
preceeding medial syllable with [e]. Th
in (22), this has the effect of saving
obtain -idi or -is-i, as seen.26

The above Yaka discussion estab
First, individual Bantu languages not
innovate VHH. This is clearly the ca
response to the unacceptability c
conjecture that all VHH is innovat
Kongo dialects that also restrict V
important point is that internal vs. fi
each other. This conclusion is al
neighbors, the languages/dialects mi

We saw earlier in the data in (s
symmetric VHH operating left-to-
hower, lack this harmony and in (1
This includes the “Mazinga or Centra
Warmelo (1932), based on material c
forms, taken from Laman (1936), sho

26This right-to-left VHH triggered h
alternation between the final [o] in mée
the corresponding singulars disud and e
*-jono fuse with the class 6 prefix ma- in
initial syllable [mee], which in turn pro
do es in the singular forms). A similar
in Kongo (Meinhof & van Warmelo 19
27The only reason to “heed” is that Ya
as a retention in the following way. First
to-right VHH, affecting the derivations
the perfective. Second, assume that
peripheralization process on medi
peripheralization would have failed to
consists of mid vowels: i.e. where pe
vowels surrounded by mid vowels. Thi
the data in (22d), where the penultimate
account for the fact that the perfective e
28A classification of Kongo dialects is f
summary in Meinhof & van Warmelo (1
Reversive transitive + Perfective

d. zibwèl-e 'ouvrir'
hulwel-e 'sauver'
ion balwel-e 'recouvrir'
yekwel-e 'séparer'
tobwel-e 'percer'

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right-to-left) VHH found in Yaka or the 5 x 5 matrix of vowels in
ie Noun Stems

<table>
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<tr>
<th></th>
<th>o</th>
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<tbody>
<tr>
<td>1</td>
<td>56</td>
<td>112</td>
</tr>
<tr>
<td>4</td>
<td>104</td>
<td>94</td>
</tr>
<tr>
<td>5</td>
<td>205</td>
<td></td>
</tr>
</tbody>
</table>

26This right-to-left VHH triggered by a final mid vowel also explains the alternation between the final [o] in méésó ‘eyes’ and méénó ‘teeth’ vs. the [a] in the corresponding singulars díssá and dímm. The reconstructed roots *-jəco and *-.jím fuse with the class 6 prefix ma- in the plural, creating the mid vowel in the initial syllable [me], which in turn protects the final [o] from becoming [u] (as it does in the singular forms). A similar interpretation can be given to the forms in Kongo (Meinhof & van Warmelo 1932:168).

27The only reason to "hedge" is that Yaka perfective harmony could be described as a retention in the following way: First, assume that pre-Yaka had standard left-to-right VTH, affecting the derivacional suffixes in (21) even in the absence of the perfective. Second, assume that this VHH is subsequently lost as a peripheralization process on medial vowels. The only cases where peripheralization would have failed to apply would be where the whole stem consists of mid vowels: i.e. where peripheralization would have created high vowels surrounded by mid vowels. This analysis would of course not account for the data in (22b), where the penultimate [e] is clearly innovative. It also fails to account for the fact that the perfective ending is -e(ə) (rather than -iəl) whenever preceded by a CVCaC- base (Hyman, in press).

28A classification of Kongo dialects is found in Laman (1912, 1936) as well as a summary in Meinhof & van Warmelo (1932). See also Mbiula (1996).
(24) No VHH in Central Kongo

   a. -sorp-il-a 's'attacher à'  
   b. -tol-ul-a 'casser, briser'
   lèng-il-a 'se flétrir, s'affaisser'  
   lèmb-ul-a 'barrer, effacer'
   -sik-il-a 'soutenir, fortifier'  
   -viz-ul-a 'toucher à'
   -vud-il-a 'surpasser'  
   -bùb-ul-a 'corrompre'
   -lùnd-il-a 'suivre'  
   -bàng-ul-a 'faire violence'

As seen, in Central Kongo, in contradistinction to Southern Kongo in (9), derivational suffixes do not by themselves undergo VHH. As in Yaka, the perfective ending conditions VHH, with -illi occurring after /i, u, a/ and -elle after /e, o/ (or their nasal variants -ini and -ine). 29

In his comparative study of six Kongo dialects, Mabiala (1996) considers vowel harmony in Bembe H.11, Vili H.12a, Yombi H.12b, Sundi H.13, Laadi H.16f, and Hangala H.16j. The following tables summarize the distribution of vowels in CVCV stems on the left and CVCC- stems on the right in three of Mabiala's dialects/languages. 30

(25) Comparison of 5 x 5 vowel distributions in Kongo dialects/languages

   a. Laadi CVCV

   \begin{tabular}{|c|c|c|c|c|}
   \hline
   V1/V2 & i & e & u & o \\
   \hline
   i  & 11 & 21 & 32 \\
   e  & 4  & 13 & 31 \\
   u  & 15 & 31 & 69 \\
   o  & 14 & 22 & 53 \\
   a  & 21 & 31 & 80 \\
   \hline
   \end{tabular}

   b. Laadi CVCC...

\begin{tabular}{|c|c|c|c|c|}
\hline
V1/V2 & i & e & u & o \\
\hline
i & 11 & 7 & 6 & 1 \\
\hline
\end{tabular}

   c. Hangala CVCV

\begin{tabular}{|c|c|c|c|c|}
\hline
V1/V2 & i & e & u & o \\
\hline
i & 19 & 24 & 59 \\
\hline
\end{tabular}

   d. Hangala CVCCV...

\begin{tabular}{|c|c|c|c|c|}
\hline
V1/V2 & i & e & u & o \\
\hline
i & 14 & 7 & 5 \\
\hline
\end{tabular}

In (25a) we see that Laadi ger preceding vowel is itself /el/. With the detriment of CoCe, of which the four occurrences of CeCi are exceptional, Mabiala's num could change as further data are disallowed in Hangala, identical to Laadi in (25a). This quite different. Here we see the second vowel in a CVCC stem.

Let us now compare these vowel of CVCC... stems. Wh both Hangala and Yombi lack consistent in its peripheralization CVCC stems and in internal Hangala is not consistent. While has non-peripheral /e/ after /e/ at final mid vowel is peripheralize which occurs to the detriment of

The following summaries of languages/dialects line up with the

(26) Ste

\begin{tabular}{|c|c|c|c|}
\hline
Laadi H.16f & CeCe/CeCi/CoCi \\
\hline
Hangala H.16j & CeCe/CoCi/ \\
\hline
\end{tabular}

29 The corresponding perfective passive endings are -ulu-/amu and -cilo-ono (Meinhof & van Warming 1932:167-8).
30 In this case, in addition to CVCC- verb stems, the survey includes CVCVC stems, which, due to reduplications and borrowings, accounts for some of the exceptions, indicated between parentheses.
31 The numbers in (26b) are low a over CoCiC-. However, Jacquot symmetrical in Laadi.
The numbers in (26b) are low and do not clearly show that CoCeC- is preferred over CoCiC-. However, Jacquot's (1962) study makes it clear that VHH is symmetrical in Laadi.
c. Suundi H.13
   CeCe/CoCo  CeCiC/CoCuC  S  N
   CoCi/CoCo  CoCiC/CoCuC  A  N

d. Yombi H.12b
   CeCi/CoCu  CeCiC/CoCuC  N  N
   CoCi/CoCu  CoCiC/CoCuC  N  N

e. Vili H.12a
   CeCi/CoCu  CeCiC/CoCuC  N  N
   CoCi/CoCu  CoCiC/CoCuC  N  N

f. Bembe H.11
   CeCe/CoCu  CeCiC/CoCuC  A  N
   CoCi/CoCo  CoCiC/CoCuC  A  N

In (26) S, A and N stand, respectively, for symmetric, asymmetric and no VHH, respectively. As seen, Laandi is alone among the languages surveyed by Mabiala to have symmetric VHH in both V2F and V2C positions. None of the languages in (26b-f) has internal VHH. Hangala and Suundi have the same asymmetric pattern in bisyllabic stems, where CoCi occurs instead of *CoCe.32 Yombi and Vili, on the other hand, have no VHH in either context. Turning to Bembe in (27f), there appears to be a double asymmetry in bisyllabic stems: CeCe and CoCo instead of CeCu and CoCi. On the other hand, Mabiala reports no VHH in CVCVC stems, while Jacquot (1981) indicates that there is symmetric harmony in such cases.33

We are now ready to consider what these data may have to say about reconstruction of VHH in PB. Some Kongo dialects are fully harmonizing, while others have no harmony other than in the perfective (which I have claimed to be a right-to-left innovation). If asymmetric VHH is reconstructed, then some Kongo dialects would have generalized it to symmetric (the only such case among 5V Bantu languages), while others would have lost left-to-right VHH altogether (replacing it in some cases with right-to-left perfective harmony). This would seem a rather complex set of developments, as all Kongo dialects would have changed in various directions without any one of them keeping the asymmetric pattern. If we thus instead reconstruct symmetric VHH, then some dialects could be said to conserve it, while others would have lost it.

Of the two, this second hypothesis thus far seems preferable. In view of the fact that Kongo stands out among 5V Bantu languages (having symmetric VHH), I would further hypothesize that both sets of VHH properties in Kongo dialects were set in motion at a point when these languages had 7V. On the one hand, well in the situation in zone C (Lei frequently have assimilations of *a Koyo C.24 in (13). Interestingly, (Ndembe-Nsasi 1972), one of only

La voyelle de 3ème degré d'aper
d'une voyelle de 2ème degré d'ap
morphème -al des noms verbals
respectivement, après 2ème degré
(Jacquot 1962:241).

We thus obtain the following re-
infinitives:34

(27) a. kū-būl-a "casser"
    kū-sīs-a ‘abandonner’
    kūsūl-a ‘travailler’.

The hypothesis, therefore, is that bo
certain 7V systems in the geog-
symmetric suffixal harmony, as in
Mongo C.61, whose symmetric VHI
not have harmony, as in (24), patt
C.24. Symmetric VHH does occur
prefixes and CVCV noun stems in
only /l/, /u/ and /o/ occur medially in

(28) V1 + V2 in Koyo

\[
\begin{array}{c|ccc}
V1/V2 & i & e & e \\
\hline
i & 14 & - & -  \\
e & 14 & - & -  \\
e & 5 & - & (2)  \\
u & 19 & - & -  \\
\sigma & 9 & - & -  \\
\sigma & 7 & - & -  \\
a & 16 & - & -  \\
\end{array}
\]

32 Since the asymmetric pattern in Hangala and Suundi is one of CeCo vs. CoCi, it is the opposite of the Savanna Bantu case, where we obtain CoCeC, but CeCuC.33 Relevant perhaps to this discrepancy, Laman (1936:1xx) shows VHH variation in Bembe. Thus, kēbe 'garden' has the perfective kēberi or kēbiri. The Bembe material are complicated by the fact that internal vowels also tend to be realized as schwa, an indication of the fact that we are dealing with a form of vowel reduction—which may trigger VHH, peripheralization, "bleaching", or, syncope in extreme cases in Northwest Bantu.

34 Mabiala (1996) has a final schwa suggests, first, that there might be vari
a contributing factor, perhaps critical,
languages had 7V. On the one hand, the dialects with symmetric VHH fit in well in the situation in zone C (Leitch 1995), which have 7V. These also frequently have assimilations of *a to a preceding /h/ or /h/, as we saw in Koyo C.24 in (13). Interestingly, Bembe H.11 is, with Lwalwa L.00 (Ndema-Nsasi 1972), one of only two 5V languages that also have this property:

La voyelle de 3ème degré d’aperture [=a] n’apparaît jamais précédée d’une voyelle de 2ème degré d’aperture, avec pour conséquence que le morphème -a/ des noms verbaux présente les variantes [-o] et [-e], respectivement, après 2ème degré postérieur et 2ème degré antérieur” (Jacquot 1962:241).

We thus obtain the following realizations of the final vowel /-a/ on infinitives:

(27) a. ku-bul-a ‘casser’
    ku-sis-a ‘abandonner’
    ku-kib-a ‘garder’
    ku-sai-a ‘travailler’.


The hypothesis, therefore, is that both types of Kongo dialects pattern with certain 7V systems in the geographical vicinity. Those which have symmetric suffixal harmony, as in (9), pattern with 7V languages like Mongo C.61, whose symmetric VHH was illustrated in (8). Those which do not have harmony, as in (24), pattern instead with languages like Koyo C.24. Symmetric VHH does occur in this language, as was illustrated in prefixes and CVCV noun stems in (5) and (6). However, as seen in (29), only /h/, /h/ and /h/ occur medially in CVCV- verb stems:

\[ V_1 + V_2 \text{ in Koyo CVCV- Verb Stems} \]

<table>
<thead>
<tr>
<th>V1/V2</th>
<th>i</th>
<th>e</th>
<th>e</th>
<th>u</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>14</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>e</td>
<td>14</td>
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<td>2</td>
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<tr>
<td>e</td>
<td>5</td>
<td>(2)</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>u</td>
<td>19</td>
<td></td>
<td>3</td>
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<td>(1)</td>
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<td>9</td>
<td>2</td>
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<td>2</td>
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<td>o</td>
<td>7</td>
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<td>3</td>
<td></td>
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<td>(1)</td>
</tr>
<tr>
<td>a</td>
<td>16</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

34 Mabila (1996) has a final schwa on many of his infinitive forms, which suggests, first, that there might be variation, and second that reduction could be a contributing factor, perhaps critical, to the assimilations in question.
In this language, most verbal suffixes have the vowel /i/, as in causative -is- and even reciprocal -in- (from PB *-an-). 35

(29) a. lim-is-a 'extinguish'  b. yis-in-a 'hide oneself'
yég-is-a 'teach'  tég-in-a 'meet'
kéng-is-a 'make observe'  jwem-in-a 'have rashes'
kdr-is-a 'make warm'  kül-in-a 'separate from each other'
wóm-is-a 'to dry (tr.)'  wóg-in-a 'agree'
kos-is-a 'soften'  lend-in-a 'follow each other'
bág-is-a 'make think'  sang-in-a 'amuse oneself'

Internal vowels are clearly peripheralized and exempt from VHH in Koyo. This should be contrasted with the following table of vowel distributions in CVCV stems, which shows that /e/, /o/ cannot co-occur with /e/, /o/:

V₁ + V₂ in Koyo Bisyllabic Noun Stems

<table>
<thead>
<tr>
<th>V₁</th>
<th>V₂</th>
<th>i</th>
<th>e</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>26</td>
<td>11</td>
<td>26</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>e</td>
<td>24</td>
<td>36</td>
<td>13</td>
<td>10</td>
<td>42</td>
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<tr>
<td>e</td>
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<td>u</td>
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<td>o</td>
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<td>50</td>
</tr>
<tr>
<td>a</td>
<td>27</td>
<td>9</td>
<td>40</td>
<td>45</td>
<td>116</td>
</tr>
</tbody>
</table>

While bisyllabic noun stems show symmetric VHH among mid vowels, internal syllables of verbs have been peripheralized to /i/, /u/. The possibility that stem-internal vowels may undergo a different history than stem-final vowels thus needs to be recognized and factored into the equation. 36 This makes our reconstruction effort that much more difficult.

35 Data are from the Koyo lexicon of 1700+ entries that I developed in Lyon during 1995-1996 with Yvon Dzamba, based loosely on Gazania (1972). All of the verbs that have the shape CVCCV have a /g/ in C₃ position, e.g. kir-ag-a 'come', as do the two verbs that have the shape CeCCV, from /CeCag-. By comparison, the 84 CVGC- verb bases divide themselves up among CVGCs- (56), CVGin- (16), CVGit- (11) (pronounced [CVCit-]), and CVGIn- (1). The 16 CVCuC- verbs have the following C₃ consonants: CVCuS- (6), CVCuIn- (4), CVCuIn- (3), CVCuInw- (2) and CVCuIn- (1). Note that Koyo does not have an applicative suffix.

36 In Hyman & Inkelas (1997) and Hyman (1998) I have referred to the relevant stem-internal sequence as constituting a "prosodic trough" within which specific phonotactic constraints may hold that do not characterize the "perimeters."

In the next section I attempt to present a possible hypothesis. 5.

5. An alternative hypothesis

In this section I shall depart from the approach of Meinhof (1948) and present a different view of what might have been the causative *-an-....
In the next section I attempt to present a different view of what the situation might have been in PB.

5. An alternative hypothesis

In this section I shall depart from the assumptions outlined above and suggest a different view of what might have existed in PB. The position I would like to tentatively advance for consideration is that neither symmetric nor asymmetric VHH existed in PB—at least as concerned suffixes within the verb stem. My proposal will involve both different reconstructions for certain suffixes than usually assumed as well as an historical VHH process that worked quite differently from the way it is normally conceived in synchronic descriptions—whether of PB or of the daughter languages.

Most recent discussions of VHH in PB and present day 7V Bantu languages start from two assumptions. First, VHH involves the assimilation of a degree 2 vowel to a preceding degree 3 vowel.\(^{37}\) VHH is thus either a lowering process, if one assumes the vowel representations in (15a,b), or a vowel laxing process, if one assumes those in (15c). A second, related assumption, is that insight into this lowering or laxing process is best acquired by examining the alternations that are observed in isolatable verb suffixes such as applicative *-id-, stative *-ik-, reversional *-uk- and *-ud-, etc. In this study I have accordingly followed the general practice of citing such alternations in support of the putative historical processes presented in (1). That is, suffixal *i is realized [e] after a preceding *eC or *oC, while suffixal *u is realized [o] after preceding *oC (and after *eC in "symmetric" VHH systems). I shall now reconsider these assumptions in turn and argue that they should be questioned, if not rejected.

I begin by raising the following question: What is the evidence that degree 2 vowels should be reconstructed with a concomitant lowering or laxing to degree 3—rather than the reverse? It is universally accepted that degree 2 and 3 vowels did not contrast in stem-final positions, i.e. where these suffixes occur. So why not reconstruct *-ed-, *-ek-, *-ok- and *-ud-, etc.? While I am unaware of any explicit argumentation, I imagine the reconstructions with *-iC- and *-uC- to be based, first, on the relatively unmarked status of [i, u] vs. [e, o]. Those taking this view may also see

\(^{37}\) On the other hand, Meinhof (1948) previously reconstructed both *i and *e in specific suffixes, e.g. causative *-ik- vs. intransitive *-ek-. Interesting from my point of view is that Meinhof and van Warkelo (1932:43-46) generally cite suffixes with a front vowel with *e, e.g. *eka and *ela, while suffixes with a rounded vowel are cited either with a high vowel, e.g. *eka and *ela, or with one after the other, e.g. *uka, *oka and *ula, *ola. The intention seems to be to suggest a difference between the front vs. back vowels in verb extensions. This interpretation can also be extracted from Meyer’s (1937) historical phonology of Cewa, with its indication of *eka > *eka, *eka vs. *uka > *uka, *oka (p.186). Meyer thus sees a change of *e > i in the front series vs. *u > o in the back, a view that I will also defend below.
support from the fact that some Bantu languages without VHH disallow [e, o] in stem-internal position, e.g. Puru B.43, Lengola D.12, Suku H.32, Mhala H.41, and Ruund L.53—to which we can also add Yaka H.31 and Easterly Konge H.10 dialects which allow (right-to-left) VHH only in the perceptive—and which otherwise limit internal vowels to [i, u, a]. However, we know that these languages are quite evolved in this and other ways—e.g. in limiting or modifying stem-internal vowels in sequence. As an example, consider the possible internal -VCVC- sequences found in quadrisyllabic (CVC-VCVC-V) verb stems in the Yaka “prosodic trough” (Hyman 1998):

(31) Attested internal -VCVC- sequences in Yaka verbs

   a. -ikis- (42), -idil- (10), -ikil- (9), -idik- (5), -in- (3), -inis- (2)
   b. -umun- (56), -ulul- (36), -unuk- (27), -uluk- (9), -unun- (2)
   c. -asan- (40), -akan- (34), -alul- (17), -aman- (14), -an- (6),
       -amas- (5), -agan- (4), -asal- (3), -angas- (2), -akas- (1)
   d. -ukil- (6), -ukis- (1)

The number in parentheses after each sequence indicates how many entries (out of 1781 verbs) appear with this form in the CBOLD version of Ruttenberg (1971). As can be correctly generalized from (31), the only consonants that appear in these two C positions are the four coronals l, l, n, s and the three non-coronals /m, k, ng/ (vs. a much larger inventory in the preceding CVC “perimeter”). In addition, vowels are limited to /i, u/ and /a/, which however appear in only four out of nine logical combinations. In (31) I indicate some of the historical innovations which removed non-occurring vowel sequences from the “trench”:

(32) Historical innovations yielding trough properties

   a. *am-uk-, *am-ud-> -umuk-, -umun- (positional + reversible)
   b. *is-an-, *ik-an-> -asan-, -akan- (causative/impositive +
       reciprocal)
   c. *am-is-, *am-id-> -amas-/aman- (positional + causative/
       applicative)

We thus cannot take comfort from such languages, which seem to be moving in the direction of fewer vowel oppositions in stem-internal position in general. While we might take solace from these evolved systems which reveal a tendency to exclude mid vowels from the positions where Bantuists have preferred to reconstruct *i and *u, this only begs the question: Were there never any mid vowels in these positions? It is hard to accept that we would not eventually meet a fuller set of vowels if we could go back far enough in history. So the issue is whether PB is “back far enough” or not. I shall suggest below that it is.

But first let us consider the other reconstruction of degree 2 vowels. If development of [-eC-] and [-oC-] e preceding degree 3 vowel. This was VHH in (1), for instance. If, on the other hand, *eC-, we would need VHH to be a.

(33) Asymmetric VHH reinterpretation

   a. front height harmony
   b. back height harmony

As seen in (33a), *e would have to be raised, while *o would have to be raised as well. However, mid vowels raise could view this as assimilation. How [as] raise to degree 2 [i] and [u], reape of the process would seem to be more complicated.

The reasoning in arriving at the is actually conditioned by the precise possibility that (33) is correct and indicated is “peripheralization,” i.e. the peripheries of the vowel space, (e.g. internally and/or finally). View as *e becoming [i] except where *e vowel. Similarly, (33b) could be reinforced by a preceding *o. Such sound change is not unknown in h
demonstrated with solid Bantu exam.

As shown by Ngunga (1997), if ek are rounded to -uk/-ok- in exam are followed by the reverse suffix -

(34) Rounding of suffixal -ik-ul-/a-

   a. lum-ik-a ‘have
       lum-ul-ul-a ‘take
       wun-ik-a ‘close
       wun-ul-ul-a ‘open
       wuund-ik-a ‘son
       wuund-ul-ul-a ‘take
   b. aan-ik-a ‘spare
       aan-ul-ul-a ‘gath
But first let us consider the other intuition that may be involved in the reconstruction of degree 2 vowels. If *-iC- and *-uC- are postulated, then the development of [-eC-] and [-oC-] can be explained as assimilations to the preceding degree 3 vowel. This was seen in the derivation of asymmetric VHH in (1), for instance. If, on the other hand, we were to begin with *-oC- and *-eC-, we would need VHH to be stated as in (33).

(33) Asymmetric VHH reinterpreted
   a. front height harmony : *e > i / { j, y, i, u, a } C _
   b. back height harmony : *o > u / { i, y, i, u, e, a } C _

As seen in (33a), *e would have to raise to [i] after five different vowels, while *o would have to raise to [u] after six different vowels in (33b). Where the mid vowels raise to high vowels after high vowels one could view this as assimilation. However, why should degree 3 *e [e] and *o [o] raise to degree 2 [i] and [u], respectively, when preceded by *a? So, some of the process would seem to be assimilatory, some dissimilatory, clearly a more complicated interpretation of the facts than in (1).

The reasoning in arriving at the interpretation of (1), then, is that VHH is actively conditioned by the preceding vowels. Let us instead consider the possibility that (33) is correct and that the motivation for the changes indicated is “peripheralization,” i.e. the tendency for vowels to migrate to the peripheries of the vowel space, becoming /i, u, a/ in “weak” positions (e.g. internally and/or finally). Viewed this way, (33a) could be interpreted as *e becoming [i] except where *e is “reinforced” by a preceding degree 3 vowel. Similarly, (33b) could be interpreted as *o becoming [u] except when reinforced by a preceding *o. Such “passive conditioning” or blocking of a sound change is not unknown in historical linguistics, and can be easily demonstrated with solid Bantu examples.

As shown by Ngunga (1997), for instance, the Yao P.21 suffixes -ik/-ek- are rounded to -uk/-ok- in examples such as the following, where they are followed by the reverse suffix -ul/-ol:

(34) Rounding of suffix -ik-ul/-ek-uk- in Yao P.21
   a. lum-ik-a ‘have between the teeth’
      lum-uk-ul-a ‘take out of mouth’
      wun-ik-a ‘close (book); put together’
      wun-uk-ul-a ‘open’
      wuund-ik- ‘store fruit by sealing in pot’
      wuund-uk-ul- ‘take fruit out of sealed pot: unseal’
   b. aan-ik-a ‘spread out to dry in the sun’
      aan-uk-ul-a ‘gather up sth. spread in sun to dry’
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<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>saj-ik-a</td>
<td>'put on top'</td>
</tr>
<tr>
<td>saj-uk-ul-a</td>
<td>'remove from top of something else'</td>
</tr>
<tr>
<td>taand-ik-a</td>
<td>'spread (bed, mat, table cloth)'</td>
</tr>
<tr>
<td>taand-uk-ul-a</td>
<td>'fold up (table cloth); unmake bed'</td>
</tr>
<tr>
<td>kol-ek-w-a</td>
<td>'be hung; be caught by thorns'</td>
</tr>
<tr>
<td>kol-ok-ol-a</td>
<td>'take down sth. that is hung'</td>
</tr>
<tr>
<td>lov-ek-a</td>
<td>'steep in water; soak'</td>
</tr>
<tr>
<td>low-ok-ol-a</td>
<td>'remove from water (from soaking); unsoak'</td>
</tr>
<tr>
<td>tct-t</td>
<td>'sew; rivet; fasten together'</td>
</tr>
<tr>
<td>tct-ok-ol-a</td>
<td>'unpick sewing; unfasten sth fastened'</td>
</tr>
</tbody>
</table>

In (34a,b) /-ik-/- rounds to /-uk-/-, while in (34c), /-ek-/- is realized as /-ok-/- by rounding as well as VHH. These examples thus amply demonstrate that there is a rounding harmony affecting the suffixal vowels /i/ and /e/. Now compare the data in (34) with those in (35).

(35) Rounding of /-ik-/- and /-ek-/- fails to occur

a. sim-ik-a | 'fix upright'                      |
| sim-ik-ol-a | 'remove what has been fixed upright' |
| siind-ik-a | 'protect a village or house with medicine' |
| siind-ik-ol-a | 'unprotect a village or house that was protected with medicine' |
| siing-a | 'twist strands (of cotton, sisal, etc.) into thread or rope' |
| siinjak-ik-a | 'disentangle, unravel'             |

b. cejk-ik-a | 'place leaning against or on'      |
| cejk-ek-ol-a | 'remove what has been placed'     |
| del-ek-a | 'carry on back (child); bear child' |
| del-ek-ol-a | 'swing child from back to hip'    |
| tej-ek-a | 'be easily set (a trap); be cocked.' |
| tej-ek-uk-a | 'unset (trap), uncock (gun)'     |

In these examples there is no rounding harmony. A close comparison of these data will reveal that the input /-ik-/- or /-ek-/- sequence is preceded by a back vowel in (34) vs. a front vowel in (35). Note the importance, again, of the form the vowel takes after /u/ or /i/. Had it not been for the rounding of /-ik-/- to /-uk-/- in (35), we might have concluded that (34a,c) represented a rounding of /-ik/- after /u/ or /i/, rather than the right-to-left process that it clearly is. Although rounding harmony targets suffix vowels, what is crucial is that the presence of the process.

Returning to VHH, Case E.62 (that the processes could have been generally assumed not to have VHH fact that the applicative suffix is real through Müller (1947), however, tells us otherwise)

<table>
<thead>
<tr>
<th>VCVC</th>
<th>All</th>
<th>s</th>
<th>y</th>
<th>k</th>
<th>r</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>eCeC</td>
<td>83</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>eCiC</td>
<td>17</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>—</td>
</tr>
<tr>
<td>oCeC</td>
<td>29</td>
<td>16</td>
<td>1</td>
<td>8</td>
<td>4</td>
<td>—</td>
</tr>
<tr>
<td>oCiC</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>eCuC</td>
<td>17</td>
<td>1</td>
<td>13</td>
<td>2</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>oCuC</td>
<td>53</td>
<td>2</td>
<td>3</td>
<td>11</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>oCuC</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

The numbers in this table show how the indicated sequences. Thus, the eCeC, 17 having eCiC, and so forth where a mid vowel is followed by an survey indicated that there would be follow /i/ or /u/ or /l/ The columns of examples occurring as a function sequence. Two observations should be made: following vowel agree in frontness 5/6 of the cases: 83 vs. 17 in the 1 series. Second, the two vowel

38 That only suffixes are affected by these data will reveal that the suffix -uk- does not affect the preceding Sanderson (1954) reveals only 1 CiCuCuCa: -dimbukka 'wobble, sag; -dimbukala 'dig up a plant with a wound'. The first two verbs have a sequence, which I hypothesize to break root vowel. (None of the verbs having labial second consonant.) The third form from vin-ik-uk-a but rather from vin-uk- to go round) an obstacle'.
what is crucial is that the presence of a preceding root vowel /i/ or /e/ blocks the process.38

Returning to VHH, Caga E.62 (5V) provides very suggestive evidence that the processes could have been as indicated in (33). This language is generally assumed not to have VHH (cf. note 8), a view reinforced by the fact that the applicative suffix is realized as an invariant -i. A manual search through Müller (1947), however, tells a different tale, summarized in (36).

(36) Mid V + Mid/High V in Caga CVCVC... Verb Stems

| VCVC | All | s | y | k | r | t | d | n | l | $ | ny | ng | m | v | w | h |
|------|-----|---|---|---|---|---|---|---|---|---|----|----|---|---|---|---|---|
| eCeC | 83  | 4 | 5 | 9 | 20 | 11 | 2 | 2 | 11 | 7 | 1 | 2 | 7 | 1 | 1 |   |
| eCiC | 17  | 6 | 3 | 6 | 2 |   |   |   |   |   |   |   |   |   |   |   |   |
| oCeC |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| oCiC | 29  | 16| 1 | 8 | 4 |   |   |   |   |   |   |   |   |   |   |   |   |
| eCoC |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| eCuC | 17  | 1 | 1 | 3 | 2 |   |   |   |   |   |   |   |   |   |   |   |   |
| oCoC | 55  | 2 | 3 | 1 | 8 | 4 | 1 | 5 | 2 |   | 3 | 3 | 6 | 3 | 2 |   |
| oCuC | 10  | 2 | 2 | 8 |   |   |   |   |   |   |   |   |   |   |   |   |   |

The numbers in this table show how many verb stems were found that attest the indicated sequences. Thus, there were 83 stems having the sequence eCeC, 17 having eCiC, and so forth. A count was made only of sequences where a mid vowel is followed by another (non-low) vowel, since an initial survey indicated that there would be extremely few cases where mid vowels follow /i/, /u/ or /a/. The columns headed by s, y, k, r, etc. plot the number of examples occurring as a function of the second consonant in the VCVC sequence. Two observations should be made. First, when the mid and following vowel agree in frontness and roundness, VHH applies in about 5/6 of the cases: 83 vs. 17 in the front series and 53 vs. 10 in the back series. Second, when the two vowels differ in frontness and roundness,

38 That only suffixes are affected by this process is seen in examples such as dim-uk-a 'be scared away' and sip-uk-a 'spurn', where the inverse intransitive suffix -uk- does not affect the preceding root /i/. A search of the CBOLD version of Sanderson (1954) reveals only three cases of verbs having the shape CiCuCa: -dimbakaka 'tumble; sag; fall over slowly (e.g., a tree or a pole); -simbukula 'dig up a plant with roots and soil attached', and -vimukula 'gap (of a wound)'. The first two verbs have a labial consonant preceding the -ukul- sequence, which I hypothesize to break the blocking effect of the preceding front root vowel. (None of the verbs having the shape CiCiCuCa in the database has a labial second consonant.) The third form is either exceptional or is not derived from vιt-uk-a but rather from vιt-uk-al-a—cf. vιt-uk-a 'go over (as opposed to go round) an obstacle'.
VHH is impossible. That is, neither oCeC nor eCoC occur in verb stems. In other words, if two vowels in successive syllables are mid, they must be identical.

There are two possible interpretations of these facts: (i) VHH is incipient in Caga and has begun by affecting vowels which agree in frontness and roundness. (ii) VHH is moribund in Caga and has begun by affecting vowels that disagree in frontness and roundness. A major difficulty with the first interpretation is that Caga clearly belongs to the same Eastern Bantu group as other languages in the area which have (canonical) VHH, e.g. Kamba E.55, Shambala G.23, etc. While Caga is somewhat isolated and detached from other Bantu languages, it is hard to conceive of VHH as a recent enough innovation for it to have escaped this. This view is further supported by the facts of contiguous Asu (Paré) G.22 (Kotz 1969). Like Caga, the applicative is non-harmonizing -i- in most cases, e.g. tet-a 'speak', tet-i-a 'speak for someone'. The applicative is however realized as harmonizing -ir-/er- in frozen forms, e.g. tet-a 'speak', tet-er-a 'cackle'; teka 'get lost', tek-er-a 'get lost on someone'. I therefore adopt the second interpretation: the gradual loss of VHH has been innovated in Caga (and Asu), beginning with applicative -i-.

An additional argument weighs in on the side of gradual loss of VHH in Caga: Note in (36) that the second consonant of disharmonic eCIC and oCuC sequences is more restricted than in the corresponding harmonic sequences eCeC and oCoC. In fact, the only attested disharmonic eCIC and oCuC sequences are: eCis, eCiy, eCik, eCir, oCuY and oCuK, i.e. where the second consonant is [s], [i], [k] or [r]. All of these consonants are involved in suffixal allomorphy in Caga, e.g. causative -is-/es-, applicative -iy-/ey-, stative -ik-/ek-, causative -ir-/er-. There may therefore be a sporadic differential treatment of stem-internal vowels in cases where a suffix can be identified: Whereas eCeC and oCoC do not become eCIC and oCuC when the second consonant is non-suffixal, these latter may occur, sometimes apparently as variants, when suffixation is involved.

Finally, I should note that 8 of the 17 disharmonic eCIC forms have the sequence emiC vs. only three harmonic emoC forms—two of which are reduplications: memeluka 'albern sein, umnützen' and memes&wa 'jemand mit dem Finger ans Unterkihn fahren' (Müller 1947:199). Similarly, of the 10 disharmonic oCuC forms, 7 have omuk or omuy and one has onuk. By contrast, only one verb, omoma, the iterative of -oma 'tanzen' (and hence obviously a reduplication), has an emoC sequence. It thus appears that loss of VHH has been further hastened by the presence of a nasal consonant preceding the vowel in question. This presumably correlates with the fact that stem-initial [me], [mo], [ne] and [no] sequences are rare in Caga as in many Bantu languages. A rough count of the number of verb entries in Müller (1947) beginning with /n/ and /n/ is given in (37).

<table>
<thead>
<tr>
<th>NV...Jstem</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>12</td>
</tr>
<tr>
<td>n</td>
<td>7</td>
</tr>
</tbody>
</table>

Thus, rather than having the exj find CeNiC and CoNuC, respere contribute to the loss of VHH important point is that height agr [e] or [o] is preceded by an ident this happened in the history of general?

This, then, is what I believe I propose that the applicative an *-ek-, respectively, which were Bantu languages except where I (cf. below for discussion of u/o h we can now interpret some crucial

(1) The non-alternating mid vi in Southern Bantu (all of zone S) are original. If we assumed the re a loss to explain why these su languages—which include the 7V

39 Another example may be Salami suffixes s'ouve en e uniquement causative of -end-a 'voyager' is the 'charger un fusil' is -som-ish-a. A neighbors Ruund L.53, which has propose is that Salampaus de VHH precedes. A slightly different, but c Leung (1986:83) shows that the PB in the imperative when the verb has degree 1 and degree 2 verbs:

| ki-gur-lz:i | 'tell it!' |
| ki-duy-lq:i | 'hit it!' |
| ki-guut-i | 'defeat it!' |
| ki-rum-i | 'bite it!' |

It is clear in this case that *-e > vowel, another precedent for what I.

40 Bastin (1983a) sees this outcome after *a in languages such as this argument goes as follows: While *a most Bantu languages, in several extended to occurring also after the the balance towards the -ec- allom
eCoC occur in verb stems. ablatives are mid, they must be
of these facts: (i) VHH is
ing vowels which agree in
in Caga and has begun by
ness. A major difficulty
get to the same Eastern
ich have (canonical) VHH, Caga
is somewhat isolated and
cide of VHH as a
y. This view is further
Kotz 1909). Like
all cases, e.g. tet-a
ive however realized as
peak', tet-er- 'cackle'; teka
therefore adopt the second
innovated in Caga (and
le of gradual loss of VHH in
t of disharmonic eCiC and
esponding harmonic
cied disharmonic eCiC and
uy and oCuC, i.e. where the
ese consonants are involved
-s-es, applicative -iy/-ey-
therefore be a sporadic
cases where a suffix can be
ome eCiC and oCuC when
ter may occur, sometimes.
harmonic eCiC forms have
forms—two of which are
 and memesxoba 'jemand
475:1999). Similarly, of the
muy and one has ouk. By
-oma 'tanzen' (and hence
ce. It thus appears that loss
ence of a nasal consonant
ly correlates with the fact
es are rare in Caga as in
umber of verb entries in
(37)
Mid V + Mid/High V in Caga CV/CV... Verb Stems

<table>
<thead>
<tr>
<th></th>
<th>i</th>
<th>e</th>
<th>u</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>12</td>
<td>3</td>
<td>10</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>n</td>
<td>7</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

Thus, rather than having the expected CeNiC and CoNuC sequences, we
find CeNiC and CoNuC, respectively. In other words, various factors
contribute to the loss of VHH in Caga, as well as to its retention. The
important point is that height agreement will generally be maintained when
[e] or [o] is preceded by an identical mid vowel. The question now is:
if this happened in the history of Caga, why not in the history of Bantu in
general?

This, then, is what I believe to be going on in suffixal VHH in Bantu.
I propose that the applicative and static suffixes reconstruct as *
-edi- and *
-ek-, respectively, which were "peripheralized" to -id- and
-ik- in most
Bantu languages except where "held back" by a preceding mid root vowel (cf.
below for discussion of u/o harmony). Assuming these reconstructions
we can now interpret some crucial facts in the following way.

(i) The non-alternating mid vowels of applicative *
-edi- and static *
-ek-
in Southern Bantu (all of zone S except Shona S.10) and in Makua (P.31)
are original. If we assumed the reconstructions *
-idi- and *
-iki-, we would be
at a loss to explain why these suffixes employ a degree 3 vowel in these
languages—which include the 7V Sotho group, e.g. Tswana S.31.

39Another example may be Salampasu L.51: "En salampasu, la voyelle i des
suffixes s'ouvre en e uniquement après cette voyelle" (Bastin 1986:76). The
causative of -end-a 'voyager' is thus -end-ed-a, while the causative of 
-som-a 'charger un fusil' is -som-ished-a. This could be significant, since Salampasu
neighbors Ruund L.33, which has no VHH at all. The interpretation I would
propose is that Salampasu use VHH has been lost except when an identical /e/
precedes. A slightly different, but case involving comes from Logoli E.41 (7V).
Leung (1986:83) shows that the FB final vowel *-e, used in the subjunctive and
in the imperative when the verb has an object prefix, is realized [i] after both
degree 1 and degree 2 vowels:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ki-gor-iz-i</td>
<td>'sell it!'</td>
</tr>
<tr>
<td>ke-veg-e</td>
<td>'shave it!'</td>
</tr>
<tr>
<td>ki-doy-ran</td>
<td>'hit for it!'</td>
</tr>
<tr>
<td>ke-goor-e</td>
<td>'obtain it!'</td>
</tr>
<tr>
<td>ki-guut-t</td>
<td>'defeat it!'</td>
</tr>
<tr>
<td>ke-same-e</td>
<td>'burn it!'</td>
</tr>
<tr>
<td>ki-rum-i</td>
<td>'bite it!'</td>
</tr>
</tbody>
</table>

It is clear in this case that *-e > -i unless "held back" by a degree 3 (or 4)
vowel, another precedent for what I am proposing here.]
(ii) The mid vowel realization of *-ed- and *-ek- following *a in the preceding syllable in Mnundu H.21a, Mnunbu K.15, Kwango K.33, Kwezo K.35, Deiriku K.62, Pende L.11/K.52, Mnunbu R.11, Kwanyama R.21, Ndongo R.22, and Herero R.31 is also original. Rather than saying that *-i- and *-i-ki- lower to -ed- and -ek- by assimilation, in these languages the preceding *a hindered the peripheralization of *-ed- and *-ek- to -id- and -ik- in this account.

(iii) The mid vowel realization of *-ed- and *-ek- following *Ca- roots is also original. Thus, the applicative of *pá- 'give' would have been *pá- ed-a, which in turn would be expected to be realized as [páela], as it is in Bembá M.42, for instance, in a language like Haya.EJ.22, where *to give forlát is realized as [hëcera], an input such as *pá- id-a would have been expected to come out as *[híma] by the normal vowel coalescence rules.

(iv) By setting up these suffixes as *-ed- and *-ek-, we can now resolve a dilemma faced by Bastin (1986) concerning the long causative suffix *-is- which co-occurs with the short causative *-i-. In many languages, there is a morph *-is- which harmonizes to -es- in exactly the same contexts as the applicative, e.g. Bembá M.42, Cewa N.31b, Shona S.11. If the applicative is reconstructed as *-i-, this would suggest that the causative sequence should be reconstructed as *-i-ic-. The problem is that individual languages from all parts of the Bantu zone also show evidence that the vowel of the causative is higher than that of the applicative. Thus, the causative suffix is *is- in Bobangi C.32 in the Northwest vs. applicative -el- (which harmonizes to -el-). Similarly, in the South, the causative suffix is *is- in Lozi K.21/S.34, Luaya K.31, Mbugu K.33, Makua P.31, Venda S.21, Sotho-Tswana S.30 and Nguni S.40 vs. applicative -el- (neither of which harmonizes). Finally, note that there are traces of this difference even in the East. Thus we have said that the applicative form /há-ir-afa/ 'give forlát' is realized [hícera] in Haya. However, the causative of *há- is [hísa]—even though both suffixes harmonize identically (*is- for *i- and *is- for *i-) when following a consonant. We might follow Guthrie's suggestion (reported in Bastin 1986:89) and say that the morph *-i- which directly follows the longer morph raised or tensed the vowel of *-ic- to *-ic- so that we sometimes hence are extended to occurring after the rounded vowel as well. While this might seem plausible in 3V systems, where 2 harmony triggers vs. 3 non-triggers changes to 3 vs. 2, in the 7V Sotho group the change would have been from 2 harmony triggers vs. 5 non-triggers to 3 vs. 4, hardly making *-C- the dominant alloform! If the putative extension of VHH to occurring after *a took place before the 7V > 5V merger, this would thereby weaken this interpretation even further. Finally, as I discuss below, the preponderance of stem-internal [e] (over degree 1 or 2 front vowels) in Tswana S.31 extends beyond recognizable suffixes to characterize so-called "expansions" and unanalyzable non-initial root syllables. While one could see Tswana analogizing applicative -el- and stative -ek- to all environments, it would seem unlikely to have done the same with corresponding tautomorphemic post-root vowels. these discrepancies between the causative. Bastin goes secondary development historically did not under undergo VHH in such Unlike the perfective, ho- con-conditions frication on her notes. My proposal handles applicative which can recognize the applicative harmonizes in most harmonizing languages degree 2 vowel which n more general in Bantu languages as in Haya, it may do a consonant or a vowel. T Batibo (1985:168) indicate realization of causative * and -es-i- after degree 3 VHH pattern that character realized -el- and -ek- after.

Why should this be? between these suffixes to causative *-i- vs. appl introduced into this language degree 2 *i or *u, while *u addition, the degree 1 vc degree 2 vowel of non-development—which was *u. Again it is the vow obtained -is-i- after /a/, we agreement in [ATR]. How rounding harmony in (34

41 Languages which do sh Asaton et al (1954) claim to arrive, reach' should be ku- is-a. If such forms exist, ex causative form ka-táus-a wh 42 Batibo mentions that 5 realizations: In addition, can PB (Bastin 1986), as it is (Trithart 1977). Thus, if reconstruction could be w suffixes—and that language.
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and *-*ek- following *Ca- roots
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realized as [pɛːta], as it is in
Haya.EJ.22, where *-'to give
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an unanalyzable non-initial root
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likely to have done the same with
these discrepancies between the vowel of the applicative and the vowel of
the causative. Bastin goes as far as to reconstruct *-*je-i-, with harmony as a
secondary development (much as in the case of perfective *-*dj-c, which
historically did not undergo VHH, but which has been “regularized” to
undergo VHH in such languages as Bukusu EJ.31c and BembA M.42.
Unlike the perfective, however, there is precious little evidence that her
*-*je-i- conditions frication on preceding consonants, as *i- should—and as Bastin
herself notes.41
My proposal handles both of these problems (higher vowel height than
applicative which cannot however be *i- because of lack of frication) by
recognizing the applicative as *-*ed- and the causative as *-*ic-i-. The
applicative harmonizes as above, i.e. except where held back by mid vowels
in most harmonizing languages. The causative, on the other hand, has a
degree 2 vowel which may lower ( lax) as a result of VHH coming to be
more general in Bantu languages, or it may tense (peripheralize) instead. Or,
as in Haya, it may do a bit of both, depending on whether it follows a
consonant or a vowel. Two bits of data further support this view. First,
Batibo (1985:168) indicates that Sukuma EJ.21 (7v) has the interesting
realization of causative *-*is-i-: *-is-i- after a, u, a, *-*is-i- after degree 2 a, u,
and *-*is-i- after degree 3 i, e, o. This situation contrasts with the “canonical
VHH pattern that characterizes the applicative and stative suffixes which are
realized -el- and *-*ek- after mid vowels, otherwise degree 2 *-i- and *-*ek-.42
Why should this be? My hypothesis would be to attribute the difference
between these suffixes to a difference in the vowel that is reconstructed in
causative *-*is-i- vs. applicative *-*ed- and stative *-*ek-. When VHH was
introduced into this language, *-*ed- and *-*ek- harmonized to a preceding
degree 2 *i or *u, while *-*is- harmonized to a preceding degree 3 vowel.
In addition, the degree 1 vowel *i- further exerted an influence, causing the
degree 2 vowel of (non-harmonized) *-is- to become *-is- as a secondary
development—which was blocked, however, by a preceding degree 2 *i or
*u. Again it is the vowel *a/ that tells us what is going on. Had we
obtained *-*i- after *a/, we might have interpreted the process as left-to-right
agreement in [ATR]. However, *a/ is followed by *-*i-. Thus, as in the Yao
rounding harmony in (34) and (35), the innovation is for *-*i- to become

41 Languages which do show such frication often do so by analogy. Thus,
Ashton et al (1954) claim that the long causative of GaE EJ.15 ku-*th- a to
arrive, each should be ku-ths-is-a, but I have been able to elicit only ku-*thak-
iska. If such forms exist, even marginally, it may be by analogy with the short
causative form ku-*th- a whose applicative is ku-*th- is-a.
42 Batibo mentions that Swahili might be exerting an influence on these
realizations. In addition, causative *-*ic- was almost certainly followed by *-*i- in
PB (Bastin 1986), as it is in many Eastern Bantu languages today, e.g. Haya
(Tirtharaj 1977). Thus, the possibility is always there that the correct
reconstruction could be with the same vowel as the applicative and stative
suffixes—and that languages later and independently raised the vowel.
-is-] by a right-to-left process, which is secondary to VHH. This process is however blocked when the preceding *i* or *u* shares the degree 2 vowel height with the suffix -is-.

Carroboration of such a vowel height distinction in verb extensions comes from as far away from Eastern Bantu as Duala A.24 (Ittmann 1938[1978]). In this language both the applicative and static are realized -e-, e.g. *long-a* 'build', *long-e-a* 'build for'; *tum-a* 'tear (tr.)'; *tum-e-a* 'tear (intr.)'. However, the causative is realized -is- (followed by the final vowel -e): *wut-a* 'become short', *wut-is-e* 'shorten'; *lond-a* 'to fill (intr.)', *lond-is-e* 'to fill (tr.)'. Reconstructing a different verb in causative *-ic-* vs. applicative *-ed-* would thus go a long way towards accounting for vowel height differences sporadically noted throughout the Bantu zone.

Now it is conceivable that the vowel height differences are due to the following degree 1 causative morph *-ic-* which obligatorily accompanied *-ic- * in FB (as in many daughter languages). A close examination of stem-internal vowels, whether suffixal or not, is of course required and has been only partially effective at the time of this writing. Other citations of differential vowel height in Bantu languages include harmonizing imperative -ik/-ek- vs. non-harmonizing static -ik- in Ndonga R.22 (Viljoen & M. 1978) and Herero R.31 (Meinhold & van Wamelo 1932:44). Since invariant applicative -i- is presumably an innovation in Cabo E.62, and since leveling of VHH is likely to hit the most productive suffixes first (e.g. the applicative and static), it is conceivable that this distinction is a secondary development. 43

If the causative and applicative suffixes are reconstructed with different vowels, they could have been subject to VHH with slight byproducts, as we have seen. However, I wish to consider the alternative hypothesis that PB did not have had stem-internal VHH at all. One area that may shed some light on these questions is the realization of suffixes (and expansions) after CV-roots. I have already alluded to the fact that differences in vowel height between the applicative and causative is sometimes attested only after a vowel, e.g. Haya EJ.22 *hê-er-a* 'give for/at' vs. *hê-er-a* 'cause to give' (from *hê-). Besides freely combining roots such as *-pa-* 'give', *-li-* 'eat', *-nê-* 'drink' etc., there are a number of frozen -CV-VC- combinations where the

- CV- "root" does not occur in and -CwVC- verbs from B. arranged by the vowel of the f

(38) a. fu-ik- (fwaik-)
   fu-is- (fwiis-)
   fu-it- (fwiit-)
   ku-ik- (kwfik-)
   ku-il- (kwfil-)
   pu-il- (pwili-)

b. fi-uk- (fuiuk-)
   fi-ur- (fuiur-)
   si-uk- (siuk-)
   si-ul- (suiul-)

c. fo-en- (fween-)
   kô-en- (kween-)
   kô-es- (kwees-)
   po-ek- (pweek-)
   pc-et- (pweet-)
   se-et- (seet-)

b. be-ol- (bool-)
   sc-ol- (solk-)
   se-ol- (solk-)
   se-on- (son-)

d. bi-al- (byaal-)
   fu-al- (fwaal-)
   fi-al- (fyaal-)
   fi-am- (fiam-)
   ku-at- (kwat-)
   ku-ad- (kwad-)
   si-al- (saaal-)
   si-am- (saaam-)
   tu-al- (twaal-)

42 Evidence that would support the tensive of a vowel immediately followed by *-i- would consist of a language in which *-i- is non-harmonizing when these two morphs occur in sequence, but harmonizing when another morph, e.g. the applicative, intervenes, i.e. *-is-il-* vs. *-es-el-* (with possible friction of the [l] of the applicative). I know of no such language. However, I am struck by the fact that *-i- tenses mid vowels that precede it in Sotho-Tswana S.30 (cf. discussion of Tsana S.31 below). The question is why *-i- does not affect the vowel of suffixes other than *-ic-* to e.g. the applicative. In my account this is because the two sequences were *-ic-* and *-ed-* respectively.

44 Ndonga apparently uses *-ik-* as its general causative, perhaps productively, whereas Herero utilizes invariant *-is-* for this purpose.
y to VHH. This process is
ares the degree 2 vowel
ction in verb extensions
as Duala A.24 (Itmann
re and stative are realized
a ‘tear (tr.)’, tìm-e-a ‘tear
allowed by the final vowel
‘a to fill (intr.)’, kònd-ìs-e
il in causative *-ìs- vs.
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in Sotho-Tswana S.30 (cf.
why *j- does not affect the
tive. In my account this is
pectively.
eneral causative, perhaps
this purpose.
-CV- “root” does not occur independently. The following list of -CyVVC-
and -CwVVC- verbs from Bemba M.42 was presented in Hyman (1995),
arranged by the vowel of the hypothetical suffix:

(38) a. fu-ìk- (fùìk-) ‘dress (tr.), clothe’ *-ðìjìk- ‘clothe’
   fu-is- (fùìs-) ‘spit’ *-tìjìd- ‘spit’
   fu-ìl- (fùìl-) ‘refuse a gift’
   ku-ìk- (kùìk-) ‘set handle on tool’ *-kùìk- ‘put into
   ku-is- (kùìs-) ‘earn’ handle’
   pu-ìl- (pùìl-) ‘sip’

b. fi-ìk- (fììk-) ‘run away’
   fi-ìl- (fììl-) ‘dislocate’
   si-ìk- (sììk-) ‘be lucky’
   si-ìl- (sììl-) ‘dig up, de-stump’ *-dìjìd- ‘disinter’

...
Since /sl/ becomes [s] only before [i] or the glide [y] in Bambang, I have included forms such as *see- 'chew' as having the intermediate structure *CyVVC-. Further evidence that this and certain other verbs from (38) have a homorhemic structure is seen from the verb pairs in (39).

(39) a. fii-ik- (fwiik-) 'dress (tr.), clothe' *diiik- 'clothe'  
   fi-al- (fwal-) 'get dressed, wear' *ddad- 'wear'  

b. si-ik- (siauk-) 'be lucky'  
   si-am- (siaam-) 'be unlucky'  

c. se-et- (seekt-) 'chew'  
   se-ol- (sool-) 'crave meat'  

d. si-ul- (siaul-) 'dig up, desump' *diiul- 'disinter'  
   si-ik- (silik-) 'bury' *diiik- 'bury'  

In both (38) and (39) I have given corresponding reconstructions from Meeussen (1960[1969]). The interesting cases are (38c,d) and (39c), where mid root vowels are involved. Three important observations should be made about these forms:

i) A mid vowel must glide before another mid vowel, e.g. /pe-et-/ → pyee- 'whimper', rather than simply fusing into a long vowel as elsewhere in the language, e.g. in imbrication (Hyman 1995).45

ii) The vowel /sl/ appears directly after the root vowel /el/, e.g. /be-ol-/ → byool- 'bech', even though Bemba is has asymmetric VHH. Bemba thus has words such as *beulk- 'knock off (work)' *tepel- 'teat', not *belok-, *tepok- etc.

iii) Although the consonant [l] appears in Bemba as the reflex of *p and *b before *l and of any obstruent before *q, the first two forms in (38c), /flee- 'hend, droop' and /fween- 'scratch', appear to require the representations given: fo-el, fo-en. Otherwise we have no explanation as to why the vowel is mid.

Of course all of the above falls into place if we abandon the requirement that vowel sequences need to show the same VHH requirements as vowels separated from each other by a consonant. In this case we can have representations such as /si-et-/, /pi-et-/, /fi-ol-/, /fiu-el-/, and /fiu-en-/. Already Meeussen (1967:18) recognized the problem:

The presence of vowel /ol/ without preceding /e/ in *pmong- ['press (out)'] and *pmor- ['stammer'] as also of lel in *tied- ['slip'] is remarkable; it would se which had not yet the Pi

By 1.7 Meeussen is is of c have plotted out all of the (1980[1969]) reconstruction

(40) Internal VV

<table>
<thead>
<tr>
<th>V1</th>
<th>V2</th>
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</thead>
<tbody>
<tr>
<td>i</td>
<td>1</td>
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<tr>
<td>i</td>
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<td>e</td>
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<tr>
<td>a</td>
<td>2</td>
</tr>
<tr>
<td>p</td>
<td>1</td>
</tr>
</tbody>
</table>

Note first that although it there is only one example, black', *pviuk- 'mature'. 46  
It be attributed to the difficul is not clear what to say ab should be contrasted with!

(41) a. *jued-
   *kued- 'y
   *puen- 's
   *tuet- 'b

It is unclear how *kt how their reflexes differ it identifed 'climb' as ko-e roots with *VV is not in disharmonic VV sequence is definitely more genera forms, it would be partic recognizable -VC- suffix mentioned by Meeussen reconstructions with *ul in

(42) a. *dj-ad-
   *djuunguk- 'tu

45Hyman & Katamba (to appear) make a similar observation for Ganda El.15.
What is also interesting about the Bemba form -pyee- is that the hypothetical extension is -Vv- and the form hence analyzed as -pc-Vv-, where V = a copy of the preceding vowel (cf. §6). Needless to say, the mid feature can only come from the first vowel.

46Guthrie (1957-1971) has of the proposed shapes of hi characterized PB.
remarkable: it would seem to suggest an earlier stage of the language which had not yet the Proto-Bantu rules given in 1.7.

By 1.7 Meeussen is of course referring to VHH. In the following table I have plotted out all of the stem-internal VV sequences in Meeussen's (1980[1969]) reconstructions:

<table>
<thead>
<tr>
<th>V1/V2</th>
<th>i</th>
<th>e</th>
<th>u</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
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<td>5</td>
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<td>a</td>
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<td>1</td>
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</tbody>
</table>

Note first that although internal long vowels occur in the reconstructions, there is only one example each involving the two degree 1 vowels: *pijita- ‘be black’, *pijuka- ‘mature’.[46] The effective absence of *ea and *ou can perhaps be attributed to the difficulty of distinguish these from *ia and *ua. While it is not clear what to say about the absence of *eo or *eu, the absence of *oe should be contrasted with Meeussen's reconstruction of both *ue and *oi:

(41) a. *-jued- ‘speak’ b. *-ccid- ‘spy’
    *-kued- ‘whistle’ *-koed- ‘climb’
    *-puen- ‘smoke’
    *-taut- ‘breathe, wheeze’

It is unclear how *-kued- and *-koed- might have contrasted in PB, or how their reflexes differ in the daughter languages. As seen in (38c), I have identified 'climb' as /ko-el/ in Bemba. While the number of reconstructed roots with *VV is not large, the table in (40) nonetheless suggests that disharmonic VV sequences were likely to have occurred in PB. Since VHH is definitely more general in CVC-VC- sequences than it is in CV-VC-forms, it would be particularly striking if we could find differences in recognizable -VC- suffixes in one vs. the other structure. The two roots mentioned by Meeussen with *jo in (42b) are contrasted with his five reconstructions with *qi in (42a).

(42) a. *-dj-uld- ‘pull out of ground’ b. *-pjom- ‘stutter’
    *-djunguk- ‘turn round’ *-pjonj- ‘squeeze out’

[46] Guthrie (1967-1971) has more, but many of these are suspect, either in terms of the proposed shapes of his common forms, or in terms of whether these forms characterized PB.
*-kwi-  "break wind"
*-tjung-  "wipe off, rub"
*-tjuk-  "shake"

As seen, the forms in (42a) all involve verbs that end in either *-ud- or *-uk-, i.e. the shapes of the transitive and intransitive reversion suffixes, respectively. On the other hand, the two forms in (42b) end in -om- and -onj-, respectively, which do not resemble suffixes. Could this be the difference, then, between the two sets of forms? The question is whether *-ud- and *-uk- behave any differently from other proto round vowels in post-radical position.

A possible answer comes from Southern Bantu. The languages of Guthrie’s zone S fall into two distinct groups from the point of view of VHH. The Shona S.10 group has asymmetric VHH exactly as other most other Savannah Bantu languages to its North, e.g. Tonga M.64, Cewa N.31b, Yao P.21. The rest of zone S lacks VHH in the front series, exhibiting, for instance, invariant applicative -el- and stative -ek-, but causative -is-. In the back series, these languages fall into two groups: Certain have VHH in the back series, where -uk- and -ul- are realized -ok- and -ol- after /o/, e.g. Venda S.21 (Murphy 1997/van Warmelo 1937) and Lozi K.21/S.34 (Gowlett 1967). To this group one can also add Makua P.31 which has invariant applicative -el- and causative -is-, but alternating u/o in the back series.47 The other group shows the same facts in the front series, but exhibits a more complex situation concerning internal [u] and [o]. Among these latter languages are Tswana S.31 and Nqetele S.44.

Tswana is typical of the Soho group in having a recently developed 9V system from the tensing of /e/ and /o/ to [ɛ] and [ɔ]. In many cases the tense variants are predictable, occurring before a following higher vowel or a consonant such as /sl/, itself derived from a following lost historical causative *-i- suffix. However, there are also instances of unpredictable tensing. The following table, based on Creissels (1996) and using his transcription, shows the plotting of the nine potential V1 and V2 vowels in CVCVC-a verb stems:

---

47 This is another sense in which Makua, despite its northerly location, belongs with the languages of zone S (cf. Janson 1991/1992 for further discussion).
hat end in either *-nd- or *-iative reverse suffixes, e.g. (42h) end in *-om- and *-ives. Could this be the Bantu Vowel Harmony? The question is whether or not "round vowel in...".

The languages of the point of view of... to other m...e. Tonga M.64, Cewa II in the front...-ek-, but the...r falling into two groups: ad *-ul- are realized *-ok- (Warmelo 1937) and e can also add Makua active *-ih-, but alternating some facts in the front...ving internal [u] and nd Ndebele S.44.

Recently developed 9V in many cases, the tense...ing higher vowel or a lowering lost historical loss of unpredictable (1996) and using his...V1 and V2 vowels in

<table>
<thead>
<tr>
<th>V1V2</th>
<th>i</th>
<th>l</th>
<th>e</th>
<th>e</th>
<th>u</th>
<th>ø</th>
<th>ø</th>
<th>ø</th>
<th>ø</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>12</td>
<td></td>
<td>11</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>l</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>8</td>
<td></td>
<td>22</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ø</td>
<td>7</td>
<td></td>
<td>24</td>
<td>19</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>u</td>
<td>10</td>
<td></td>
<td>14</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>ø</td>
<td>3</td>
<td>10</td>
<td>24</td>
<td>3</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>ø</td>
<td>25</td>
<td>6</td>
<td>10</td>
<td>52</td>
<td>3</td>
<td>64</td>
<td></td>
<td></td>
<td>51</td>
<td></td>
</tr>
</tbody>
</table>

Note, first along the top left/bottom right diagonal, that any vowel can be followed by itself, a property that is typical of Southern Bantu, despite other constraints. In addition, of the 68 verbs having the shape CVCVC-a, 52 are causatives, i.e. CVCVC-a. Degree 2 /l/ mostly occurs after itself, but also after /l/. Since /e/ and /i/ differ only in secondary tensing, if we combine their numbers we see that 195 V2 vowels are mid vs. only 58 /l/ and 13 /l/.

The back series shows something quite different. Although /a/ has a very general distribution, tense /a/ occurs only after back vowels, /ø/ also occurs generally, though not after /l/. One possibility is that CVCVC-a derives from *CVC-C-, since internal /l/ otherwise occurs only after /l/. Finally, note that /ø/ and /ø/ occur only after an identical mid vowel. This last fact suggests vowel harmony in the back series. However, we also see that contrasting with the 6 cases of CoCoC- and 16 cases of CoCoC- are 23 entries with CoCoC-. In other words, back VH appears to occur in about 50% of the relevant verb forms. We, thus, obtain verbs such as thi[b]j'a 'desesperar (intr.)' as well as thi[b]j'a 'peler (intr.).' If we plot out these 45 verbs as a function of the consonant that follows the /l/, /l/ or /ø/, we obtain the following results:

(44) /ø/ + /ø/ in Tswana CVCVC-a Verb Stems

<table>
<thead>
<tr>
<th>CVCVC</th>
<th>All</th>
<th>l</th>
<th>X</th>
<th>t</th>
<th>k</th>
<th>k</th>
<th>k</th>
<th>s</th>
<th>ts</th>
<th>ntsh</th>
<th>lh</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoCoC</td>
<td>16</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CoCoC</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CoCoC</td>
<td>23</td>
<td>13</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We are concerned with CVCVC-a verb stems whose last C is /l/ or /ø/. Only 4 out of 22 CoCoC-a or CoCoC-a verbs end in one of these two consonants vs. 19 out of 23 CoCoC-a verbs. In addition, a combined search of CVCVC-a and longer verbs turned up 60 CoCoC or CoCoC sequences of which only 3 were CoCo (and none CoCo) vs. 46 cases of CoCoC, of which 31 had the sequence CoCo. In other words, the sequence CoCo in numbers CoCo ten to one! This cannot be accidental.
The picture is even clearer in the 5V Nguni S.40 languages, where similar distributions are found. Within this group I shall briefly consider only Ndebele S.44, based on the CBOLD version of Pelling (1971). The first two vowels of CVCVC... verb stems are plotted in (45).

(45) \[ V_1 + V_2 \text{ in Ndebele CVCVC... verb stems} \]

<table>
<thead>
<tr>
<th>( V_1/V_2 )</th>
<th>i</th>
<th>e</th>
<th>u</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>92</td>
<td>42</td>
<td>8</td>
<td>(2)</td>
<td>36</td>
</tr>
<tr>
<td>e</td>
<td>28</td>
<td>99</td>
<td>67</td>
<td>(1)</td>
<td>26</td>
</tr>
<tr>
<td>u</td>
<td>29</td>
<td>45</td>
<td>141</td>
<td>---</td>
<td>35</td>
</tr>
<tr>
<td>o</td>
<td>19</td>
<td>27</td>
<td>36</td>
<td>75</td>
<td>21</td>
</tr>
<tr>
<td>a</td>
<td>52</td>
<td>80</td>
<td>107</td>
<td>---</td>
<td>127</td>
</tr>
</tbody>
</table>

As seen, both \( i/i \) and \( /e/ \) occur frequently after all root vowels. This isn't surprising, given that the causative suffix is invariant -is- and the applicative and stative suffixes invariant -ei- and -ek-, respectively. Of 220 verbs that begin CVCVC-, only 21 have neither the root vowel \( i/i \), nor have \( /i/ \) following the \( V_2 /i/ \). The back series, on the other hand, clearly shows, first, that \( /o/ \) occurs only after root \( /o/ \). However, \( /u/ \) may also occur after root \( /o/ \). Upon closer inspection of the data in (46), however, we note that the \( C_3 \) consonant plays an important role in predicting whether the form will be CoCuC... or CoCoC...:

(46) \[ \text{CoCuC.../CoCoC... in NdebeleVerb Stems} \]

<table>
<thead>
<tr>
<th>CVCVC</th>
<th>All</th>
<th>l</th>
<th>k</th>
<th>b</th>
<th>d</th>
<th>m</th>
<th>n</th>
<th>ng</th>
<th>nq</th>
<th>s</th>
<th>fh</th>
<th>tsh</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoCuC</td>
<td>75</td>
<td>10</td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>CoCoC</td>
<td>36</td>
<td>27</td>
<td>9</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

As seen, all 36 CoCuC... verb stems have either the shape CoCu... or CoCoak... CoCoak... tends to vary. Particularly noteworthy is the fact that 28 verbs have the shape CoCoz. Why should this be?

In order to address this question, let us take a closer look at the distribution of vowels in verb stems that begin with the sequence CVCVz.... The results are displayed in (47).

(47) \[ V_1 + V_2 \text{ in Ndebele CVCVz... verb stems} \]

<table>
<thead>
<tr>
<th>( V_1/V_2 )</th>
<th>i</th>
<th>e</th>
<th>u</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>23</td>
<td>7</td>
<td></td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>e</td>
<td>---</td>
<td>34</td>
<td>8</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>u</td>
<td>---</td>
<td>5</td>
<td>28</td>
<td>---</td>
<td>10</td>
</tr>
<tr>
<td>o</td>
<td>---</td>
<td>1</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>a</td>
<td>5</td>
<td>10</td>
<td>13</td>
<td>---</td>
<td>45</td>
</tr>
</tbody>
</table>

A number of imp as elsewhere, a posits an identical preceding CoCoz and CoCa are i postradical ez appear and /of/. In fact, there /of/ is followed by ez. verb sondel-a 'go n applicative. If this is answer, I believe, der modify stem-vowel s with respect to the t C’tC-Co. We also hy noting especially that thus, like to sugg pronouced CoCeZ-rounding. Note that associated with cause some confusion wit harmony. It was not shape CoCo... (vs. 2 six of these 10 verbs a

(48) a. dondoloze
gomboloze
londoloze
mpompol
nyankolo
zongoloze
b. godol-\( a\)
kopel-\( a\)
lobel-\( a\)
qobel-\( a\)

Further, of the four ve others may be de-ideo that the reversive tra CoCul- forms. The f shape -olo-, but rat database: phephuloz
blakuluz-\( a\) 'annoy, i:
A number of important observations can be made from this table. First, as elsewhere, a postradical vowel seems always able to immediately follow an identical preceding root vowel. Hence, the sequences iCiz, eCez, uCuz, oCoz and aCaz are all found in relative abundance. Second, we see that postradical ez appears after all root vowels, though less frequently after /u/ and /o/. In fact, there is only one example, sedez-a ‘bring near’, where root /oi/ is followed by ez. This verb is clearly a causative of the corresponding verb sendel-a ‘go near’, where the el sequence may itself be a frozen applicative. If this is so, why aren’t there more examples of CoCez? The answer, I believe, derives from the tendency of S.30 and S.40 languages to modify stem-vowel sequences that disagree in roundness. We already noted with respect to the table in (43) that Tswana lacks CiCuC-, CiCuC- and CiCoC-. We also hypothesized that the latter has been replaced by CiCiC-, noting especially that postradical [i] occurs mostly after root /u/. I would, thus, like to suggest a similar scenario here: What would have been pronounced CoCez- is instead realized CoCez-, i.e. with agreement in rounding. Note that this latter form ends in [z], which is elsewhere associated with causative *-j-. What this means is that one might expect some confusion with CoCu- forms, which normally do not undergo harmony. It was noted in (46) that 10 verbs occur in the database with the shape CoCol... (vs. 27 verbs of the shape CoCol...). As seen now in (48a), six of these 10 verbs are further “extended” by [oz]!

(48) a. dondolozel-a ‘go along with a staff’
gombolozel-a ‘encircle, surround’
londoloza ‘take care of, look after’
mpompoloza ‘talk boisterously’
nyonkoloza ‘scowl, gloom at’
zongolozel-a ‘wind round, wind up’

b. godol-a ‘cold, feel the cold’
kpokol-a ‘peck at’
lobol-a ‘give lobolo [bride price]’
qobol-a ‘cuff gently on the head’

Further, of the four verbs in (48b), one is clearly denominal (lobol-a), while others may be de-ideophonic (see below) or borrowings. It is, therefore, clear that the recursive transitive should be invariant -ul- in Ndebele, even in CoCu-ul- forms. The forms in (48a) should therefore not have the extension shape -oloz-, but rather -uloz-, as in the three examples occurring in the database: phophuluz-a ‘blow away’, huguluz-a ‘take, appropriate’ and hlukuluz-a ‘annoy, intimidate’. Thus, the development of oz from ez by
assimilation to a preceding /l/ has caused a realignment—and perhaps introduced VHH in the back series in Ndèbele.48,49

Assimilation may not be the only source of the discrepancy between CoCuC- and CoCoC-. Recall from (46) that there are 9 CoCuC- verbs in Ndèbele vs. 5 CoCoC-. Since our contention is that the former set is "regular", showing a direct reflex of reverse transitive "-uk-", it is significant to note in (49) that all but one of these verbs has a corresponding reverse transitive in -ul:

(49) hotsh-uk-a ‘get pulled out’
    mony-uk-a ‘slip out’
    ngecom-uk-a ‘come out, slip out’
    ngeoh-uk-a ‘get plucked/pulled out’
    nyem-uk-a ‘slip (knot), get pulled’
    phot-uk-a ‘get round’
    qoth-uk-a ‘get rubbed off’
    yoc-uk-a ‘get taken off (skin)’

hotsh-ul-a ‘pull out’
mony-ul-a ‘pull out’
ngcom-ul-a ‘pull out’
ngcoh-ul-a ‘pluck/pull out’
nyom-ul-a ‘slip out knot’
phot-ul-a ‘grind mealies’
qoth-ul-a ‘rub smooth’
yoc-ul-a ‘tear skin off’

48 Of perhaps potential significance to this problem is the fact that semantically related verbs exist with similar forms that cannot exactly be derived from each other. We have cited the verb zengelezel-a ‘wind round, wind up’ in (48). Seven other verbs occur in Pelling (1971) that begin with a VNg... sequence: zeng-a ‘just’, zengel-a ‘hurt, persecute’, zengelez-a ‘go round’, zengelez-a ‘encircle, surround’, zungenel-a ‘encircle’, zunger-a ‘sway, wave (tr.)’, zungerel-a ‘sway (intr.).’ As seen, there appears to be a relatedness, even though the root vowel varies between [e], [u] and [u]. Given the restrictions on vowel sequencing in Ndèbele, it would not be without interest to investigate how the suffix might have affected the root vowel, rather than the reverse.

49 One other issue not mentioned is the potential interaction of reduplication with VHH. In a language with canonical VHH such as Canda EJ:12, the full reduplication of a verb such as kol-å ‘do’ as kolā-kola will mean that an [a] follows an [a], which is disharmonic. We can easily ignore such cases (also in languages where verb stem reduplication is limited to two syllables). However, most Bantu languages have roots that begin with what appears to be the reduplication of the first root syllable, e.g. Ndèbele xoxxenela ‘stand on tiptoe’. To test whether this factor might contribute to the occurrence of CoCoC... verbs, I did the following count of C\textsubscript{1}V\textsubscript{1}C\textsubscript{2}V\textsubscript{2}C... verbs for the 5 vowels in Ndèbele. The results are as follows:

<table>
<thead>
<tr>
<th>V1 V2 V3</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>C\textsubscript{i}C\textsubscript{j}C\textsubscript{c}</td>
<td>7/92 (8%)</td>
<td></td>
</tr>
<tr>
<td>C\textsubscript{i}C\textsubscript{j}C\textsubscript{c}</td>
<td>12/99 (12%)</td>
<td></td>
</tr>
<tr>
<td>C\textsubscript{i}C\textsubscript{j}C\textsubcript{c}</td>
<td>22/271 (8%)</td>
<td></td>
</tr>
</tbody>
</table>

48 Of perhaps potential significance to this problem is the fact that semantically related verbs exist with similar forms that cannot exactly be derived from each other. We have cited the verb zengelezel-a ‘wind round, wind up’ in (48). Seven other verbs occur in Pelling (1971) that begin with a VNg... sequence: zeng-a ‘just’, zengel-a ‘hurt, persecute’, zengelez-a ‘go round’, zengelez-a ‘encircle, surround’, zungenel-a ‘encircle’, zunger-a ‘sway, wave (tr.)’, zungerel-a ‘sway (intr.).’ As seen, there appears to be a relatedness, even though the root vowel varies between [e], [u] and [u]. Given the restrictions on vowel sequencing in Ndèbele, it would not be without interest to investigate how the suffix might have affected the root vowel, rather than the reverse.

My hypothesis is that ideophones of the shape verbalized with intransitive down (intr.) and wohi (1971) does not have an does appear in the dieti collapsing’, which is el words, there is a potential CoC-uk-a vs. CoCoC-a.

Ideophones are widely can be assumed to have are also known to produce which has canonical (asy of C\textsubscript{e}C\textsubscript{e}C-c harmonic in

(50) bbhok-a ‘get pi
    phoko-a ‘snap
    wohiok-a ‘fall’
    phohlok-a ‘get bi
    tshopok-a ‘sprin

My hypothesis is that ideophones of the shape verbalized with intransitive down (intr.) and wohi (1971) does not have an does appear in the dieti collapsing’, which is el words, there is a potential CoC-uk-a vs. CoCoC-a.

Ideophones are widely can be assumed to have are also known to produce which has canonical (asy of C\textsubscript{e}C\textsubscript{e}C-c harmonic in

(51) a. chen-\textsubscript{i}m-a
    chezi-\textsubscript{e}m-a
    nyet-\textsubscript{i}m-a
    nyeti-\textsubscript{i}m-a
    phezi-\textsubscript{e}m-a
    yet-\textsubscript{i}m-a
    c. tseji-\textsub{il}-\textsub{a}

As seen, the six verbs (51b), which have the remains an unaccounted bissylabic stem shape, Cb.

The verbs in (51) constitute a well-defined the case. One of the r

50 As seen, there is an i consonant of the root.

51 This result should cause whose limited VHH resen
god-uk-a 'depart, die of old age'

By contrast, none of the CoCoX- verbs has a corresponding CoCo-.
Instead, four have a corresponding transitive of the form CoCoZ-

(50) bhobok-a 'get pierced'    bhoboz-a 'break'
    phoqo-k-a 'snap in two (intr.)' phoqoz-a 'snap in two (tr.)'
    wohlo-k-a 'fall/shower down' wohloz-a 'shake down (tr.)'
    phohlo-k-a 'get broken, smashed' bohozo50 'break, smash'
    tsho:pok-a 'spring (intr.)'

My hypothesis is that these verbs derive historically from bisyllabic ideophones of the shape CoCo. These ideophones would have been verbalized with intransitive -k- and transitive -z-, hence wohlo-k-a 'shower down (intr.)' and wohlo-z-a 'shower down (tr.)', etc. Although Pelling (1971) does not have an extensive list of such ideophones, one relevant form does appear in the dictionary: wohlotelo 'ideophone expressing idea of collapsing', which is clearly related to the two verbs just cited. In other words, there is a potential difference in morphological segmentation between CoC-uk-a vs. CoCo-k-a.51

Ideophones are widespread in Bantu, particularly Southern Bantu, and can be assumed to have existed quite early in Bantu linguistic history. They are also known to produce disharmonic verb forms. Thus, in Cewa N.31b, which has canonical (asymmetric) VHH, the following are the complete set of CoCiC- disharmonic verbs in the CBOLD database for that language:

(51) a. cheni-m-a 'to shine'    b. cheni-m-a 'shining' (ideo.)
    chezi-m-a 'to shine'    chezi 'shining' (ideo.)
    nyeti-m-a 'to shine'    nyeti 'shining' (ideo.)
    nyzei-m-a 'to shine'    nyzei 'shining' (ideo.)
    pheni-m-a 'to shine'    pheni 'glittering; truly'
    yeti-m-a 'to glitter'    yeti 'shining; glistening'

c. tenjilj-a 'to disappear, be out of sight'

As seen, the six verbs in (51a) all derive from bisyllabic ideophones in (51b), which have the shape CeCi. (The one disharmonic verb in (51c) remains unaccounted for exception.) Although CeCi is an acceptable bisyllabic stem shape, CeCiC-V is disharmonic.

The verbs in (51) suggest that disharmonic (de-ideophonic) verbs constitute a well-defined semantic class 'shining' in Cewa. This need not be the case. One of the most extensive documentations of ideophones is

50As seen, there is an irregular correspondence in the voicing of the initial consonant of the root.
51This result should cause one to reponder the conclusion drawn from Capa E.62, whose limited VHH resembles the $30-5.40 situation in obvious ways.
available from Shona S.11, just to the south of Cewa N.31b. Fortune (1962) indicates that almost every verb has a corresponding ideophone in Shona. Shona, like Cewa, has canonical VHH. While there is significant dialect variation, (52) provides a representative sampling of disharmonic verb stems of the shapes CoCiC- and CoCuC- and their corresponding ideophones (Hannan 1987):

(52) De-ideophonic verbs in Shona and their source ideophones
a. CoCiC- verbs

bóidza
chómwira
 dórika
dórinha
kóira
körofika
kótisidza
kotsira
ngóndika
nyobidza
nyobika
pfórída
pfóríka
tóira
tórika
tsonwidza
tsonwira

bóí bóí ideo. of blinking
chomwí ideo. of swallowing without chewing
dórí dórí ideo. of hopping (esp. non-flying insects)
dórí dórí ideo. of running, trotting
ekóí kóí ideo. of copulating
kóróí kóróí ideo. of hoieving lazily
kotsí ideo of nodding with sleep
kotsí ideo of nodding with sleep
ngúndí ideo of bending forwards (tail object)
nyóbí nyóbí ideo of bobbing (float on fishing line)
nyóbí nyóbí ideo of bobbing (of float on fishing line)
pfórí ideo of falling fast asleep, going astray
pfórí ideo of falling fast asleep, going astray
tóí tóí ideo of flickering (esp. in distance)
tóí tóí ideo of hopping (insects)
tsómi ideo of swallowing sth difficult
tsómi ideo of swallowing sth difficult

As seen, the id Co(C)i. Derived intr. Co(C)i,k-, while the as their verbalizing inhibited, either gener a corresponding Co(C)

In fact, disharmonic nominal (usually de-a

(53) a. -géz-w-
-genyi-w-

b. -égi-w-
kópí-w-a

c. -zito-w-

In these examples, ve (al), a direct reflex of CeCi-w..., while those also disharmonic, is de
disharmonously disharmon DJ.53 zido-h.; Yao P.

In studies on VHH as such scholars typic stative, causative and easily isolable, morp
disharmonic verb base examples just consi

t

52 On the other hand, if Co(C)iC- verbs whose are indicated as “bore to surface” (Englis,

bóimurá
bóimuká
hópuka
hóura
kóbyudza
kóbyuka
kórumuka
bark
turn (oxen)
be lii
be lii (heav
bark
make
grow
turn r
(oxen)
### Bantu Vowel Harmony 287

**Cewa N.31b.** Fortune ephoning ideophone in ile there is significant apling of disharmonic d their corresponding ideophones

<table>
<thead>
<tr>
<th>Verb</th>
<th>Meaning</th>
<th>Transitive Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>hómura</td>
<td>bark (baboon)</td>
<td>hómú ideo. of barking (baboon)</td>
</tr>
<tr>
<td>hómuka</td>
<td>turn (inspanded oxen)</td>
<td>hómú inter. turn (to inspanded oxen)</td>
</tr>
<tr>
<td>hópuka</td>
<td>be liftable, movable (heavy obj.)</td>
<td>hópu inter. pull (to oxen)</td>
</tr>
<tr>
<td>hóari</td>
<td>bark (dog)</td>
<td>hóu ideo. of barking (dog)</td>
</tr>
<tr>
<td>kóbvuda</td>
<td>make thick</td>
<td>kóbvú adj. thick</td>
</tr>
<tr>
<td>kóbvuka</td>
<td>grow thick</td>
<td>kóbvú adj. thick</td>
</tr>
<tr>
<td>kónuma</td>
<td>turn right round (oxen)</td>
<td>kónuma ideo. turn! (to oxen); cf. homu</td>
</tr>
</tbody>
</table>

As seen, the ideophones in question have the shapes Co(C)j-k and Co(C)u-k. Derived intransitive verbs generally have the shapes Co(C)j-u-k and Co(C)u-j-k, while the corresponding transitive may have use -r-, -dz- or -s- as their verbalizing consonant. What’s important is that VHII may be inhibited, either generally or dialectically, by virtue of a verb’s relationship to a corresponding Co(C)j or Co(C)u ideophone in Shona.22

In fact, disharmonic verbs can not only be ideophonic, but also denominal (usually de-adjectival), as in Ganda EJ.15 (Hyman 1994):

#### (53)

**a.**
- -gézi-w-al- `grow wise'  
  -genyi-w-(al)- `visit'  
  cf. -gézi `wise'  
  cf. -genyi `visiting'

**b.**
- -gézi-w- `grow sharp'  
  cf. -gó `sharp'

**c.**
- -zóti-w- `be heavy'  
  cf. -zóti `heavy'

In these examples, verb bases are derived from adjectives by suffixing -w-(al), a direct reflex of PB *-p-(ad). The data in (53a) show forms that begin CeCi-w..., while those in (53b) begin CoCi-w- In (53c) the verb -zóti-w-, also disharmonic, is derived from the adjective -zóti `heavy' (PB *-dji). It is frequently disharmonic in Bantu languages with canonical VHH (cf. Shi DJ.33 zóti-h-; Yao P.21 -sóti-p-).

In studies on VHII such derivational relationships are often overlooked, as such scholars typically privilege the alternations found in the applicative, stative, causative and other “alternating” suffixes. While these forms are easily isolable, morphologically, they show in language after language that disharmonic verb bases can and do co-exist along side canonical VHH. The examples just considered involve “exceptional” non-harmonizing forms.

---

22 On the other hand, Hannan (1987) includes a smaller number of Co(C)iC- and Co(C)uC- verbs whose corresponding ideophone is not provided. Some of these are indicated as borrowings, e.g. kénsa `enjoy' (<Nguni), périsa `apply polish to surface' (<English), kumbura `complain' (<English).
the discussion of CoCo... verbs in Ndebele, where we instead have "exceptional" harmony, it was suggested that the existence of ideophones of the shape CoCo might be sought as a partial explanation for some of the observed facts. In other words, de-ideophonic, de-nominal and, ultimately, borrowed verbs, should be carefully considered for their potential relevance in determining the rise and fall of VHH in Bantu.

6. Conclusion

In the preceding sections we have taken a close look at VHH as it is realized throughout the Bantu family. We have considered a number of issues on which VHH depends, including the distribution of the features that define both canonical and non-canonical VHH throughout the Bantu zone. We have also considered the nature of the PB vowel system, specifically, how different interpretations of it might intersect with the job of reconstructing the historical development (and loss) of VHH in the various branches and individual languages. While virtually everything said here must be taken as tentative, I hope to have at least mapped out some of the broad issues with which we must still contend. As seen particularly in §5, this study has led us to take a close look at the distribution of vowels not only within the derived Bantu stem, where most attention on VHH has focused, but in non-derived verb and noun stems as well.

While this study has confirmed many of the prior observations made about VHH in different Bantu languages, I have, however, speculatively, parted company with majority views in certain of my conclusions. First, I have suggested that VHH did not exist in PB—at least not as usually cited with derivational suffixes such as the applicative, stative, causative, revesive etc. Second, in order to account for their differential realization across languages, I have proposed to reconstruct some of these latter suffixes with degree 3 vowels, e.g. applicative *-ed- and stative *-ek- vs. causative *-ic-i-, revesive intr. *-uk-, and revesive tr. *-ud-. In my view, VHH is so often asymmetric in the front vs. back series because of a different in starting point: *-ed- and *-ek- begin as degree 3 vowels, while *-uk- and *-ud- begin as degree 2 vowels. Front height harmony thus involves a raising of *e to degree 2 [i] by a process of "peripheralization", inhibited by the presence of a preceding mid vowel (as well as by /a/ in parts of zones K and R. Back height harmony, on the other hand, involves the lowering of *u to degree 3 [u] by assimilation to a preceding [o]. The fact that causative *-ic-i- sometimes joins *-ed- and *-ek- in its harmony properties, and sometimes doesn’t, is accounted for by reconstructing *-ic- with a degree 2 vowel.

Looking at more specifically, I would claim that these derivational suffixes did not harmonize in PB. That is, they had the same behavior as we suppose both for the inflectional final vowel morphemes *-i- and *-e- and their derivational counterparts, e.g. *-i- and *-e- etc. This prior resemblance must certainly have something to do with the tremendous temptation

Bantuists have had to vitr (modem: intransitive-reconstructed vowels) to transitive *-d- combines transitive revesives, and peripheralization process might not have gotten set vowel *-a was added to demarcated inflectional c possible interpretation of possible factoring out of * of the vowel of the deverb causative *-j-. Could th Consider also the resemb adjectival nominalizer *-i longer passive *-ib-un- w- meaning of ‘make do’ an vowel’s also account for *-j- and passive *-u- may Whatever the answer that there is no apriori n derivational suffixes, wh usually been done. Since *-uk-, one might reason different in this way in P fact that *-aC- suffixes *-ec- and *-ic- suffixes between two types of *e* to be good reason to m productive suffixes such reciprocal *-an-; (ii) rel *-uk- and *-ud-; and (iii) this typology *-uk- and between expansions at variation, they often art root, which in most case the verb stem, *-uk- an valence requirements a Thus, in this medial pe restriction of having to*

53 I know that the conson from PB *t in all l
54 See Hyman & Katimh
Bantu Vowel Harmony 289

Bantuists have had to view certain or all of the derivational suffixes as homophonic: Intransitive *-k- combines with both *-c- and *-u- (my reconstructed vowels) to form statives and intransitive reversives, while transitive *-d- combines with these same vowels to form applicatives and transitive reversives, and so forth. If front height harmony is largely a peripheralization process (*e > i), as I have suggested, then the process might not have gotten seriously under way until after the ubiquitous final vowel *-a was added to all verb forms lacking an otherwise clearly demarcated inflectional ending (cf. Grégoire 1979 for discussion of this possible interpretation of PB). We Bantuists are struck not only by the possible factoring out of *-d-, *-k-, etc., but also by the striking resemblance of the vowel of the deverbal (e.g. agentive) nominalizer -i with the vowel of causative *-j-. Could this latter have been a "final vowel" morpheme? Consider also the resemblance between passive *-u- and the deverbal (e.g. adjectival) nominalizer *-j. Maybe the longer causative *-ic-i- and the longer passive *-ib-u- were once derivatives of a verb such as 'do', with meaning of 'make do' and 'being done'?

Whatever the answer, what is important for the purpose of this study is that there is no a priori reason to reconstruct the same vowel height on all derivational suffixes, which, with the exception of the Meinholz school, has usually been done. Since I have reconstructed *-ed- and *-ek- vs. *-ud- and *-uk-, one might reasonably ask why these vowel heights might have been different in this way in PB? If non-accidental, I would seek an answer in the fact that *-uc- suffixes are more tightly bound with their radical than are *-uc- and *-ic- suffixes. Although Meuissen (1967) and others distinguish between two types of "extension" (suffix vs. expansion), there seems in fact to be a good reason to make at least a three-way distinction: (i) relatively productive suffixes such as applicative *-ed-, causative causative *-is-i- and reciprocal *-an-i-; (ii) relatively unproductive suffixes such as the reversives *-uk- and *-ud-; and (iii) unanalyzable expansions (see next paragraph). By this typology *-uk- and *-ud- fall in the second category, i.e. somewhere between expansions and productive suffixes. Although there is some variation, they often are restricted to occurring immediately after the verb root, which in most cases cannot occur without a suffix. Coming "early" in the verb stem, *-uk- and *-ud- may also be followed by other suffixes, if valence requirements are met, e.g. the applicative, reciprocal, passive, etc. Thus, in this medial position, they might have been subject earlier to the restriction of having to be [+high].

53I know that the consonant of the causative suffix cannot be regularly derived from PB *-t in all languages, but once proposed that *-ic- could be related to *-kit- 'do'.

54See Hyman & Katamba (1990) for further discussion and exemplification.
My view, then, is that stem-internal VHH was not fully formed in FV, and that the verbal derivational suffixes should be reconstructed with more than the three vowels *i, *u and *a. As I have pointed out, most work on VHH has focused on these derivational suffixes, which have often been synchronically represented as degree 2 vowels or as the archiphoneme /W and /U/. Contrast this with the frozen “expansions” reconstructed by Meeussen (1967) in (54).

\[(54)\]
\[
a. *-i, *-im, *-un, *-ing
\]
\[
b. *-ang, *-ab, *-og, *-ak
\]
\[
c. *-im, *-om, *-ong
\]
\[
d. *-ut
\]

(these occur only after CV-)

What is most striking about the above array is, first, how many degree 1 vowels there are in the expansions in (54a), and second, how utterly lacking degree 1 vowels are in derivational suffixes (except causative *-e). (54b) shows that *e also appears to be prevalent in expansions, just as it is in derivational suffixes, e.g. in the productive reciprocal suffix *-an, *-reciprocal and the usually non-productive positional *-am (which, however, does occur as a productive passive suffix in certain areas, e.g. in Mongo C.60).

My contention is that the only overlap between expansion vowels and derivational extension vowels is *a. I must therefore address the expansions in (54d), which are purported to contain a degree 2 or 3 vowel. First, as indicated, *-im, *-om and *-ong occur only after a CV- “radical.” It is therefore not clear that they should be compared with derivational suffixes, which of course appear after all verb bases. In any case, note that the expansions *-om- and *-ong- are reconstructed with a degree 3 vowel: the degree 2 Meeussen proposes for *-uk- and *-ut-. This leaves the expansion *-ut- in (54d).

In order to determine the synchronic status of this proposed expansion, I have searched for CVCut- verb stems in several languages for which CBOLD has on-line dictionaries: Nande DJ.42, Kiga ED.14, Pende L.11/K.32, Bembu M.42, Cewa N.31b, Yao P.21, Makua P.31, Kalanga S.16, Venda S.21, Ndebele S.44. What I have found is that except for *-kus- “be satisfied (with food),” which may contain an historical reflexive *-i, almost all such verbs exhibit an initial CuCut-sequence (exception each in Pende, Makua, Kalanga and Venda; 3 exceptions in the large Kiga corpus). This is consistent with the overall distribution of CVCut/, which is relatively insensitive to the second vowel to agree with the first. There are verbs that have the shape CVCut-) I therefore do not know on what basis Meeussen arrived at the reconstruction of an *-ut- expansion.

Instead, expansion vowels, where they are determinable, do not generally reconstruct with either degree 2 or degree 3 vowels, rather with *i, *u and *a. In other words, they are subject even more to the peripheralization process that clearly affects stem-internal vowels, i.e. what I have called the “prosodic trough.” Expansion vowels are also more subject to assimilation to the preceding (root) vowel than are suffixal vowels. Thus, many of these, including those reconstruct completely assimilate to it process, appears to be incomb **-at-. Some verbs are realized if I am correct that expansion PB; then this obviously raise the vowels of verb suffixes *I were perhaps restricted, but it Why couldn't these same FV why did they become *i and have good examples of recog as an expansion, but with any be that the expansions *-e, *- positional *-am, *-reversive to recent completion of Banu L. to study these and related quest

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The evidence of stem.

The work of the CEELA (Centre d'Etudes Linguistiques et d'Applications) on the CEBEA (Centre de Recherches de l'Économie et des Études Afriques) has been instrumental in furthering the understanding of Bantu languages.

The influence of Benin, the wealthiest Bantu language, on the development of other Bantu languages is significant. Benin is characterized by its vowel harmony, which is a distinctive feature of Bantu languages.

The contribution of Tervuren, the Musée Royal de l'Afrique Centrale, to the study of Bantu languages cannot be overstated. Their comprehensive collection of artifacts and documents has been invaluable in the research of Bantu linguistics.

The book "Bantu Language Systems" by Heine and Depauw provides a comprehensive overview of the grammatical structures of Bantu languages. It is a valuable resource for anyone studying Bantu linguistics.

The work of Hyman and his colleagues on vowel harmony in Bantu languages is particularly noteworthy. Their research has shed light on the complex morphological and phonological systems of Bantu languages.

The concept of vowel harmony has been studied extensively in Bantu languages. It is a feature where the vowel of a syllable is determined by the vowel of the preceding syllable. This feature is found in many Bantu languages and is a key aspect of their phonological system.

The study of vowel harmony in Bantu languages has important implications for understanding the evolution of Bantu languages and their relationship with other language families.

In conclusion, the study of Bantu linguistics is fundamental to understanding the rich linguistic diversity of Africa. The work of scholars like Heine, Depauw, Hyman, and others has provided valuable insights into the complex systems of Bantu languages.

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